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Adaptation preparedness scoreboard Country fiches

Accompanying the document

**REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND
THE COUNCIL**

on the implementation of the EU Strategy on adaptation to climate change

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Note to the Reader

This Staff Working Document collects the adaptation preparedness scoreboard country fiches for each Member State. Under Action 1 of the EU's Strategy on adaptation to climate change (COM(2013)216), in collaboration with the Member States, the Commission developed an 'adaptation preparedness scoreboard'. Using the scoreboard, the Commission prepared country fiches on each Member State in an iterative consultation process.¹ The country fiches assess the Member States' adaptation policy, including the content of NASs and plans, for the following aspects:

- Institutional structure
- Quality of national vulnerability assessments
- Knowledge creation (national observation systems in relevant sectors² and climate modelling), transfer and use
- Action plans:
 - Quality (incl. the basis used for assessment of adaptation options)
 - Actual implementation mechanisms
- Funding mechanisms
- Mainstreaming into sectoral policies, in particular:
 - Disaster risk reduction
 - Spatial planning
 - Environmental impact assessment (EIA) (how the Directive is transposed)
 - Insurance policy
- Transboundary cooperation
- Monitoring mechanisms in different sectors and governance levels

The fiches are based on internal work by the Commission and on targeted assistance from an external contractor. They also served as input to the assessment of Action 1 of the Strategy during its evaluation. Annex IX of the Commission's linked SWD on the evaluation of the Strategy presents a horizontal assessment of the 28 country fiches, while Annex X presents the list of scoreboard indicators and the methodology used in applying them.

The assessments in the country fiches (yes/no/in progress) need to be read in conjunction with the narrative that accompanies them. They assess the state of play within each EU Member State. While all effort has been made to ensure the coherence across fiches in the assessment of the same indicator, it should not be directly compared across the Member States. Two countries with a "yes" on the same indicator could have a different national situation leading to that assessment. Not all indicators have the "in progress" status, some can only be "yes" or "no".

¹ The first versions of the fiches, prepared in consultation with the Member States in 2014-15, were unpublished and used to fine-tune the scoreboard. The second drafts were published, after consulting the Member States, as background documents to the public consultation on this evaluation in December 2017. https://ec.europa.eu/clima/consultations/evaluation-eus-strategy-adaptation-climate-change_en The final Member State consultation on the draft fiches took place in June 2018.

² These relate for example to meteorology, floods, drought, sea level, coastal erosion, biodiversity, human/animal/plant health etc.

Adaptation preparedness scoreboard country fiche for Austria

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List of abbreviations

ACRP	Austrian Climate Research Programme
APCC	Austrian Panel on Climate Change
BMNT	Ministry of Sustainability and Tourism
CCCA	Climate Change Centre Austria
COIN	Costs of Inaction
EAA	Environment Agency Austria
EIA	Environmental Impact Assessment
EUSALP	EU Strategy for the Alpine Region
LURK	Provincial Environmental Speaker's Conference
NAP	National Adaptation Plan
NAS	National Adaptation Strategy
NGO	Non-Governmental Organisation
NUTS	Classification of Territorial Units for Statistics
PACINAS	Public Adaptation Costs: Investigating the National Adaptation Strategy
PATCH:ES	Private Adaptation Threats and Chances: Enhancing Synergies
SEA	Strategic Environmental Assessment
SKKM	Strategy for National Crisis and Disaster Protection Management
VIOLA	Violent Observed Local Assessment
ZAMG	Central Institute for Meteorology and Geodynamics
ÖREK	Austrian Spatial Planning Concept
ÖROK	Austrian Conference on Spatial Planning

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

In Austria, a national adaptation strategy (NAS) was adopted on 23rd October 2012 by the Council of Ministers and endorsed by the Provincial Governors' Conference on 16th May 2013. The Austrian NAS consists of two parts: a Strategic Framework (or "Context") and an Action Plan³. The aim of the Austrian NAS is to avoid the adverse effects of climate change on the environment, society, and the economy and to fully utilise any opportunities that may arise. The NAS aims to create a national framework to ensure coordination and harmonisation of the various climate adaptation activities in all areas. In August 2017, a revised version of the NAS was adopted by the Austrian Council of Ministers, which was subsequently also approved by the Conference of the Governor's of the Bundesländer (NUTS II) in November 2017. This new version aims to update and further develop the NAS, while preserving its overall structure.

A2. Adaptation strategies adopted at subnational levels

In Austria, the Bundesländer have legislative and executive powers (e.g. with regard to spatial planning, nature protection, transport), which are relevant to climate adaptation. The Bundesländer are also responsible for the administration, implementation and enforcement of certain federal laws at lower levels of government. Representatives from all Bundesländer were actively involved in the development of the NAS and NAP.

The Bundesländer have either developed regional adaptation strategies (Oberösterreich, 2013; Steiermark, 2015; Vorarlberg, 2016; Salzburg, 2017) or integrated adaptation and mitigation strategies (Tirol, 2015), or have integrated adaptation into existing climate mitigation strategies (Niederösterreich, 2011; Wien, 2009). Kärnten is in the process of preparing a climate adaptation strategy. In Burgenland, adaptation measures are directly integrated into sectoral programmes and strategies. The Bundesländer propose, enact and implement measures. Overall, 93.6% of the population and 88.6% of the territory of Austria are covered by sub-national adaptation strategies (with Kärnten as the only Bundesland without one).

Adaptation action plans

B1. National adaptation plan

A national adaptation plan (NAP) was adopted in 2012 (as part of the NAS) and revised in 2016 (and approved together with the revised NAS in 2017, see above). The NAP presents a catalogue of 136 adaptation options for 14 areas of action. These areas are: agriculture, forestry, water resources and water management, tourism, energy (with a focus on the electricity industry), protection from natural hazards, construction and housing, disaster risk

³ BMNT, formerly BMLFUW (2017). The Austrian Strategy for Adaptation to Climate Change. Part 1 – Context and Part 2 – Action plan. Available (in German) at: https://www.bmnt.gv.at/umwelt/klimaschutz/klimapolitik_national/anpassungsstrategie/strategie-kontext.html. Date accessed: 15/05/2018

management, health, ecosystems and biodiversity, transportation infrastructure and selected aspects of mobility, spatial planning, business/industry/trade, and cities (with a focus on urban green and open spaces).

B2. Adaptation plans adopted at sub-national level

The NAP makes reference to a range of individual Bundesländer in its 136 adaptation options, however, only Tirol and Vorarlberg have also prepared (together with their strategy) their own action plan with relevant state-specific adaptation measures⁴.

The development of local adaptation concepts and measures is supported by KLAR! – Climate Change Adaptation Model Regions⁵, a programme which was launched in 2016. Until the end of March 2017, regions and municipalities were invited to submit their applications including a basic concept to the Climate and Energy Fund, who initiated the programme in cooperation with the Ministry of Sustainability and Tourism (BMNT). Since 2018 and up until 2020, beneficiaries are now working on implementing the measures laid out in these concepts. In a third phase post-2020, the action plans and their executed measures will then be evaluated.

An increasing number of activities carried out at regional and local level can be identified already; however, these are not always explicitly labelled as adaptation. Many of these activities are fostered by applied research projects, which are financed by the ACRP (Austrian Climate Research Programme) of the Climate and Energy Fund⁶ and StartClim⁷. Examples of Bundesländer-level activities are: touristic concepts and water management measures for an important large lake in eastern Austria, research projects devoted to impacts and adaptation measures in the Alps, projects for flood risk management and spatial planning, protection of forests and habitats, and concepts for safeguards against summertime overheating of buildings in urban areas.⁸ The Austrian government has recently published a good practice guide presenting various examples of how cities and communities can implement adaptation actions⁹.

B3. Sectoral adaptation plans

A range of sectors are discussed in the NAP, as well as the Tirol action plan on adaptation and others. However, no sector-specific adaptation plans exist as of today.

⁴ Government of Tirol (2015). Klimaschutz und Anpassung an den Klimawandel in Tiroler Gemeinden. Available at: <http://www.klimaschutz-tirol.at/images/doku/gemeindemappe.pdf>. Date accessed: 15/05/2018

⁵ KLAR!-Website, URL: <http://klar-anpassungsregionen.at/>, Date accessed: 15/05/2018

⁶ Klima Energie Fonds. Climate Research Programme. URL: <https://www.klimafonds.gv.at/foerderungen/aktuelle-foerderungen/2015/austrian-climate-research-programme-2/>, Date accessed: 15/05/2018

⁷ StartClim. URL: www.startclim.at, Date accessed: 15/05/2018

⁸ BMNT, formerly BMLFUW (2017). The Austrian Strategy for Adaptation to Climate Change. Part 1 – Context, Available (in German) at:

https://www.bmnt.gv.at/umwelt/klimaschutz/klimapolitik_national/anpassungsstrategie/strategie-kontext.html

⁹ BMNT, formerly BMLFUW (2016). Unsere Gemeinden im Klimawandel: Good Practice Broschuere. Available at:

https://www.bmnt.gv.at/umwelt/klimaschutz/klimapolitik_national/anpassungsstrategie/goodpractice-broschuere.html. Date accessed: 15/05/2018

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

In Austria, the BMNT¹⁰ (formerly, BMLFUW) holds overall responsibility for adaptation policy-making (Division I/4 of the BMNT). One of its main assignments is to provide guidance by keeping the NAS and NAP updated, as well as by drafting the progress report on its implementation. The NAP is implemented in collaboration with a wide range of fellow ministries, regional government actors and sector stakeholders.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

All federal ministries were invited to join the NAS and NAP development process and to provide feedback and comments on the document via three rounds of written consultations. More precisely, the Inter-Ministerial Committee to Coordinate Measures to Protect Global Climate (IMC Climate Change) was regularly updated on the status of work towards the NAS. (According to the latest amendment of the Austrian Climate Protection Law, § 4. (2), instead of the IMC the National Climate Protection Committee is in charge of adaptation to unavoidable climate impacts. The Committee meets at least once a year and is chaired by the BMLFUW.)

Given the holistic and cross-sectoral nature of adaptation action, there is a need for horizontal coordination in the implementation phase as well. In accordance with the current division of competences (after the national election in 2017), the BMNT holds a much broader range of responsibilities as concerns areas of action in climate change. The National Climate Protection Committee is the relevant institutional body, set up by law, to provide sectoral coordination of adaptation and mitigation measures. The Austrian Spatial Planning Concept (ÖREK)¹¹, also calls for the continued organisation of ‘round table’ meetings between sectoral representatives to discuss relevant climate-related issues during the implementation of measures.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.

¹⁰ Bundesministerium für Nachhaltigkeit und Tourismus, URL: <https://www.bmnt.gv.at/>, Date accessed: 15/05/2018

¹¹ ÖROK (2011). ÖREK 2011 - Austrian Spatial Planning Concept. Available at: https://www.oerok.gv.at/fileadmin/Bilder/2.Reiter-Raum_u_Region/1.OEREK/OEREK_2011/Dokumente_OEREK_2011/OEREK_2011_EN_Downloadversion.pdf, Date accessed: 15/05/2018

Yes / **In progress** / No

The Bundesländer are highly committed to cooperating with the Federal Ministry (BMNT) on climate adaptation. Climate coordination officers/units have been installed in all provincial governments and act as the main agents of vertical cooperation with the National Ministry¹².

The Federal Ministry for Sustainability and Tourism together with all Bundesländer (decision taken by the LURK - Provincial Environmental Speaker's Conference) has established an implementation plan summarising a few specific measures to be implemented in close cooperation, as a first step. One of the decisions¹³ was the implementation of "dialogue events"¹⁴ in various Austrian cities. Twelve such dialogue events took place in 2016 and 2017.

The National Climate Protection Committee is the relevant institutional body, set up by law, to provide vertical (and sectoral) coordination of adaptation and mitigation measures.

2 Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

A broad participatory process conducted by the Environment Agency Austria (EAA) accompanied development of the NAS. The main objective of the participation process was to discuss the adaptation options identified by the scientific community (expert studies) with stakeholders from the organised public (e.g. federal and provincial ministries or related institutions, interest groups and social/environmental NGOs) for inclusion in the policy paper¹⁵.

Stakeholders were consulted during the development of the NAS via online-surveys, written feedback on policy drafts and advisory committees. Governmental stakeholders from national level and sub-national level have been actively involved. The private sector, interest groups and researchers have been consulted and information has been gathered from the general public.¹⁶

2b. Transboundary cooperation is planned to address common challenges with relevant countries

¹² Nachmany, M, S. Frankhauser, J. Davidová et al. (2015). Climate Legislation in Austria. An excerpt from: The 2015 Global Climate Legislation Study. A review of Climate Change Legislation in 99 countries. Grantham Research Institute on Climate Change and the Environment, London.

¹³ Beschlüsse der Landesumweltreferentinnenkonferenz, URL: <https://www.wien.gv.at/umweltschutz/pdf/lurk-2015.pdf>, Date accessed: 15/05/2018

¹⁴ Dialogveranstaltungsreihe 2016/2017, URL: <http://klimawandelanpassung.at/index.php?id=31609>, Date accessed: 15/05/2018

¹⁵ Climate-ADAPT (2017). Austria, Summary. Available at: <http://climate-adapt.eea.europa.eu/countries-regions/countries/austria>, Date accessed: 15/05/2018

¹⁶ BMNT, formerly BMLFUW (2014). Self-assessment survey from Austria. National adaptation policy processes in European countries. EEA, Publications Office of the European Union, Luxembourg

Yes / No

In the NAS/NAP, cooperation to address common challenges with neighbouring countries is not explicitly addressed. Nevertheless, Austria is participating in several international partnerships that are actively working on climate change and adaptation issues, although it is not clear how these interact with the Austrian strategic approach to adaptation.

Austria is a contracting Party to the International Commission for the Protection of the Danube River, which adopted a Climate Adaptation Strategy in 2012¹⁷. The Strategy is based on a thorough assessment of possible climate impacts and suggests possible means to adapt to and mitigate them.

Austria is also a member country of the Alpine Convention, a framework that sets out general measures for sustainable development in the Alpine region. A ministerial declaration¹⁸ on climate change was adopted in 2006, followed in 2009 by an action plan¹⁹ of measures for the Alpine region to contribute to the reduction of emissions affecting the climate and the development of strategies to adapt to a changing environment. Within the Alpine convention, guidelines have been developed on local climate adaptation in relation to water management and natural hazards in the Alps²⁰. In addition, the recently established Advisory Committee on the Alpine Climate (Alpine Climate Board)²¹ under the Alpine Convention gathers climate change specialists from the eight Alpine States and observer organisations. It aims to bundle the current contributions of the Alpine Convention to climate mitigation and adaptation. The Board will prepare recommendations for future reinforced action, for the attention of the next Alpine Conference in 2018, with the establishment of a climate-neutral Alpine space 2050 as the overarching goal.

A shared task of all Alpine countries is to intensify research work on the consequences of climate change. Joint activities are taking place in the EU Strategy for the Alpine Region (EUSALP) in Action Group 8²², which focuses on improving risk management and coping with climate impacts, including major natural risks prevention.

The EU Interreg project, C3-Alps aimed to foster transboundary cooperation with the focus on information and knowledge transfer²³. During the course of the C3-Alps project (2012-2014), an informal exchange among ministerial representatives of all Alpine countries was

¹⁷ ICPDR (2013). Strategy on Adaptation to Climate Change. Available at: https://www.icpdr.org/flowpaper/viewer/default/files/nodes/documents/icpdr_climate-adaptation-strategy.pdf. Date accessed: 15/05/2018

¹⁸ Alpine Convention (2006). Ministerial Declaration on Climate Change. Available at: http://www.alpconv.org/en/convention/protocols/Documents/AC_IX_declarationclimatechange_en_fin.pdf. Date accessed: 15/05/2018

¹⁹ Alpine Convention (2009). Action Plan on Climate Change in the Alps. Available at: Alpine Convention. The Climate Portal. Available at: <http://www.alpconv.org/en/ClimatePortal/default.html>. Date accessed: 15/05/2018

²⁰ Alpine Convention. The Climate Portal. Available at: <http://www.alpconv.org/en/ClimatePortal/default.html>. Date accessed: 15/05/2018

²¹ Alpine Climate Board instituted by the XIVth Alpine Conference in October 2016

²² Action Group 8, URL: <https://www.alpine-region.eu/action-group-8>, Date accessed: 15/05/2018

²³ Climate-Adapt. C3-Alps. Available at: <http://climate-adapt.eea.europa.eu/metadata/projects/c3-alps-2013-capitalising-climate-change-knowledge-for-adaptation-in-the-alpine-space>. Date accessed: 15/05/2018

initiated. Meetings took place twice per year and served the purpose of transnational coordination for issues of common concern. These activities are continuing.

Step B: Assessing risks and vulnerabilities to climate change

3 Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / In progress / No

Data collection and provision is located at the Central Institute for Meteorology and Geodynamics (ZAMG) with meteorological stations measuring temperature, precipitation, wind, sunshine and many other meteorological parameters²⁴. Since 1948, data about damage caused by extreme events have been recorded by ZAMG. The VIOLA (Violent Observed Local Assessment)²⁵ project started in 2014 with the development of a digital extreme-weather-platform. It works like a search engine for extreme events and offers different search options. In the frame of the project damage.at (funded by the Austrian Climate and Energy Fund), the feasibility for the development of an Austrian-wide damage-database for weather- and climate-related natural hazards is currently being assessed²⁶.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

New regional climate scenarios for Austria and its nine provincial states have been available since Autumn 2016. The scenarios are based on 13 EURO-CORDEX models, a 12.5km x 12.5 km grid, and use two greenhouse gas scenarios. Results are available via the Climate Change Centre Austria (CCCA) data portal²⁷.

A scientific evaluation of the financial consequences of climate change in Austria was presented in January 2015 as results of an ACRP project, Costs of Inaction (COIN)²⁸. The main results of two projects – PACINAS (Public Adaptation Costs: Investigating the National Adaptation Strategy)²⁹ and PACTCH:ES (Private Adaptation Threats and Chances:

²⁴ ZAMG Climate, URL: <https://www.zamg.ac.at/cms/en/climate>, Date accessed: 15/05/2018

²⁵ VIOLA, URL: <https://www.zamg.ac.at/cms/de/forschung/klima/datensatze/viola>, Date accessed: 15/05/2018

²⁶ Damage.at, URL: https://www.joanneum.at/life/aktuelles/news/news-detail/news/damageat/?tx_news_pi1%5Bcontroller%5D=News&tx_news_pi1%5Baction%5D=detail&cHash=ec733657c5828d853ee0683e93cfd82, Date accessed: 15/05/2018

²⁷ CCCA Data Centre, URL: <https://data.ccca.ac.at/group/oks15>, Date accessed: 15/05/2018

²⁸ COIN project, <https://www.ccca.ac.at/en/climate-knowledge/coin/>, Date accessed: 20/06/2018

²⁹ PACINAS, URL: <http://anpassung.ccca.at/pacinas/ergebnisse/>, Date accessed: 15/05/2018

Enhancing Synergies with the Austrian NAS implementation)³⁰ – were published in mid-2017.

The ACRP also emphasises the social aspects of climate change. Projects, such as Capital-Adapt³¹, have used projections and collected data on a variety of indicators to assess the climate vulnerability of different parts of society.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.

Yes / In progress / No

The Austrian NAS (2017) contains a qualitative vulnerability assessment for nine sectors (i.e. water, tourism, agriculture, forestry, electricity and energy, housing and construction, health, ecosystems and biodiversity and transport/infrastructure). It was carried out by the Environment Agency Austria in cooperation with the Institute of Meteorology of the University of Natural Resources and Life Sciences. The vulnerability reports fed into the NAS. Separate studies have not been carried out for the other five sectors (protection from natural hazards, disaster risk management, spatial planning, business/industry/trade, cities). Nevertheless, a descriptive vulnerability assessment has been included in the NAP 2017 for all 14 sectors, although it highlights the differences in the level of knowledge and detail across sectors.

The Austrian Panel on Climate Change (APCC) published a report in September 2014³², after the release of the IPCC Working Group III 5th Assessment Report. The APCC report consists of three volumes that present existing knowledge on climate change in Austria, and the needs and possibilities for mitigation and adaptation.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

The vulnerability assessments described in relation to Indicator 3c do not take transboundary risks into account. Nevertheless, as noted in relation to Indicator 2b, Austria is involved in a range of transboundary cooperation initiatives some of which address relevant transboundary risks; these primarily focus on the River Danube and the Alpine region.

4 Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / In progress / No

³⁰ PATCH:ES, URL: <http://anpassung.ccca.at/patches/ergebnisse/>, Date accessed: 15/05/2018

³¹ Klimanetz, URL: <http://www.klimanetz.at/>, Date accessed: 15/05/2018

³² APCC. Available at: <http://www.apcc.ac.at/>, Date accessed: 15/05/2018

The Austrian Assessment Report 2014 (AAR14)³³ built an active network of Austrian research institutions, individual scientists, policymakers, and other stakeholders to carry work on climate change forward. At the initiative of Austrian universities, the CCCA was formally established in 2011. The objective of the CCCA is to improve the quality and efficiency of Austrian climate research not only through networking and promoting cooperation, but also by enhancing its international visibility³⁴.

A workshop with scientists was conducted, within the framework of the participatory process accompanying the development of the NAS³⁵, to determine the research needs specifically for implementation of measures in the NAS. The aim was to facilitate a dialogue between scientists/researchers and politicians and other decision-makers. The 2015 progress report³⁶ on the NAS also indicated research needs. In addition, the CCCA Science Plan 2017³⁷ showcases the research needs and gaps identified by the Austrian scientific community. The research needs identified are being addressed in research programmes such as the ACRP of the Climate and Energy Fund and the national climate research programme StartClim³⁸. The eleventh and most recent (June 2018) guide for calls for proposals of the ACRP³⁹ focuses especially on four thematic areas where knowledge gaps persist. These are ‘Understanding the climate system and consequences of climate change’, ‘Specific support for Austria’s policymakers’, ‘Systemic transformation – the human dimension’, and ‘Governance and institutions – towards systemic transformation’. Specific topics range from biodiversity and agricultural aspects to social dimensions of climate change. One special report discussing ‘Tourism, large cultural and sports events and climate change’ was funded in the frame of the tenth ACRP call for proposals.

5 Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).

Yes / In progress / No

³³ CCCA (2014). AAR14. Available at: <https://www.ccca.ac.at/en/apcc/austrian-assessment-report-apcc-aar14-information-and-materials/>. Date accessed: 15/05/2018

³⁴ Climate-ADAPT (2017). Austria, Summary. Available at: <http://climate-adapt.eea.europa.eu/countries-regions/countries/austria>. Date accessed: 15/05/2018

³⁵ KWA. Climate Change Adaptation in Austria. Available at: <http://www.klimawandelanpassung.at/ms/klimawandelanpassung/en/>. Date accessed: 15/05/2018

³⁶ BMNT, formerly BMLFUW (2015). Anpassung an den Klimawandel in Österreich: Fortschrittsbericht. Available at: https://www.bmlfuw.gv.at/dam/jcr:affd5225-8d2b-4772-9977-da229f5b5690/Fortschrittsbericht-Final_v17_2015-12-02_klein.pdf. Date accessed: 15/05/2018

³⁷ CCCA Science Plan 2017
https://www.ccca.ac.at/fileadmin/00_DokumenteHauptmenue/03_Aktivitaeten/Science_Plan/CCCA_Science_Plan.pdf_20170502.pdf. Date accessed: 15/05/2018

³⁸ BMNT, formerly BMLFUW (2012). The Austrian Strategy for Adaptation to Climate Change. Part 1 – Context. Available at: https://www.bmlfuw.gv.at/dam/jcr:f2e2e558-f714-4676-8768-e9b4d32be6a4/AustrianAdaptationStrategy_Context_FINAL_25092013_v02_online.pdf. Date accessed: 15/05/2018

³⁹ ACRP (2017). 10th Call for Proposals Guide for the Submission of Proposals. Available at: <https://www.klimafonds.gv.at/assets/Uploads/Downloads-Frderungen/ACRP/LeitfadenACRP10th2017.pdf>. Date accessed: 15/05/2018

The website of the BMNT contains information on the NAS, various activities in climate adaptation including, for example, a brochure on good practices for municipalities⁴⁰.

The national platform for climate adaptation⁴¹ contains information on climate research, policies, proposed implementation measures and examples and support for municipalities, the Bundesländer and sectors. The databank is useful for finding relevant resources, e.g. sector-specific research or adaptation practice for a specific region. It is possible to subscribe to a newsletter⁴².

The climate research department of the Central Institute for Meteorology and Geodynamics (ZAMG) presents scientific information on climate change⁴³.

CCCA's website provides climate data and information on ongoing research activities⁴⁴.

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated.

Yes / In progress / No

For raising public awareness on climate impacts and adaptation, the Ministry of Sustainability and Tourism has published a brochure for the general public⁴⁵, "translating" the national adaptation strategy's content into easily understandable language and providing concrete tips for individuals. This brochure has been sent to all municipalities in Austria and has been further distributed via contacts and networks.

A handbook with methods and tools that help to tackle the challenges of adaptation was published⁴⁶ to support politicians and experts in the public administration of provinces and cities, as well as actors in regional management in developing adaptation strategies. It provides guidance for the strategic and proactive examination of climate impacts. A practical guide on local adaptation is available⁴⁷, which provides information on regional climate impacts and specific measures that can be implemented by cities. It also includes tools that can be used in workshops.

The NAS includes recommendations for communication and education of the wider public but does not provide information on the coordination of capacity building. The BMNT,

⁴⁰ BMNT, formerly BMLFUW (2016). Unsere Gemeinden im Klimawandel. Available at: https://www.bmlfuw.gv.at/dam/jcr:73969c08-9351-49fd-a2f3-85bf25c55167/Good%20Practice_Broschuere.pdf, Date accessed: 15/05/2018

⁴¹ KWA. Climate Change Adaptation in Austria. Available at: <http://klimawandelanpassung.at>

⁴² KWA. Newsletter registration. Available at: http://www.klimawandelanpassung.at/ms/klimawandelanpassung/de/newsletterregistrierung/kwa_archiv/, Date accessed: 15/05/2018

⁴³ ZAMG. Informationsportal Klimawandel. Available at: <https://www.zamg.ac.at/cms/de/klima/informationsportal-klimawandel>, Date accessed: 15/05/2018

⁴⁴ CCCA. Available at: <https://www.ccca.ac.at>, Date accessed: 15/05/2018

⁴⁵ CCCA. COIN. Available at: <http://coin.ccca.at/>, Date accessed: 15/05/2018

⁴⁶ Umweltbundesamt (2014). Methods and Tools for Adaptation to Climate Change. Available at: http://www.klimawandelanpassung.at/fileadmin/inhalte/kwa/pdfs/HANDBUCH_EN.pdf, Date accessed: 15/05/2018

⁴⁷ CCact. Ihre Gemeinde im Klimawandel. Available at: <http://www.ccact.anpassung.at/>

together with the provincial states, have financed various capacity building activities at regional and local levels (e.g. workshops in regions, a brochure with 11 good-practice examples on adaptation from regions across Austria⁴⁸). Capacity building mostly functions through a cooperation-based network approach to vertical governance with predominantly voluntary instruments. Examples reflecting the nature of this cooperation-based network are dedicated workshops in the Bundesländer, which were financed by the Ministry of Sustainability and Tourism in cooperation with the Climate and Energy Fund. These workshops aimed to support the Bundesländer in building adaptive capacity, discuss means of implementation, and highlight research results relevant to the respective province, as a basis for deciding on concrete adaptation measures.

As mentioned above, a new pilot project to foster adaptation in Austrian regions started in September 2016⁴⁹.

In 2016, a handbook for so-called ‘Multipliers’ (i.e. Adaptation managers, Energy modelling managers, regional managers) was released to implement adaptation action at regional and municipal level⁵⁰. Further trainings building on this guide and other study materials were provided to ‘Multipliers’ up to the beginning of 2018 (“learning workshops”). Since April 2018, these Bundesländer-level consultants and advisors support municipalities and regions in the implementation of adaptation activities⁵¹.

Step C: Identifying adaptation options

6 Adaptation options’ identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

The NAS contains a qualitative vulnerability assessment for nine out of the 14 sectors (see Indicator 3c). For the remaining five sectors, the NAP presents a descriptive vulnerability assessment. Adaptation options are based on these assessments (including geographic specificities where relevant), stakeholder consultations and expert judgment. Adaptation measures are described in detail and interlinkages to other areas and links to existing instruments are indicated.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

⁴⁸ BMNT, formerly BMLFUW (2016). Unsere Gemeinden im Klimawandel: Good Practice Broschuere. Available at: https://www.bmlfuw.gv.at/dam/jcr:73969c08-9351-49fd-a2f3-85bf25c55167/Good%20Practice_Broschuere.pdf, Date accessed: 15/05/2018

⁴⁹ See KLAR!-Website, URL: <http://klar-anpassungsregionen.at/>, Date accessed: 15/05/2018

⁵⁰ CCact (2016). Klimawandelanpassung umsetzen – Lebensqualität erhöhen; Ein Handbuch für MultiplikatorInnen zur Beratung österreichischer Gemeinden und Regionen. Available at: <http://www.anpassung.at/ccact/downloads/CC-Act-Handbuch.pdf>, Date accessed: 15/05/2018

⁵¹ Personal communication with a MS contact.

Yes / No

Adaptation options have not been prioritised, but criteria for prioritisation are identified in the NAS. In general, measures that provide benefits independent of climate change (“win-win”) or measures that entail no disadvantages in case the actual climate trends do not correspond to projections (“no-regret”) should be prioritised, as well as flexible measures. Furthermore, prioritisation according to the “Europe 2020 – A strategy for intelligent, sustainable, and inclusive growth” is suggested.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes/ **In Progress** / No

As an alpine country, Austria has been used to adapting and coping with environmental risks for centuries. The Federal Ministry of the Interior is responsible for the coordination of the State Crisis and Disaster Protection Management in Austria, whereas the BMNT is responsible for coordinating the national adaptation policy. One of the NAS actions aims at coordinating disaster protection management and adaptation policies, through a continuous review, modification, and implementation of the SKKM Strategy 2020 (Strategy for National Crisis and Disaster Protection Management)⁵², taking into account the effects of climate change. Regular exchange between the Ministries and working groups on the NAS as well as the progress report ensure bi-lateral coordination. Joint efforts to work on the 2nd National Risk Assessment, as well as on the upcoming national portal for the reduction of disaster risk in Austria⁵³, leads to regular exchange and improved coordination.

7 Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / **In Progress** / No

The NAS does not include a dedicated budget (no numbers) or an expenditure commitment for adaptation activities to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action. The NAS only states that “the implementation of the recommendations must be achieved within the existing jurisdictions of all governmental authorities (federal, state, local)” and are to be “covered by the resources available in the applicable financial frameworks of the public sector (federal, state, local)”. While it is not possible to conclude directly that a critical mass of actions or consistent funding is in place for vulnerable sectors, the phrasing of the NAS does indicate that sufficient funding should be available for them.

Step D: Implementing adaptation action

⁵² SKKM (2009). Strategie 2020. Available at: http://www.bmi.gv.at/cms/BMI_Zivilschutz/skkm/files/002_SKKM_Strategie_2020.pdf, Date accessed: 15/05/2018

⁵³ Austrian Strategy for Disaster Risk Reduction, available at: www.isdr.at, Date accessed: 15/05/2018

8 Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / **No**

Climate adaptation will be addressed by an amendment to the Environmental Impact Assessment (EIA) Law in Austria in 2018. The guidance documents for conducting EIA Reports are currently being revised in order to comply with the requirements of the amended EIA Directive. However, neither the change to the Law nor to the guidance documents has been finalised at the time of writing this fiche. Legislation on Strategic Environmental Assessment (SEA) in Austria does not, currently, refer to climate adaptation or vulnerability in its list of criteria to assess.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / **No**

The proposed measures in the NAP to improve natural disaster preparedness under climate change are based on experiences with natural disaster management in the past and expert judgement. One of the proposed actions in the NAP is developing knowledge of the projected change in natural processes and resulting possibilities for early warning systems. The other adaptation measures are mainly related to the precautionary principle, including through hazard zoning and promoting hazard and risk awareness, self-sufficiency and responsible behaviour.

The National Crisis and Disaster Protection Management Strategy 2020⁵⁴ does not include projected climate change effects and does not mention climate change as one of the major challenges for disaster protection management. One of the proposed actions in the NAP is to adapt and implement the SKKM Strategy 2020 in line with expected climate change impacts.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / **No**

The Bundesländer are responsible for spatial planning legislation. Therefore, the level at which climate impacts are taken into account varies in state-specific legislative documents. The 2015 progress report on the implementation of the NAS/NAP states that some aspects, such as flood risks and natural hazard management, are frequently mentioned in spatial planning legislations but zoning and green infrastructure are not⁵⁵.

⁵⁴ SKKM, (2009). Staatliches Krisen – und Katastrophenschutzmanagement Strategie 2020. Available at: <https://www.bmi.gv.at/204/skkm/start.aspx>. Date accessed: 15/05/2018

⁵⁵ BMNT, formerly BMLFUW (2015). Anpassung and den Klimawandel in Österreich. Fortschrittsbericht. Federal Ministry of Agriculture, Forestry, Environment and Water Management, Vienna.

The Austrian Conference on Spatial Planning (ÖROK) developed the Austrian Spatial Planning Concept (ÖREK) in 2011⁵⁶. This is a non-binding agreement signed by the national government, the Bundesländer, and the convention of municipalities. Among other things, the concept lays out pathways to integrate adaptation action (e.g. zoning, energy-efficient construction, flood management) into regional legislative documents. However, the 2018 mid-term evaluation of the ÖREK⁵⁷ does not report on progress in this endeavor.

The mainstreaming of climate adaptation into urban planning policies is more advanced. The Vienna urban development plan 2025 (STEP 2025)⁵⁸ mentions climate adaptation measures as an integral part of planning the management and enhancement of the city. The ‘Grünes Netz Graz’ (Green Grid Graz)⁵⁹ developed by the city of Graz is a further example of a municipal strategy paper for urban planning that places ecological and climate-specific measures at its core. Nonetheless, the overall incidence of such climate-focused urban planning policy documents and strategies across Austrian cities is low.

Austria does not have a coastline and, therefore, has no plans for maritime spatial planning.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / **In Progress** / No

The NAS provides guidance for the development and amendment of national policy instruments at sectoral level to promote adaptation. However, it is recognised in the NAP (and its progress report) that only a few sectoral instruments explicitly address adaptation and other climate-relevant issues.

Institutional barriers and lack of political momentum currently hinder the implementation of cornerstone policies that include adaptation measures at sectoral level (e.g. in health and transport)⁶⁰. Nevertheless, climate adaptation is being integrated into sectoral policies for agriculture (within the National Agricultural Programme, 2015), forestry, energy⁶¹, and

⁵⁶ ÖROK (2011). ÖREK 2011. Austrian Conference on Spatial Planning. Available at: [https://www.oerok.gv.at/fileadmin/Bilder/2.Reiter-Raum u_Region/1.OEREK/OEREK_2011/Dokumente_OEREK_2011/OEREK_2011_EN_Downloadversion.pdf](https://www.oerok.gv.at/fileadmin/Bilder/2.Reiter-Raum_u_Region/1.OEREK/OEREK_2011/Dokumente_OEREK_2011/OEREK_2011_EN_Downloadversion.pdf). Date accessed: 15/05/2018

⁵⁷ ÖROK (2018). Executive Summary Interim Evaluation ÖREK 2011. Available at: <https://bestelltool.oerok.gv.at/go/DateiUpload/uploads/pub277/kurzfassungEN.PDF>, Date accessed: 15/05/2018

⁵⁸ Stadt Wien (2014) Stadtentwicklungsplan Wien STEP 2025. Available at: <https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008379a.pdf>

⁵⁹ Grünes Netz Graz. Available at: <http://www5.umweltbundesamt.at/klimawandel/abfrage/show/4a118664-3c0d-1030-89d5-ed5b02f6ce23>, Date accessed: 15/05/2018

⁶⁰ BMLFUW (2015). Anpassung an den Klimawandel in Österreich. Fortschrittbericht. Federal Ministry of Agriculture, Forestry, Environment and Water Management, Vienna.

⁶¹ BOKU. FIS. Available at: https://forschung.boku.ac.at/fis/suchen.projekt_uebersicht?sprache_in=de&menue_id_in=300&id_in=7199. Date accessed: 15/05/2018

biodiversity⁶². In addition, a 2018 study on the effects of climate change in the water sector⁶³ is set to inform climate-relevant policy development.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

Several recommendations proposed under relevant sectors (e.g. agriculture, protection from natural hazards, disaster risk reduction, health, business) in the NAP involve the insurance sector and refer to it as a key actor. Recommendations include the development of new risk assessment methods, development and extension of risk-sharing instruments, and awareness-raising. At present, there is limited information available about the extent to which these actions have been implemented. A standardisation of contributions for insurances against natural hazards in the agricultural sector is underway.

The ‘Österreichische Hagelversicherung’ is the main insurance company for agriculture against natural disasters, including hail, frost, storms, snow load, droughts, floods, and animal pests. Target groups are farmers, gardeners and wineries. ‘Hagelversicherung’ also initiates targeted climate action projects.

The NAP progress report indicates that the insurance of agricultural land has remained constant, no new instruments have been developed to promote further insurance in the sector (only new schemes under the ‘Hagelversicherung’ that focus more on droughts: ‘Dürreindex’). Furthermore, there has not been much progress in the drafting of the natural disaster insurance that was mentioned in the NAP (‘NatKat-Versicherung’). However, first steps towards the creation of a public-private partnership for risk transfers have been made.⁶⁴ In general, the progress report concludes that it is not yet clear to what degree climate adaptation is integrated within private risk management.

Thus, although insurance schemes incentivising investments in enhanced resilience and/or risk prevention are not yet in place, there are several ongoing activities and discussions in this field.

9 Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In Progress** / No

The progress report evaluates the state of implementation of the proposed actions in the NAP. Several proposed measures have been implemented. They include mainstreaming of climate

⁶² BMNT, formerly BMLFUW (2014). Biodiversity Strategy Austria 2020+. Conserving Diversity - securing quality of life and prosperity for us and future generations. Available at: <https://www.cbd.int/doc/world/at/at-nbsap-v3-en.pdf>. Date accessed: 15/05/2018

⁶³ BMNT, formerly BMLFUW (2017). Klimawandel in der Wasserwirtschaft. Available at: <http://klimawandelanpassung.at/index.php?id=34870>. Date accessed: 15/05/2018

⁶⁴ BMNT, formerly BMLFUW (2015). Anpassung an den Klimawandel in Österreich. Fortschrittbericht. Federal Ministry of Agriculture, Forestry, Environment and Water Management, Vienna.

change in sectoral as well as regional policy documents, such as the National Agricultural Programme or, more recently, the Forest Strategy 2020+ (see Indicator 8d for more detail). Furthermore, several Bundesländer have published regional adaptation strategies and action plans (see Sections A2 and B2 above).

Nonetheless, climate change and adaptation are not yet considered sufficiently in strategic policy documents throughout Austria. Institutional barriers and lack of political momentum still slow down and hinder the implementation of adaptation measures across sectors and regions⁶⁵.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / No

For vertical coordination throughout the implementation phase, existing committees, such as the National Climate Protection Committee, are important for regular exchange of information, experience, lessons learned and close contact between the Ministry and the provincial states. The Federal Ministry for Sustainability and Tourism, together with all provincial states, established an implementation plan summarising specific adaptation measures to be implemented in close cooperation as a first step.

The Ministry of Sustainability and Tourism supports adaptation activities across regions or municipalities mainly by providing information⁶⁶, via funding specific projects, or by developing tools and guidelines⁶⁷. A number of ACRP-financed projects⁶⁸ (e.g. Capital-Adapt, FAMOUS, AdaptBehaviour, CcTalk!, Go-Adapt) are fostering regional cooperation in adaptation.

The measures described in the action plan identify key actors responsible for implementation, but the NAS does not prescribe a clear governance system that ensures necessary coordination for turning recommendations into specific actions. The Ministry of Sustainability and Tourism organised workshops in 2014 in order to increase adaptive capacity in the provinces. Due to their success, a second series of workshops was organised in Autumn 2016, focusing on building the capacity of regional and local stakeholders. In addition, the monitoring and evaluation scheme is designed to enable dialogue between stakeholders, leading to a more efficient distribution of responsibilities for implementation.

⁶⁵ BMNT, formerly BMLFUW (2015). Anpassung an den Klimawandel in Österreich. Fortschrittbericht. Federal Ministry of Agriculture, Forestry, Environment and Water Management, Vienna.

⁶⁶ BBSR (2016). Anpassung an den Klimawandel in Stadt und Region. Available at: http://www.bbsr.bund.de/BBSR/DE/Veroeffentlichungen/Sonderveroeffentlichungen/2016/anpassung-klimawandel-dl.pdf;jsessionid=D3E9C3D23F8AE48656C761BAB4529763.live11294?_blob=publicationFile&v=2. Date accessed: 15/05/2018

⁶⁷ BBSR. Klima Stadt Raum. Available at: http://www.klimastadtraum.de/DE/Home/home_node.html. Date accessed: 15/05/2018

⁶⁸ ACRP (2016). Klimawandelanpassung in der Umsetzung. Available at: <https://www.klimafonds.gv.at/assets/Uploads/ACRPKlimawandelanpassungweb.pdf>. Date accessed: 15/05/2018

In September 2016, a new pilot project to foster adaptation in Austrian regions was initiated. In a first phase, regions apply for support in order to develop adaptation concepts and measures shaped to their special adaptation needs. Successful applications receive funding for an adaptation manager who is responsible for steering the process of implementing adaptation measures for a period of two years⁶⁹.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / No

The Institute for Meteorology published a document entitled ‘Strategic support for integrating climate change into project planning for large projects’⁷⁰, as part of the research project ENVISAGE-CC, funded by the ACRP. The project was successful in raising awareness of climate impacts with developers of large-scale infrastructure projects that are subject to EIA. A follow-up project named SPECIFIC (SPECific Climate change Foresight in projeCt design)⁷¹ has broadened the target audience to environmental authorities and consultants (EIA assessors/ practitioners), and focuses on rail, highway and power grid projects, leading to the EIA climate-fit portal⁷².

A handbook with methods and tools that help to tackle adaptation challenges was published in order to support politicians and experts in the public administration of provinces, regions and cities, as well as actors in regional management, to develop adaptation strategies (see Indicator 5b). The handbook provides guidance for strategic examination of the consequences of climate change in all areas of action covered by the NAS. The handbook is one of the main results of the project FAMOUS (Factory of Adaptation Measures operated at different Scales)⁷³ financed by the Climate and Energy Fund.

Another overarching guidance published at the end of 2014 is a communication strategy⁷⁴ focusing on practically oriented, target-group specific, and action-motivating recommendations for effectively communicating climate change and adaptation.

⁶⁹ Climate-ADAPT (2017). Austria, Summary. Available at: <http://climate-adapt.eea.europa.eu/countries-regions/countries/austria>, Date accessed: 15/05/2018

⁷⁰ BOKU-Met (2015). Strategische Unterstützung bei der Projektplanung zur Berücksichtigung von Klimawandelfolgen. Available at: http://www.klimawandelanpassung.at/fileadmin/inhalte/kwa/pdfs/Envisage_StrategischeUnterstuetzung_BOKU-Met_Report_24.pdf, Date accessed: 15/05/2018

⁷¹ <https://www.rali.boku.ac.at/ilen/forschungsprojekte/specific/>, Date accessed: 15/05/2018

⁷² EIA climatefit portal: <http://uvpklimatefit.boku.ac.at/>, Date accessed: 15/05/2018

⁷³ Prutsch, A., Felderer, A., Balas, M., König, M., Clar, C., Steurer, R. (2014): Methods and Tools for Adaptation to Climate Change. A Handbook for Provinces, Regions and Cities. Environment Agency Austria, Wien. Available at: http://www.klimawandelanpassung.at/fileadmin/inhalte/kwa/pdfs/HANDBUCH_EN.pdf, Date accessed: 15/05/2018

⁷⁴ Umwelt Bundesamt (2014). Ein Leitfaden zur erfolgreichen Kommunikation. Available at: http://klimawandelanpassung.at/fileadmin/inhalte/kwa/pdfs/cctalk_strategie_Web-Version.pdf [29], Date accessed: 15/05/2018
http://www.bmlfuw.gv.at/dms/Imat/umwelt/klimaschutz/klimapolitik_national/anpassungsstrategie/broschuere/Klimawandel-Brosch-re-Web/Klimawandel%20Brosch%20Web.pdf, Date accessed: 15/05/2018

Several guidelines have successfully supported implementation of adaptation measures (see also Indicator 5b). An example is the climate change (adaptation) handbook for spatial planning⁷⁵. Its tools have been widely tested and applied throughout the different Austrian alpine regions (as per the updated NAS). External handbooks (e.g. EU-level, transnational, national) and other forms of (national) guidance documents are mentioned by projects and plans and, thus, support the implementation of specific actions included in the NAP.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.

Yes / **No**

Although activities have taken place in the past and there are some activities currently underway and planned, it is unclear to what extent non-public administration stakeholders are being involved in the implementation of adaptation policies and measures. To improve the management of natural disasters, the NAP (via a specific action) mandates inclusion of all relevant civil society actors in the decision-making and execution processes.

The Federal Ministry for Sustainability and Tourism, together with all of the Bundesländer, has established an implementation plan for the NAP. This plan summarises a few specific participatory measures to be undertaken as a next step. For example, a working group on increased private risk precaution in case of extreme weather events was established in Austria. In addition, it was agreed to make stronger joint efforts to support adaptation at regional level (e.g. through regional workshops, and a brochure with good-practice examples).

Step E: Monitoring and evaluation of adaptation activities

10 Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / No

A progress report was published by the BMNT in 2015⁷⁶ on the state of implementation of the measures described in the NAP. Monitoring and evaluation of the NAS/NAP is pragmatic and comprises two modules: 1) a self-assessment approach using a stakeholder survey based on the NAP and sent to the key actors mentioned therein; 2) an indicator-based approach with qualitative and quantitative data collections⁷⁷. No information is available on allocated

⁷⁵ Pütz, M., Kruse, S., Butterling, M. (2011). Bewertung der Klimawandel-Fitness der Raumplanung: Ein Leitfaden für PlanerInnen. Projekt CLISP, ETC Alpine Space Programm. Available at: http://www.klimawandelanpassung.at/fileadmin/inhalte/kwa/pdfs/Clisp_Leitfaden_Klimawandelfitness.pdf. Date accessed: 15/05/2018

⁷⁶ BMNT, formerly BMLFUW (2015). Anpassung an den Klimawandel in Österreich. Fortschrittbericht. Federal Ministry of Agriculture, Forestry, Environment and Water Management, Vienna.

⁷⁷ BMNT, formerly BMLFUW (2014). Anpassung an den Klimawandel in Österreich. Konzept für die Fortschrittsdarstellung. Federal Ministry of Agriculture, Forestry, Environment and Water Management, Vienna

budgets, but the cost of inaction was calculated by the ACRP project COIN in 2015⁷⁸. The costs of public adaptation was calculated in the project PACINAS.⁷⁹ Furthermore, the role of private actors in adaptation was analysed by the project PATCH:ES⁸⁰. All studies were reflected in the NAS and NAP 2017. The progress report is to be drafted and published at 5-year intervals. The next version is, therefore, due in 2020⁸¹.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

The central progress report (see Indicator 10a) assesses the implementation of adaptation measures for 14 different sectors. Mainstreaming of climate adaptation into sector policies is one of the evaluation criteria of these sectoral assessments.

10c. Regional-, subnational or local action is monitored and the results of the monitoring are disseminated

Yes / No

As mentioned in relation to Indicator 10a, the progress report is based on heavy input from regional (Bundesländer) and local stakeholders (self-assessment approach). This feedback mechanism allows for significant vertical flow of information, qualifying the central progress report as a proper monitoring tool for regional, sub-national, and local adaptation action.

11 Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

The concept note for the ‘presentation of progress’ (Konzept für die Fortschritts-Darstellung)⁸² that lies at the heart of the central progress report (see Indicator 10a) provides an evaluation framework for both the NAS and the NAP. The evaluation takes place within a five-year cycle⁸³.

There is no formal revision framework that dictates a specific process for amending the NAS or NAP periodically. However, the release of the 2015 progress report and other political developments at the time triggered a first revision and update of the NAS and NAP

⁷⁸ CCCA. COIN. Available at: <http://coin.ccca.at/>, Date accessed: 15/05/2018

⁷⁹ <http://anpassung.ccca.at/pacinas/ergebnisse/>, Date accessed: 15/05/2018

⁸⁰ <http://anpassung.ccca.at/patches/ergebnisse/>, Date accessed: 15/05/2018

⁸¹ Climate-ADAPT (2017). Austria, Summary. Available at: <http://climate-adapt.eea.europa.eu/countries-regions/countries/austria>, Date accessed: 15/05/2018

⁸² BMNT, formerly BMLFUW (2014). Anpassung an den Klimawandel in Österreich – Konzept für die Fortschritts-Darstellung. Available at: https://www.bmnt.gv.at/umwelt/klimaschutz/klimapolitik_national/anpassungsstrategie/fortschrittsbericht.html, Date accessed: 15/05/2018

⁸³ Climate-ADAPT (2017). Austria, Summary. Available at: <http://climate-adapt.eea.europa.eu/countries-regions/countries/austria>, Date accessed: 15/05/2018

documents in 2017. Therefore, the review timeline is characterised by an ad-hoc revision based on the findings of the five-year recurring evaluation/progress report of the NAS and NAP.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / No

Stakeholder involvement and engagement (cross-ministerial and regional) in the development of the central progress report qualifies as active participation in the monitoring and reviewing process. In both the self-assessment approach and the indicator-based approach, stakeholders provided information and were consulted. Additional workshops took place to jointly work on the interpretation of quantitative and qualitative data for the progress report and to find consensus in the findings. The 2015 progress report was adopted by the Council of Ministers and all Provincial Governors.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 <i>Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In Progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	Yes / <u>In Progress</u> / No
2 <i>Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 <i>Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	<u>Yes</u> / In progress / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No
4 <i>Knowledge gaps</i>		
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	<u>Yes</u> / In progress / No
5 <i>Knowledge transfer</i>		

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	<u>Yes</u> / In progress / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	<u>Yes</u> / In progress / No
Step C: Identifying adaptation options		
6 Identification of adaptation options		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	Yes/ <u>In Progress</u> / No
7 Funding resources identified and allocated		
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / <u>In Progress</u> / No
Step D: Implementing adaptation action		
8 Mainstreaming adaptation in planning processes		
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	Yes / <u>No</u>
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	Yes / <u>No</u>
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	Yes / <u>No</u>
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	Yes / <u>In Progress</u> / No
8e	Adaptation is mainstreamed in insurance or alternative	Yes / <u>No</u>

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	policy instruments, where relevant, to provide incentives for investments in risk prevention	
9 Implementing adaptation		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In Progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	<u>Yes</u> / No
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	<u>Yes</u> / No
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	Yes / <u>No</u>
Step E: Monitoring and evaluation of adaptation activities		
10 Monitoring and reporting		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10c	Regional-, subnational or local action is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
11 Evaluation		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	<u>Yes</u> / No

Adaptation preparedness scoreboard country fiche for Belgium

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List of abbreviations

AMICE	Adaptation of the Meuse to the Impacts of Climate Evolution
BELSPO	Belgian Federal Science Policy Office
CCIEP	Coordination Committee for International Environmental Policy
EIA	Environmental Impact Assessment
NAP	National Adaptation Plan
NAS	National Adaptation Strategy
NCC	National Climate Commission
RMI	Royal Meteorological Institute
SSD	Science for a Sustainable Development programme
SEA	Strategic Environmental Assessment
TIDE	Tidal River Development
VAP	Flemish Adaptation Plan
VMM	Flanders Environment Agency
WGA	Working Group on Adaptation

POLICY FRAMEWORK

Belgium is a federal state, composed of three regions and three language-based communities, each with its own executive and legislative bodies. These bodies intervene on an equal footing but in different areas of competence⁸⁴. The federal state level is in charge of competences like foreign affairs, national defence and parts of national health⁸⁵. This division of power means that what is considered as Belgium's national climate adaptation policy is in fact the combination of the federal and three regional climate adaptation policies, which are those of the Walloon, the Flemish and the Brussels Capital region.

At the national level, the National Climate Commission (NCC) plays the main role in internal coordination of climate policy. The Coordination Committee for International Environmental Policy (CCIEP) deals with international environmental affairs. The NCC, and more specifically its Working Group on Adaptation (WGA), is responsible for the development, adoption and implementation of the National Adaptation Strategy (NAS) and the National Adaptation Plan (NAP)⁸⁶. The WGA is composed of representatives from the Federal Government and the three different regions, as mentioned above^{87,88}:

- The Federal Government: Federal Public Service Health, Food Chain Safety and Environment (DG Environment) and Federal Public Service Foreign Affairs, Foreign Trade and Development Cooperation (DG Development Cooperation and Humanitarian Aid)
- Flemish region: Department of Environment and Spatial Development
- Walloon region: Agence wallonne de l'air & du climat
- Brussels region: Environment Brussels.

When describing the national climate adaptation policy in the analysis presented in this document, all relevant activities in each of the four governments are included. Intergovernmental mechanisms refer to collaborations between the Federal, Flemish, Walloon and Brussels Capital regions. Vertical mechanisms are mechanisms between these regions and the provincial and local level.

Adaptation strategies

A1. National adaptation strategy

⁸⁴ Further details are available at: belgium.be, Date accessed: 01/06/2018

⁸⁵ Belgium, a Federal State, URL: https://www.belgium.be/en/about_belgium/government/federale_staat, Date accessed: 01/06/2018

⁸⁶ National adaptation strategy, URL: https://www.cnc-nkc.be/sites/default/files/content/be_nas_2010.pdf, Date accessed: 01/06/2018

⁸⁷ Beslissorganen, URL: <http://www.klimaat.be/nl-be/klimaatbeleid/belgisch-klimaatbeleid/nationaal-beleid/beslissingsorganen/> Date accessed: 01/06/2018

⁸⁸ The National Climate Commission, URL: <https://www.cnc-nkc.be/en/about-national-climate-commission>, Date accessed: 01/06/2018

Belgium has a National Adaptation Strategy (NAS), which was approved in 2010. The NAS describes the main climate impacts, the existing adaptation responses, a roadmap to the National Adaptation Plan (NAP) and some policy guidelines for a climate proof future. The priority sectors are health, tourism, agriculture, forestry, biodiversity, ecosystems and water, coastal, marine and tidal areas, and production systems and physical infrastructure. The NAS pursues the improvement of the communication of and coherence between the adaptation activities among the different governments.

A2. Adaptation strategies adopted at subnational levels

The Federal Government and each of the three regional governments – the Walloon region, the Flemish Region and the Brussels Capital region – together contribute to the national adaptation policy. They do not have separate adaptation strategies, but are each responsible for part of the NAS relevant to their competences.

Adaptation action plans

B1. National adaptation action plan

The National Adaptation Plan (NAP) was approved in April 2017. Priority sectors addressed in the NAP are agriculture, coastal areas, fishery, spatial planning and infrastructure, forests, biodiversity, energy, health, water management, tourism, industry and services, research and international cooperation⁸⁹. The NAP complements the existing Flemish, Brussels Capital, Walloon and Federal adaptation plans. It includes some additional adaptation measures to improve the coordination and information exchange between the different governments, for example developing high-resolution climate scenarios and a roadmap for a Belgian Centre of Excellence on adaptation.

B2. Adaptation plans adopted at sub-national level

On 2 May 2013, the Brussels Capital Region adopted its Air-Climate-Energy Code (known as COBRACE⁹⁰). It serves as a legal basis for its Integrated Air-Climate-Energy Plan, which was adopted on 2 June 2016 and which includes a section on adaptation⁹¹. Priority sectors are water management, infrastructure and built areas, energy, green areas and, forests. Other thematic plans that include adaptation measures are the 2012 Regional Water Management Plan⁹², including a flood prevention plan created in 2003. A second regional water management plan has been adopted for the period 2016-2020 and integrates consideration of

⁸⁹ Nationale Adaptation Plan België, URL: http://www.klimaat.be/files/6714/9880/5758/NAP_NL.pdf, Date accessed: 01/06/2018. English version available at: https://www.cnc-nkc.be/sites/default/files/report/file/nap_en.pdf

⁹⁰ Air-Climate-Energy Code Brussels, URL: <http://environnement.brussels/thematiques/mobilite/stationnement-cobrace>, Date accessed: 01/06/2018

⁹¹ Brussels Climate Plan, URL: http://document.environnement.brussels/opac_css/elecfile/PLAN_AIR_CLIMAT_ENERGIE_NL_DEF.pdf, Date accessed: 01/06/2018

⁹² 2012 Regional Water Management Plan, URL: http://www.environnement.brussels/thematiques/eau/plan-de-gestion-de-leau/plan-de-gestion-de-leau-2009-2015?view_pro=1, Date accessed: 01/06/2018

floods and flood risks⁹³. Furthermore, the region adopted the "Forêt de Soignes" management plan (2003)⁹⁴ and its Nature Plan (2016), which both include adaptation measures.

In January 2014, the Walloon government adopted its 'Climate Decree'⁹⁵ giving a legal framework for climate policy in Wallonia. The main implementation instrument is the 'Air-Climate-Energy Plan 2016 – 2022'⁹⁶ which contains a section on adaptation and was adopted on 21 April 2016⁹⁷. This adaptation section summarises the impacts and vulnerability assessments, as well as detailed adaptation actions to deal with these impacts and vulnerabilities in the following sectors: agriculture, forestry, biodiversity, water, health and tourism.

On 28 October 2016, the Federal Government adopted the Federal Contribution to the National Adaptation Plan⁹⁸, which identifies federal adaptation actions in sectors like crisis management and transport.

In addition, some provincial and local governments have signed the Covenant of Mayors for Climate and Energy and have developed adaptation plans, amongst others the Province of Antwerp,⁹⁹ the Province of Limburg¹⁰⁰, and the City of Gent¹⁰¹

B3. Sectoral adaptation plans

No sectoral adaptation plans have been identified. Sectoral adaptation measures from the different policy departments are, however, integrated in the national, federal and regional adaptation plans.

SCOREBOARD

⁹³ Brussels Watermanagement plan, URL: <http://www.environnement.brussels/thematiques/eau/plan-de-gestion-de-leau>, Date accessed: 01/06/2018

⁹⁴ "Forêt de Soignes" management plan (2003), URL: http://www.environnement.brussels/thematiques/espaces-verts-et-biodiversite/action-de-la-region/plan-de-gestion-pour-la-foret-de?view_pro=1, Date accessed: 01/06/2018

⁹⁵ Climate Decree, URL: <http://environnement.wallonie.be/legis/air/air074.html>, Date accessed: 10/05/2018

⁹⁶ Walloon Climate Plan, URL: http://www.awac.be/images/Pierre/PACE/Plan%20Air%20climat%20C3%A9nergie%202016_2022.pdf, Date accessed: 01/06/2018

⁹⁷ Adaptation section of PACE, URL: <http://www.awac.be/index.php/thematiques/changement-climatique/adaptation#en-wallonie-de-la-concertation-au-pace>, Date accessed: 01/06/2018

⁹⁸ Federal contribution to national adaptation plan, URL: http://www.klimaat.be/files/5514/7915/5040/federale_bijdrage_adaptatieplan.pdf, Date accessed: 01/06/2018

⁹⁹ Adaptatieplan Provincie Antwerpen, URL: <https://www.provincieantwerpen.be/content/dam/provant/dlm/dmn/klimaat/ProvinciaalAdaptatiePlan.pdf>, Date accessed: 01/06/2018

¹⁰⁰ Adaptatieplan Provincie Limburg, URL: http://www.limburg.be/webfiles/limburg/product/klimaat_klimaatadaptatieplan_2017.pdf, Date accessed: 01/06/2018

¹⁰¹ Adaptatieplan Gent, URL: https://klimaat.stad.gent/sites/default/files/klimaatadaptatieplan_gent.pdf, Date accessed: 01/06/2018

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes/ No

In Belgium, the central administration body in charge of Belgian adaptation policy is the WGA¹⁰², which is part of the NCC. It is the responsibility of the WGA to develop the NAS and the NAP. Representatives of the four levels of the Government, i.e. the Federal Government and the three regional governments, form the WGA. All of these four governments are equal and there is no hierarchical relationship between the regions and the federal authority.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes/ In progress/ No

Horizontal coordination among sectors is organised by each of the federal and regional governments via meetings in committees and contact groups. These groups bring together representatives of various sectoral policy departments that are likely to be affected by climate change, such as water, agriculture, nature and forests, agriculture, health, spatial planning, disaster risk management, etc. Horizontal coordination mainly includes identification and follow-up of priority goals and adaptation actions. Furthermore, it addresses information and data exchange and pursues communication and synergy between the different sectors. The WGA, mandated by the NCC, was the central actor for the drafting of the NAS and the NAP. The WGA is in charge of the consultation with and coordination of the different regional/federal sectors for the elaboration, implementation and monitoring of the NAP.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes/ **In progress**/ No

To develop the NAS, representatives of the different governments of the WGA met regularly and continue to do so in order to discuss progress of the NAS and the implementation of adaptation plans.

Vertical coordination in Belgium refers to coordination between the four governments, the ten provinces and the 589 local authorities. Vertical coordination is in place at some levels but not in a systematic manner. At the regional level, the departments involved in adaptation are in touch with provinces and local authorities, although not always through formal

¹⁰² Working Group on Adaptation, URL: <https://www.cnc-nkc.be/nl/wg-adaptatie>, Date accessed: 01/06/2018

working groups or coordination mechanisms between the regional level and the provincial or the local authorities, but rather through cooperation mechanisms.

The federal level has no competence with regard to provinces and local authorities.

In Flanders, there is no formal coordination mechanism that vertically coordinates the provincial and local authorities, nevertheless coordination exists *ad hoc* and related to specific initiatives, such as the development of an adaptation portal. Furthermore, there was a pilot group with representatives of some local authorities and provinces that aimed to co-develop adaptation support tools, including a tool to explore adaptation measures¹⁰³, good adaptation practices, and a climate portal (under development) that collects all data on climate impacts at a municipal level in Flanders¹⁰⁴.

In contrast to Flanders, vertical coordination in Wallonia is formal. In July 2017, the Government signed a commitment to be a territorial coordinator of the Covenant of Mayors. In addition, the Walloon region has elaborated comparable adaptation support tools for local authorities¹⁰⁵.

Vertical coordination is also planned to take place via the official territorial coordinators of the Covenant of Mayors. Eight out of ten Belgian provinces, and about 12 associations of municipalities ('intercommunales') have signed up as territorial coordinators. The main focus of this coordination so far is on mitigation, but it is expected that these administrations will also play a role in adaptation¹⁰⁶.

There is no specific vertical coordination between Brussels Capital government and the local authorities.

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

Stakeholders are involved in the preparation and implementation of adaptation policies in various ways.

¹⁰³ Klimaatadaptatieportaal, URL: <http://www.burgemeestersconvenant.be/klimaatadaptatie>, Date accessed on: 01/06/2018

¹⁰⁴ Klimaatportaal, URL: <https://www.milieurapport.be/klimaatportaal>, Date accessed on: 01/06/2018

¹⁰⁵ Adaptation portal for Walloon local authorities, URL: <http://www.awac.be/index.php/en/thematiques/changement-climatique/adaptation#a-diagnosis-of-vulnerability-at-the-local-level>, <http://leswallonssadaptent.be>, Date accessed on: 01/06/2018

¹⁰⁶ Territorial coordinators Covenant of Mayors, URL: <https://www.covenantofmayors.eu/about/covenant-community/coordinators.html>, Date accessed on: 01/06/2018

In all four governments, focus groups that included representatives of the different policy departments were established to identify objectives and priority measures. In addition, other stakeholders have been consulted as well during the process. More specifically:

- At the level of the Federal Government, there was a public consultation on the federal plan ‘adaptation to climate change’ (later renamed ‘federal contribution to the NAP’) between 17 February and 18 April 2014. Stakeholders involved included citizens, NGOs and sectoral organisations. The plan was also submitted to the Federal Council for Sustainable Development that includes representatives of society, including environmental organisations, organisation for development cooperation, users’, employees’ and employers’ bodies, youth organisations and scientists.
- In Flanders, stakeholder consultation during the development of the adaptation plan was carried out twice via ‘roundtables’. The first roundtable presented preliminary ideas about the adaptation plan, while the second roundtable focused on the draft version of the plan to offer a platform for stakeholders to discuss it. Stakeholders included industry representatives, environmental organisations, farmer organisations and youth associations. Furthermore, the ‘MINAraad’ was consulted on the draft Flemish Climate Plan.
- In the Walloon region, there was a public consultation on the adaptation plan in the summer of 2014. Citizens, companies and local authorities took part in the consultation¹⁰⁷.
- The Brussels adaptation plan went to public consultation in 2015.

The national adaptation plan was submitted for consultation to the federal and regional advice councils, which include stakeholders from all societal sectors, such as environment, industry, employee, and science.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes/ No

Transboundary cooperation is a priority in the NAP¹⁰⁸. Action 10 of the NAP (“Promote transnational cooperation on adaptation”) aims to facilitate transnational cooperation on adaptation, covering both international cooperation between (neighbouring) countries and cross-border cooperation among countries with shared cross-border resources (e.g. water, protected areas) or other shared interests. The main foci for transboundary cooperation are disaster management, nature and water management. Cooperation mechanisms in these sectors already existed, nevertheless, it was recognised that further cooperation was needed. For instance, Belgium takes part in transboundary water management commissions of the Meuse and Scheldt. Belgium participated in Interreg projects, such as TIDE (Tidal River

¹⁰⁷ Public Consultation Walloon climate plan, URL: <http://www.climat.be/fr-be/news/2014/consultation-publique-plan-air-climat-energie-de-la-wallonie/> Date accessed on: 01/06/2018

¹⁰⁸ National Adaptation Plan Belgium, URL: http://www.klimaat.be/files/6714/9880/5758/NAP_NL.pdf, Date accessed on: 01/06/2018

Development), AMICE, and Future Cities. Furthermore, the Flemish government coordinates the Interreg 2 Seas project PROWATER (protecting and restoring raw water sources through actions at the landscape scale), which is expected to start in September 2018.

So far, transboundary co-operation on adaptation in the BENELUX countries has been *ad hoc*. For instance, in 2016 the BENELUX secretariat organised workshops on adaptation concerning the following sectors: transport, energy, health and crisis management¹⁰⁹. The expectation is that more formal transboundary cooperation will be established in the coming years¹¹⁰.

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / In progress/ No

Belgium has observation systems that allow for long-term monitoring of temperature, precipitation and sea level. This monitoring work is carried out by the Royal Meteorological Institute (RMI)¹¹¹ and the Permanent Service for Mean Sea Level.

Climate impacts are monitored by the different organisations:

- Different climate impact studies have been performed for Belgium in the framework of CORDEX.be project on: extreme precipitation; maximum snow height; urban parameters for Brussels (including outdoor labour productivity, excess energy consumption and heat stress due to heat waves); agricultural crop performance and yield as well as biogenic emissions.
- Impacts on forests and nature: by Brussels Environment¹¹², Walloon Observatory of Forest Health¹¹³ and the Research Institute for Nature and Forest in Flanders.¹¹⁴
- Impacts on the oceans: the Flemish Hydrography and Royal Institute of Natural Sciences.
- Impact on water: flood, water quality and drought – Flanders Hydraulics Research, the Flemish water managers¹¹⁵, the Walloon Waterways¹¹⁶, the Walloon Flood

¹⁰⁹Cooperation BENELUX on Adaptation, URL:

<http://www.benelux.int/fr/publications/publications/adaptation-au-changement-climatique-au-sein-du-benelux>, Date accessed on: 01/06/2018

¹¹⁰ National Adaptation plan Belgium, URL: http://www.klimaat.be/files/6714/9880/5758/NAP_NL.pdf, Date accessed on: 01/06/2018

¹¹¹ KMI/RMI: URL <http://www.kmi.be/meteo/view/nl/357714-Algemeen.html>, Date accessed on: 01/06/2018

¹¹² Brussels Environment, URL: http://www.environnement.brussels/thematiques/espaces-verts-et-biodiversite/la-foret-de-soignes/gestion-de-la-foret?view_pro=1&view_school=1, Date accessed on: 01/06/2018

¹¹³ Walloon Observatory of forest health, URL: <http://owsf.environnement.wallonie.be/fr/index.html?IDC=5636>, Date accessed on: 01/06/2018

¹¹⁴ INBO research institute for nature and forest in Flanders, URL: <https://www.inbo.be/en>, Date accessed on: 01/06/2018

¹¹⁵ Flanders Hydraulics Research, URL: <http://www.waterinfo.be/>, Date accessed on: 01/06/2018

Portal¹¹⁷, Brussels Environment, Royal Institute of Natural Sciences. Impact on extreme precipitation, heat waves, and droughts is collected by the RMI. In 2015, the RMI published “Vigilance climatique”. In 2015 the Flanders Environment Agency (VMM) published the ‘MIRA Climate Report 2015: About observed and future climate changes in Flanders and Belgium’. The indicators from the report are regularly updated on their website. Due to the dry conditions in Flanders, the VMM published a report on drought¹¹⁸ based on hydrological and meteorological indicators in June 2017.

Since 1992 the EM-DAT database has recorded the number of victims (deaths and affected persons) of natural disasters in Belgium. Indicators are developed by the Federal Planning Bureau.¹¹⁹To conclude, observation systems for many climate impacts are in place, however, they sometimes are fragmentary and not always available for the whole of Belgium.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes/ In progress/ No

While Belgium does not formally have a national climate centre, the CORDEX.be project¹²⁰ (Combining regional downscaling expertise in Belgium: CORDEX and Beyond 2015-2017) provided a platform for data exchange and communication among the Belgian climate modelling groups. CORDEX.be makes use of the most recent IPCC scenarios (2014). All impact assessments rely on these models. In the context of the CORDEX.be project, a wide range of climate model simulations have been performed that are collected on the CORDEX.be data hub at the RMI and will serve as the basis of future impact studies. The model simulations are thoroughly validated by comparison with past observations and GNSS-derived products.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes/ In progress/ No

The NAP provides sound climate risk and vulnerability assessments for 11 key sectors: agriculture, coastal areas, fishery, spatial planning and infrastructure, forests, biodiversity,

¹¹⁶ Walloon Waterways, URL: <http://voies-hydrauliques.wallonie.be/opencms/opencms/fr>, Date accessed on: 01/06/2018

¹¹⁷ Walloon Flood Portal, URL: <http://environnement.wallonie.be/inondations/>, Date accessed on: 01/06/2018

¹¹⁸ VVM drought report, URL: <http://www.waterinfo.be/download/e8cd3c39-0463-478e-a41b-1d3bfbad332c?dl=0>, Date accessed on: 01/06/2018

¹¹⁹ Federal Planning Bureau EM-DAT database, URL: http://www.indicators.be/fr/i/BGD_CLI_NDV/Victimes_de_catastrophes_naturelles, Date accessed on: 01/06/2018

¹²⁰ CORDEX – project, URL: <http://www.euro-cordex.be/>, Date accessed on: 01/06/2018

energy, health, water management, tourism, industry and services. The assessments indicate the types and intensity of climate impacts on these sectors by a colour gradation from green to red (opportunity to threat). The assessment is carried out in a qualitative way and provides climate impact information for the periods 2030, 2050 and 2085 within wet, mean and dry scenarios. The assessment is the combination of the results of the different climate impact assessments carried out by the regional governments and impact studies at federal level. In addition, the Flemish Environment Agency has published a climate assessment report in 2015¹²¹ and the research report on indicators for urban heat island effect in Flanders¹²².

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes/ **In Progress**/ No

Taking into account transboundary risks is not yet common practice in climate risk and vulnerability assessments in Belgium. It is mainly in the field of flood risk management where progress has been made, primarily as a result of joint projects. One of the examples is the Interreg AMICE project for which scientists from France, Belgium and the Netherlands have built a transnational scenario to evaluate climate impacts with regards to flood risks in the Meuse river basin. Another example is the ENDURE Interreg project, which aims to improve the adaptive capacity by focusing on the protection of sand dunes in the 2 Seas area. Furthermore, the Flemish drought and water scarcity indicator also considers risks of upstream parts of the international basins¹²³.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes/ In progress/ No

Research for better understanding is part of the Belgian adaptation policy. Knowledge gaps are addressed by:

- 1) Conventional research funding organisations. Knowledge gaps are mentioned in a general way but researchers have some freedom to determine the focus of their research. The Belgian Federal Science Policy Office (BELSPO) financed several projects on climate impacts and adaptation through the former ‘Science for a Sustainable Development’ (SSD) programme¹²⁴. Topics and sector-specific domains of interest addressed include transport, hydrological events, surface water, coastal

¹²¹ Climate assessment report 2015, URL: <http://www.milieurapport.be/nl/publicaties/topicrapporten/mira-rapport-klimaat-2015/> Date accessed on: 01/06/2018

¹²² Urban Heat Island report, URL: <http://www.milieurapport.be/nl/publicaties/topicrapporten/mira-rapport-klimaat-2015/> Date accessed on: 01/06/2018

¹²³ Risks in river basins, URL: <http://www.milieurapport.be/nl/feitencijfers/milieuthemas/waterkwantiteit/> Date accessed on: 01/06/2018

¹²⁴ Science for a Sustainable Development” programme, URL: http://www.belspo.be/belspo/ssd/science/pr_climate_nl.stm Date accessed on: 01/06/2018

management, fisheries and health. Several research projects have been launched to increase knowledge of climate impacts and adaptation through the BRAIN-be programme¹²⁵. In 2014, the call for project proposals by BELSPO included climate adaptation as one of its four priority themes. Special attention was directed to two research activities: understanding sectoral climate impacts, and developing policy decision-support tools that aim at evaluating the effects of climate change. The BRAIN-BE call in 2016 included a call for proposals for developing scientific support for the development of climate services. Unfortunately, no projects were selected for funding.

In total five projects are funded in the framework of the ERA4CS Joint Call on Researching and Advancing Climate Services Development by (A) Advanced co-development with users (B) Institutional integration, linked to the JPI Climate (two cash-funded via BELSPO and three funded in kind via RMI).

- 2) Research and studies funded by the policy departments themselves. These studies are upon request and knowledge gaps are identified and specified. Examples of these studies are the study on climate proof spatial planning, or on the needs assessment for local authorities on climate adaptation planning.
- 3) A think tank consisting of academics and other experts on climate adaptation (Flanders only), which was subsidised by the Flemish government from 2015 – 2017 to develop and spread knowledge on adaptation across disciplines. Knowledge gaps were identified and addressed during meetings^{126,127}.

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).

Yes/ In progress/ No

Information that is useful for adaptation is available online and can be used by different types of stakeholders.

In Flanders, there are portals with abundant adaptation-relevant information, including:

- An overview of Flemish adaptation policy¹²⁸
- Climate change information¹²⁹

¹²⁵ BRAIN-be programme, URL: https://www.belspo.be/belspo/brain-be/index_fr.stm Date accessed on: 01/06/2018

¹²⁶ DenkTank Adaptatie, URL: <http://dka.ugent.be/index.php/cases-2/eindcongres-denktank-klimaataadaptatie-vlaanderen>, Date accessed on: 01/06/2018

¹²⁷ DenkTank Adaptatie, URL: <http://www.dka.ugent.be/>, Date accessed on: 01/06/2018

¹²⁸ Vlaams adaptatiebeleid, URL: <http://www.vlaamseklimaatop.be/>, Date accessed on: 01/06/2018

¹²⁹ MIRA Klimaatrapport, URL: <http://www.milieurapport.be/nl/publicaties/topicrapporten/mira-rapport-klimaat-2015/>, Date accessed on: 01/06/2018

- Support for local authorities¹³⁰.

A climate portal will also soon be launched that includes geographical climate impact information at a detailed level for all Flemish municipalities¹³¹. The main policy department in climate adaptation has initiated this data provision.

In Wallonia, it is the Walloon Agency for Air & Climate (AWAC) that provides the online information to support adaptation. This information mainly aims at different sectors and at local authorities¹³²

The Brussels Capital region offers information on its website mainly limited to the policy plan¹³³.

At the federal level, the website¹³⁴ provides information on climate change and climate adaptation policy at all levels as well as climate observations and impacts.

A dedicated national online platform¹³⁵ is planned (with a committed budget) at the national level, as mentioned in the NAP.

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes/**In progress**/ No

A limited number of specific education and training materials could be identified in the available sources of information.¹³⁶

Some more generic materials, considering impacts and adaptation exist, such as the “KLIMOS” environmental sustainability toolkit for development cooperation, and educational files on climate change targeted to young students.

There has also been some capacity building of local authorities, particularly on how to develop adaptation plans. Several workshops were organised for the Walloon municipalities to disseminate these tools, within two frameworks: the Floods Directive and the elaboration

¹³⁰ Ondersteuning lokale overheden, URL: <http://www.vlaamseklimaatop.be/ondersteuning-lokale-overheden>, Date accessed on: 01/06/2018 ; adaptatieportaal, URL: <http://www.burgemeestersconvenant.be>, Date accessed on: 01/06/2018; Klimaat en Ruimte, URL: <http://www.klimaatruimte.be/>, Date accessed on: 01/06/2018

¹³¹ Klimaatportaal, URL: <https://www.milieurapport.be/klimaatportaal>, Date accessed on: 01/06/2018

¹³² URL: <http://www.awac.be/index.php/1-adaptation>, Date accessed on: 01/06/2018

¹³³ COBRACE, URL: http://environnement.brussels/thematiques/air-climat/laction-de-la-region/air-climat-et-energie-vision-integree?view_pro=1&view_school=1, Date accessed on: 01/06/2018

¹³⁴ URL: <http://www.climatechange.be/>, Date accessed on: 01/06/2018

¹³⁵ URL: www.adapt2climate.be, Date accessed on: 01/06/2018

¹³⁶ Outils de vulgarisation, URL: <http://www.awac.be/index.php/mediatheque/outils-de-vulgarisation>, Date accessed on: 01/06/2018

See also "Weather forecast in 2050" video to sensitize population to the future climate of Christmas in Belgium in 2050 (initiative during the WMO climate summit), URL: <http://www.awac.be/index.php/mediatheque/multimedia-1/item/98-bulletin-meteo-en-2050>, Date accessed on: 01/06/2018

of flood risk management plans; and the Walloon POLLEC Programme, which provides regional support to the cities in relation to the Covenant of Mayors objectives.

It is expected that the capacity building for public officers to develop adaptation plans will be developed in the near future in Flanders¹³⁷ as well. The Flemish Region and some Flemish provinces have organised a number of annual conferences, aiming at climate practitioners to share their experiences on mitigation and adaptation¹³⁸.

In addition, national conferences and roundtables are organised in a coordinated way by regional and federal governments to implement the NAP (Measure 4 ‘Strengthening sectoral coordination at national level’). The 1st Conference ‘Adaptation to Climate Change: What is the Situation in Belgium’ was organised in November 2017¹³⁹ and was attended by around one hundred people.

Step C: Identifying adaptation options

6. Adaptation options’ identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

Relevant adaptation options for each sector in the national, the federal and regional adaptation plans were selected on the basis of sound sectoral risk and vulnerability assessments¹⁴⁰. The options were identified by expert judgement of the relevant policy departments. Besides sectoral adaptation options, the regional, federal and national adaptation plans also mentioned ‘horizontal’ adaptation options like research, international collaboration

¹³⁷ Ondersteuning lokale overheden, URL: <http://www.vlaamseklimaatop.be/ondersteuning-lokale-overheden>, Date accessed on: 01/06/2018

¹³⁸ Interprovinciale klimaatdag, URL: <https://www.west-vlaanderen.be/kwaliteit/Leefomgeving/klimaat/Documents/Verslag%20interprovinciale%20klimaatdag%2013%20oktober%202016.pdf> en

Vlaams Brabant Klimaatneutraal, URL: <http://www.vlaamsbrabant.be/wonen-milieu/milieu-en-natuur/vlaams-brabant-klimaatneutraal/samen-met-jou-naar-een-klimaatneutrale-provincie/klimaattop-vlaams-brabant/index.jsp>, Date accessed on: 01/06/2018

¹³⁹ National climate Commission, URL: <https://www.cnc-nkc.be/en/ConfAdapt>, Date accessed on: 01/06/2018

¹⁴⁰ Federal contribution to the national adaptation plan, URL: http://www.klimaat.be/files/5514/7915/5040/federale_bijdrage_adaptatieplan.pdf, Date accessed on: 01/06/2018;

Vlaams adaptatieplan, URL: https://www.lne.be/sites/default/files/atoms/files/2013-06-28_VAP.pdf, Date accessed on: 01/06/2018;

COBRA, URL:

http://document.environnement.brussels/opac_css/elecfile/PLAN_AIR_CLIMAT_ENERGIE_NL_DEF.pdf, Date accessed on: 01/06/2018;

PACE, URL:

http://www.awac.be/images/Pierre/PACE/Plan%20Air%20climat%20%C3%A9nergie%202016_2022.pdf, Date accessed on: 01/06/2018

and transversal affairs. These adaptation options result from ambitions to better coordinate adaptation actions and are related to identified adaptation needs¹⁴¹.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

The selection of priority adaptation options for the NAP is the result of an extensive process. It was based on an analysis of the measures contained in the adaptation plans (three regions and the Federal Government) with the aim to identify the gaps and/or the opportunities for synergies. It was also based on the EU adaptation framework (particularly the EU Adaptation Strategy and its accompanying documents), and a study exploring potential national adaptation actions to be implemented jointly by the federal and regional authorities. The WGA of the NCC identified a set of measures based on this analysis. The relevance and feasibility of the measures were analysed in consultation with the relevant sectoral experts, according to criteria, such as the opportunity for implementation (focusing on the integration of adaptation into planned sectoral projects/process), the national added-value (i.e. the extent of benefits for all four entities) and the urgency of action.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes/ In progress / No

There is some evidence available on coordination mechanisms between the authorities dealing with disaster risk management and adaptation policies. There has been increased coordination in the context of the Federal contribution to the NAP, as the Federal Government is in charge of crisis and emergency management.

Belgium fostered better coordination between disaster risk reduction and climate adaptation by gathering the regional and federal crisis centre, adaptation experts, and climate services scientists in September 2017. Future coordination will build on the work realized in the framework of the cordex.be project and will look further into how to mainstream climate change in disaster risk prevention and management. This would be in line with implementation of Measure 11 of the NAP and Measure 5 of the Federal contribution to the NAP.

A national platform for disaster risk reduction (Sendai platform) was established in 2016 (coordinated by the Ministry of Foreign Affairs).

7. Funding resources identified and allocated

¹⁴¹ National Adaptation plan, URL: http://www.klimaat.be/files/6714/9880/5758/NAP_NL.pdf, Date accessed on: 01/06/2018

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / **In Progress** / No

A dedicated budget is not attached to the NAS. Funding for climate adaptation is available at all levels within existing governmental budgets.

For 2017 and 2018, the NCC foresaw a dedicated budget for the implementation of the NAP.¹⁴² The NAP actions are generally horizontal and, therefore, the budget is not dedicated to one specific sector but every sector can benefit from these measures (e.g. the budget to develop a web platform on adaptation where every sector will be integrated). The sectoral adaptation actions have to be financed by each of the relevant policy departments and need to be included in the annual department budget. Although there is no evidence of multi-annual funding for climate adaptation, the different governments allocate a part of their budget to implementing adaptation measures. For instance, in 2017, Flanders¹⁴³ and Wallonia¹⁴⁴ funded impact assessments and the development of adaptation support tools to help local authorities. Flanders funded the development of climate scenarios and assess climate impacts¹⁴⁵. In addition, there was a think tank¹⁴⁶ in Flanders on adaptation, financed by the Department of Environment and Spatial Development to bring together expertise. The Federal Government has funded an impact assessment study as well as research projects (via BELSPO). There appears to be no climate adaptation funding in the Brussels Capital region.

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

At the federal level, the need for Strategic Environmental Assessment (SEA) was established in law on 13 February 2006¹⁴⁷. The Federal Government has provided guidance on SEA via

¹⁴² Personal communication with MS contact.

¹⁴³ Ondersteuning lokale overheden, URL: <http://www.vlaamseklimaatop.be/ondersteuning-lokale-overheden>, <http://www.vlaamseklimaatop.be/ondersteuning-lokale-overheden.en>, Date accessed on: 01/06/2018; Adaptatieportaal, URL: <http://burgemeestersconvenant.be/klimaatadaptatie>, Date accessed on: 01/06/2018

¹⁴⁴ Tool to assess vulnerability at local level, URL: <http://www.awac.be/index.php/en/thematiques/changement-climatique/adaptation#a-diagnosis-of-vulnerability-at-the-local-level>, Date accessed on: 01/06/2018

¹⁴⁵ This fund is available at VMM

¹⁴⁶ DenkTank Adaptatie, URL: <http://www.dka.ugent.be/index.php/doelstelling/doelstelling>, Date accessed on: 01/06/2018

¹⁴⁷ SEA Guidance, URL: <https://www.health.belgium.be/nl/sea-guidance-klimaat-en-milieueffect>, Date accessed on: 01/06/2018

its website, since October 2017¹⁴⁸, in order to ensure that assessments address climate adaptation.

At the Flemish level, the Environmental Impact Assessment (EIA) Directive 2014/52/EU was transposed into law via the Decree of 3 February 2017¹⁴⁹. Consequently, climate adaptation is considered in EIA¹⁵⁰.

In the Walloon region and Brussels-Capital region, the former EU directive 2011/92/UE is still used to guide EIA, so climate change is not yet always considered in practice¹⁵¹.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes/ **No**

Disaster risk management is a shared responsibility between the local, provincial and federal levels. Disaster risk management plans do not include direct reference to climate change. The NAP¹⁵² includes a measure for the 2018 risk analysis to include consideration of climate impacts in order to revise the disaster risk management plans¹⁵³. Specific plans for the protection of critical infrastructure, as well as specific emergency management plans for floods¹⁵⁴, heat waves¹⁵⁵ and forest fires, do consider climate change to a certain extent.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes/ **No**

Climate change is not yet completely integrated in land use, spatial planning, urban planning and maritime planning. However, there are a few policy instruments implemented in spatial planning in Flanders that aim to avoid new developments in flood risk areas (e.g. the ‘watertoets’ and the ‘Signaalgebieden’ in Flanders¹⁵⁶). However, these policy instruments are based on current flood risk information rather than flood risks arising from climate change.

¹⁴⁸ SEA Guidance, URL: <https://www.health.belgium.be/nl/sea-guidance-klimaat-en-milieueffect>, Date accessed on: 01/06/2018

¹⁴⁹ Omgevingsvergunning en klimaatverandering in Vlaanderen, URL: <https://www.lne.be/omgevingsvergunning-gestart-op-23-februari-2017>, Date accessed on: 01/06/2018

¹⁵⁰ Richtlijnenboek Milieueffectenrapportage, URL: <https://www.lne.be/sites/default/files/atoms/files/rlb-alg-proc-en-meth-aspecten-2015.pdf>, Date accessed on: 01/06/2018

¹⁵¹ Portail environnement de Wallonie, URL: <http://environnement.wallonie.be/>, Date accessed on: 01/06/2018 and Evaluatie van de milieueffecten, URL: <https://stedenbouw.irisnet.be/vergunning/de-vergunningaanvraag/evaluatie-van-de-milieueffecten-1>, Date accessed on: 01/06/2018

¹⁵² Federale bijdrage adaptatieplan, URL: http://www.klimaat.be/files/5514/7915/5040/federale_bijdrage_adaptatieplan.pdf, Date accessed on: 01/06/2018

¹⁵³ Personal communication with MS contact.

¹⁵⁴ Flanders Hydraulics, URL: <http://www.waterinfo.be/>, Date accessed on: 01/06/2018

¹⁵⁵ Belgian Interregional Environment Agency, URL: http://www.irceline.be/en_and_Hittewaarschuwing, URL: <http://www.meteo.be/meteo/view/nl/1401103-Hittewaarschuwing.html>, Date accessed on: 01/06/2018

¹⁵⁶ Watertoets, URL: http://www.integraalwaterbeleid.be/nl/beleidsinstrumenten/watertoets_and, Date accessed on: 01/06/2018; Signaalgebieden, URL: <http://www.integraalwaterbeleid.be/nl/beleidsinstrumenten/signaalgebieden>, Date accessed on: 01/06/2018

Climate change is mentioned in maritime spatial planning. It is being taken into account throughout the planning process and has led to specific spatial decisions directly or indirectly related to climate change, e.g. the designation of a zone for a test island for coastal protection and the designation of additional zones for offshore renewable energy. In addition, climate change is included in EIA.

Regional forestry policy instruments (e.g. the Walloon forest code, the Flanders forestry policy and the Brussels forest plans) aim to enhance the climate resilience of forests. Some major water and flood management initiatives with land-use implications consider climate change (e.g. the Walloon Plan PLUIES¹⁵⁷ and the Flemish SIGMA plan¹⁵⁸). However, no guidance related to climate proofing of buildings has been found¹⁵⁹.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes/ In progress/ No

The NAS, the federal contribution to the NAP and the regional adaptation plans promote the mainstreaming of climate change in different policy sectors. Evidence of mainstreaming in sectors is reported in the 7th National Communication report¹⁶⁰ across many sectors, including water management, coastal areas, biodiversity, agriculture, forests, fishing, infrastructure and urban environment, transport, tourism, health, industry and services, energy, and disaster risk management. The policy instruments are diverse, ranging from an information campaign to encourage water savings to integrating climate change in the coastal safety master plan to encouraging farmer actions via climatic agri-environmental measures. The NAS (2010) has been the sole driver of mainstreaming climate adaptation in these sectors.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes/ No

The draft federal contribution to the NAP¹⁶¹ contains provisions to foster the consideration of climate risks in insurance and guarantee schemes, and to support the productive sectors in considering and addressing climate impacts and adaptation. However, this measure was not retained in the final version ('Federal Contribution to the NAP') adopted by the Federal Council of Ministers. Incorporating climate change in the insurance sector is also an ambition

¹⁵⁷ Plan Pluies, URL: http://environnement.wallonie.be/de/dcenn/plan_pluies/index.htm, Date accessed on: 01/06/2018

¹⁵⁸ Sigmaplan, URL: <http://sigmaplan.be/nl/>, Date accessed on: 01/06/2018

¹⁵⁹ Personal communication with MS contact.

¹⁶⁰ 7th National Communication, URL: http://www.klimaat.be/files/4315/1549/8156/NC7_EN_LR.pdf, Date accessed on: 01/06/2018

¹⁶¹ Federal Contribution to the national adaptation plan, URL: http://www.klimaat.be/files/5514/7915/5040/federale_bijdrage_adaptatieplan.pdf, Date accessed on: 01/06/2018

of the Flemish Adaptation Plan. However, the progress report^{162,163} indicated that the insurance sector is not yet willing to include climate change in their products due to lack of a legal framework. No evidence was found of other incentives for investments in risk prevention.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes /**In progress**/ No

The NAS as well as the federal contribution to the NAP and the regional adaptation plans, have listed adaptation measures and actions. These actions are mainly defined by sectors and are implemented by the respective policy departments. There are also some overarching horizontal adaptation actions listed like carrying out research¹⁶⁴, and establishing transnational cooperation¹⁶⁵.

Many of the adaptation actions are being implemented¹⁶⁶ sectorally, i.e. in relation to water management, coastal areas, biodiversity, agriculture, forests, fishing, infrastructure and urban environment, transport, tourism, health, industry & services, energy and disaster risk management. Examples of adaptation actions include: awareness raising on the importance of healthy soils; connecting nature areas; setting up a centre of excellence on adaptation; considering climate change when restoring.

At the federal level, the adaptation actions have been implemented since 2016, so are in progress, as was planned.

At the Flemish level, implementation of adaptation actions started in 2013 and most actions are in progress, as was planned.

At the Walloon level, implementation of adaptation actions started in 2016 and most actions are in progress, as was planned.

In the Brussels Capital region, implementation of adaptation actions started in 2016.

¹⁶² Voortgangsrapport 2015. Vlaams Adaptatiebeleid, URL:

<https://www.lne.be/sites/default/files/atoms/files/VR%202016%201504%20MED.%20VORA2015%20-%203%20bijlage.pdf>, Date accessed on: 01/06/2018

¹⁶³ Voortgangsrapport 2017 Vlaams Adaptatiebeleid, URL:

https://www.lne.be/sites/default/files/atoms/files/VORA2016-2017_Adaptatie.pdf, Date accessed on: 01/06/2018

¹⁶⁴ Vlaams Adaptatieplan, URL: https://www.lne.be/sites/default/files/atoms/files/2013-06-28_VAP.pdf, Date accessed on: 01/06/2018

¹⁶⁵ Nationaal Adaptatieplan, URL: http://www.klimaat.be/files/6714/9880/5758/NAP_NL.pdf, Date accessed on: 01/06/2018

¹⁶⁶ Voortgangsrapport 2015. Vlaams adaptatieplan, URL:

<https://www.lne.be/sites/default/files/atoms/files/VR%202016%201504%20MED.%20VORA2015%20-%203%20bijlage.pdf>, Date accessed on: 01/06/2018

At the national level, implementation started in 2017.

There are some adaptation actions that emerged autonomously and were implemented even before the adaptation plans were developed, like the SIGMA plan in Flanders in 2005 or Plan PIUIES in Wallonia in 2003.

In addition to the adaptation measures in the NAP, there are also some provinces and cities that have listed adaptation measures that will soon be implemented¹⁶⁷.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes/No

Cooperation mechanisms at provincial and local levels are under development in Flanders and Wallonia. These are the regions that could benefit most from these cooperation mechanisms. The cooperation is being formalised in the Walloon.

In Flanders, the cooperation mechanism is provided by an adaptation support tool that was developed by the Flemish government with a pilot group of local authorities in order to support local authorities in the development of their adaptation plans. This support tool includes:

- A climate atlas that reveals the most vulnerable areas in Flanders
- A tool to explore adaptation measures¹⁶⁸; and
- Good practices about climate adaptation.

In the Walloon region, a comparable adaptation support tool for local authorities is available.¹⁶⁹

The Walloon region has recently signed a commitment to be a territorial coordinator of the Covenant of Mayors. Cooperation is, therefore, emphasized in a more formal way. Several workshops have been organized to present the tools available for the cities in the framework of the POLLEC Programme. This programme supports cities to develop action plans for the Covenant of Mayors. Wallonia also has more *ad hoc* cooperation, like the workshops organised in the framework of the Flood Directive and the elaboration of the flood risk

¹⁶⁷ Provinciaal Adaptatieplan, URL:

<https://www.provincieantwerpen.be/content/dam/provant/dlm/dmn/klimaat/ProvinciaalAdaptatiePlan.pdf>, Date accessed on: 01/06/2018; Adaptatieplan provincie Limburg, URL:

http://www.limburg.be/webfiles/limburg/product/klimaat_klimaatadaptatieplan_2017.pdf, Date accessed on: 01/06/2018; Adaptatieplan stad Gent, URL:

https://klimaat.stad.gent/sites/default/files/klimaatadaptatieplan_gent.pdf, Date accessed on: 01/06/2018

¹⁶⁸ Adaptatieportaal, URL: <http://www.burgemeestersconvenant.be/klimaatadaptatie>, Date accessed on: 01/06/2018

¹⁶⁹ Tools to assess vulnerability, URL: <http://www.awac.be/index.php/en/thematiques/changement-climatique/adaptation#a-diagnosis-of-vulnerability-at-the-local-level>; Adaptatiportal for Walloon local authorities, URL: <http://leswallonssadaptent.be>, Date accessed on: 01/06/2018

management plans. These workshops were organised to disseminate information to cities, provinces and other actors in charge of the flood risk management the Walloon region. The adaptation tool for cities has been presented during these workshops.

Some provinces are planning to coordinate adaptation with the local authorities. However, as yet, no formalized coordination group has been established.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes/ No

Measure 9 of the Federal contribution to the NAP is a cross-sectoral measure that foresaw mainstreaming of climate adaptation in the development of federal policies. This measure has been implemented through:

- Integration of adaptation in the analysis procedure for regulation (the so-called AIR – ‘analyse d’impact de législation’) as well as in the manual for impact analysis for regulation.
- Development of guidelines to promote better integration of climate mitigation and adaptation (and biodiversity) in SEA and EIA in the North Sea. The guidelines were published in October 2017¹⁷⁰. A (general) reference to the guidelines has been made in the Belgian EIA regulation for activities in the North Sea (Royal Decree of 9 September 2003). The existing guidelines¹⁷¹ for SEA will be updated according to the guidance.

Flanders has already developed guidelines to consider climate in EIA.

9d. There are processes for stakeholders’ involvement in the implementation of adaptation policies and measures.

Yes / **No**

Many of the adaptation plans are government-driven. Stakeholders have a limited role in the implementation of adaptation measures and are involved on an ad hoc basis, depending on the adaptation measure considered. Although it is proposed that measures to address climate impacts should be taken up by the private sector, there does not seem to be any public-private cooperation.

¹⁷⁰ Guidance climate change in EIA, URL: http://www.climat.be/files/8215/0874/7294/Guidance_climat_et_impact_environmental.pdf, Date accessed on: 01/06/2018

¹⁷¹ Evaluation des incidences environnementales de certains plans, URL: <https://www.health.belgium.be/fr/document-dorientation-pour-levaluation-des-incidences-environnementales-de-certains-plans-et>, Date accessed on: 01/06/2018

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring, reporting and evaluation.

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes/ No

Monitoring implementation of adaptation policy takes place every two to four years at the national level¹⁷². The WGA monitors the progress of implementation in a qualitative way by listing actions that are carried out by the different policy departments¹⁷³. The monitoring indicators that are described in the different adaptation plans are used as guidance. Allocated budgets and other financial information are not monitored. The National Climate Commission integrates monitoring results into the National Communication report¹⁷⁴.

Monitoring has been taking place since 2015, as part of the National Communication report. Results were disseminated in the 6th National Communication (2015-2016)¹⁷⁵ and in the 7th National Communication (2017-2018)¹⁷⁶, and are accessible amongst others via the national website¹⁷⁷ and the federal website¹⁷⁸.

A workshop for French-speaking technical staff working on climate adaptation in Africa was co-organised by Germany, Belgium, Switzerland, France, FAO and UNDP (Cluster Francophone) in May 2018 in Couala (Cameroun). The focus was on monitoring and evaluation of adaptation measures.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

The monitoring results in National Communications are organised according to sectoral policies. However, the monitoring of the NAP is not specified per sector.

¹⁷² Rapportering klimaatbeleid, URL: <http://www.klimaat.be/nl-be/klimaatbeleid/belgisch-klimaatbeleid/rapportering>, Date accessed on: 01/06/2018

¹⁷³ 7th communication climate policy, URL: http://www.klimaat.be/files/4315/1549/8156/NC7_EN_LR.pdf, Date accessed on: 01/06/2018

¹⁷⁴ 6th communication climate policy, URL: http://www.klimaat.be/files/6714/9880/5758/NAP_NL.pdf, Date accessed on: 01/06/2018

¹⁷⁵ http://www.klimaat.be/files/7514/5034/4559/BR2_EN.pdf, Date accessed on: 01/06/2018

¹⁷⁶ 7th National Communication, URL: http://www.klimaat.be/files/4315/1549/8156/NC7_EN_LR.pdf, Date accessed on: 01/06/2018

¹⁷⁷ URL: www.cnc-nkc.be, Date accessed on: 01/06/2018

¹⁷⁸ URL: www.climatechange.be, Date accessed on: 01/06/2018

Nevertheless, at the Flemish level, the different policy sectors report on a bi-annual basis on the progress of their adaptation actions¹⁷⁹. The first progress report was published for the period 2013-2015. The second report for the period 2015-2017 was approved in March 2018.

At the federal level, in the framework of the federal law on monitoring, reporting and verification (MRV), sectoral departments of the federal authority have to report on the implementation of their respective adaptation measures (taken or planned), particularly the actions provided for in the federal contribution to the NAP. Monitoring addresses the main objectives, the climate impact category targeted, the planned and allocated budgets, the degree of implementation and, to the extent possible, indicators (the Royal Decree implementing the Law is not published yet).

At the level of the Walloon and the Brussels Capital region, no evidence was found of how climate adaptation is monitored in sectoral policies.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes/No

There is no systematic monitoring mechanism to collect and disseminate information on progress with the implementation of adaptation actions at the provincial or local levels.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes/No

A mid-term evaluation of the NAP will take place in 2018 and a final evaluation in 2020. This timing is aligned with the periodic National Communication and the development of the next NAP. Indicators identified in the NAP will be used in the evaluations. The mid-term evaluation will assess the progress of implementation and evaluate strengths and weaknesses. The final evaluation will mainly focus on identifying remaining gaps with regard to adaptation actions.^{180,181}

The regional level will contribute to the evaluation. The federal level has specified in the Federal Contribution to the NAP that an evaluation will take place to assess coherence between actions in the NAP and actions taken at the federal level.

¹⁷⁹ URL:

<https://www.lne.be/sites/default/files/atoms/files/VR%202016%201504%20MED.%20VORA2015%20-%203%20bijlage.pdf>, Date accessed on: 01/06/2018

¹⁸⁰ National Adaptation plan, URL: http://www.klimaat.be/files/6714/9880/5758/NAP_NL.pdf

¹⁸¹ Federal contribution to national adaptation plan, URL: http://www.klimaat.be/files/5514/7915/5040/federale_bijdrage_adaptatieplan.pdf

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes/No

No specific information on external stakeholder involvement in the monitoring, evaluation or review of the adaptation strategies or plans was found. It is expected that assessment, evaluation and review will be undertaken by the actors involved in the WGA and respective regional platforms.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 Coordination structure		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In Progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	Yes / <u>In Progress</u> / No
2 Stakeholders' involvement in policy development		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 Current and projected climate change		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	<u>Yes</u> / In progress / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No
4 Knowledge gaps		
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	<u>Yes</u> / In progress / No
5 Knowledge transfer		
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	<u>Yes</u> / In progress / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices	Yes / <u>In progress</u> / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	are available and disseminated	
Step C: Identifying adaptation options		
6 Identification of adaptation options		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	Yes/ <u>In Progress</u> / No
7 Funding resources identified and allocated		
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / <u>In Progress</u> / No
Step D: Implementing adaptation action		
8 Mainstreaming adaptation in planning processes		
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	Yes / <u>No</u>
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	Yes / <u>No</u>
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	<u>Yes</u> / In Progress / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 Implementing adaptation		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In Progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	Yes / <u>No</u>

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	<u>Yes</u> / No
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	Yes / <u>No</u>
Step E: Monitoring and evaluation of adaptation activities		
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
11 <i>Evaluation</i>		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	Yes / <u>No</u>

Adaptation preparedness scoreboard country fiche for Bulgaria

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List of abbreviations

EIA	Environmental Impact Assessment (EIA)
IBRD	International Bank for Reconstruction and Development
IPCC	Intergovernmental Panel on Climate Change
NAS	National adaptation strategy
NAP	National adaptation plan
NAMRB	National Association of Municipalities in the Republic of Bulgaria
MoEW	Ministry of Environment and Water
SEA	Strategic Environmental Assessment

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

On May 4th, 2018, Bulgaria published a draft national adaptation strategy (NAS)¹⁸² that covers the period until 2030. Using resources from the EU structural funds operational programme on Good Governance, the Government of Bulgaria commissioned the World Bank to provide advisory services on: “Strengthening strategic planning on climate adaptation, including providing inputs for the preparation of a National Climate Change Adaptation Strategy, together with an Action Plan – for the Ministry of Environment and Water”¹⁸³. The objectives of this project were to:

- Assess options to address climate risks across the economy
- Formulate the NAS and national adaptation plan (NAP) for the period to 2030
- Strengthen capacity for implementation and cross-sector coordination on climate adaptation.

The draft NAS is intended to serve as a reference document, setting a framework for climate adaptation action and priority directions up to 2030, and identifying and confirming the need for climate adaptation action both at economy-wide and sectoral levels, while highlighting the consequences of no action.

A2. Adaptation strategies adopted at subnational levels

The draft NAS has adopted a sectoral rather than a regional approach to climate adaptation. Nevertheless, regional development plans¹⁸⁴ developed under the EU Cohesion Policy¹⁸⁵ each include a separate chapter on climate change related (mainly adaptation) measures relevant at the local level (see B2).

Additionally, a Strategy on Adaptation to Climate Change for Sofia Municipality has been developed under the EU-funded project “Transitioning towards Urban Resilience and Sustainability (TURAS)”¹⁸⁶. The Strategy has the following objectives: 1. To develop horizontal policies and strategic planning; 2. To increase institutional capacity and improve co-operation between institutions; 3. To support targeted research and monitoring to fill the

¹⁸²Proposal for a National Climate Change Adaptation Strategy and Action Plan, URL:

[http://www.moew.government.bg/static/media/ups/tiny/%D0%9F%D0%98%D0%9A/%D0%9C%D0%9F%D0%90/Strategy%20and%20Action%20Plan%20-%20Full%20Report%20-%20Draft%20\(2018-05-03\)%20-%20EN%20V4.EM.pdf](http://www.moew.government.bg/static/media/ups/tiny/%D0%9F%D0%98%D0%9A/%D0%9C%D0%9F%D0%90/Strategy%20and%20Action%20Plan%20-%20Full%20Report%20-%20Draft%20(2018-05-03)%20-%20EN%20V4.EM.pdf), Access date: 10/05/2018

¹⁸³ Climate Change Adaptation Advisory Support to Bulgaria, URL:

<http://www.worldbank.org/en/events/2017/03/01/inception-workshop-in-bulgaria#3>, Access date:10/05/2018

¹⁸⁴Ministry of Regional Development website, URL: <http://www.mrrb.government.bg/regionalni-planove-za-razvitiie-na-rajonite-ot-nivo-2-za-perioda-2014-2020-g-prieti-s-reshenie-na-ms/>

¹⁸⁵Regional Development Plans 2014-2020, URL:

<http://www.mrrb.government.bg/?controller=articles&id=521>, Access date: 10/05/2018

¹⁸⁶Стратегия за адаптация към климатичните промени на Столична община, URL:

https://www.sofia.bg/search?p_p_id=101&p_p_lifecycle=0&p_p_state=maximized&p_p_mode=view&_101_st_ruts_action=%2Fasset_publisher%2Fview_content&_101_returnToFullPageURL=%2Fsearch&_101_assetEntryId=1395518&_101_type=document, Access date: 10/05/2018

knowledge gaps regarding anticipated climate impacts; 4. To improve citizens' awareness through climate change information campaigns; 5. To identify additional benefits of risk prevention and adaptation.

Adaptation action plans

B1. National adaptation plan

A draft NAP was published as a chapter¹⁸⁷ within the draft NAS. The development of the draft NAP followed an iterative process to identify and select sectoral operational objectives and specify the underlying actions. This was based on a process of developing sector assessment reports for the nine key sectors and has been informed by the disaster risk management and macro-economic analysis reports. The process involved a series of stakeholder consultations that also included relevant government agencies. The stakeholder groups were organised using a multi-criteria analysis approach, following Climate-Adapt guidance¹⁸⁸. In the selection of draft operational objectives and priority activities for these objectives, with associated implementation details, a consultation between the NAS and NAP writers and sectoral experts was carried out. The NAP, thus, includes operational objectives and priority options, an explanation of proposed activities, expected results and performance indicators.

B2. Adaptation plans adopted at sub-national level

In 2013, the Council of Ministers adopted the 2014-2020 Regional Development Plans of Level 2 regions under the EU Cohesion Policy¹⁸⁹. The plans outline the development of the Northeast, Northwest, Southwest, Southeast, North Central and South-Central Regions, featuring a section about the region's climate vulnerability. The sections include suggested adaptation measures at regional level. The sectors most vulnerable to climate change in the different regions include agriculture, biodiversity, tourism, water resources management, power generation, fisheries, and forestry.

Local authorities (municipalities) have an important role to play, particularly regarding the implementation of adaptation actions, which is reflected in the operational programmes¹⁹⁰ for the new programming period.

B3. Sectoral adaptation plans

¹⁸⁷ Chapter 5, Proposal for a National Climate Change Adaptation Strategy and Action Plan, URL: [http://www.moew.government.bg/static/media/ups/tiny/D0%9F%D0%98%D0%9A/%D0%9C%D0%9F%D0%90/Strategy%20and%20Action%20Plan%20-%20Full%20Report%20-%20Draft%20\(2018-05-03\)%20-%20EN%20V4.EM.pdf](http://www.moew.government.bg/static/media/ups/tiny/D0%9F%D0%98%D0%9A/%D0%9C%D0%9F%D0%90/Strategy%20and%20Action%20Plan%20-%20Full%20Report%20-%20Draft%20(2018-05-03)%20-%20EN%20V4.EM.pdf), Access date: 10/05/2018

¹⁸⁸ Adaptation Support Tool: Prioritise adaptation options and select preferred ones, URL: <https://climate-adapt.eea.europa.eu/knowledge/tools/adaptation-support-tool/step-4/prioritise-and-select>, Access date: 10/05/2018

¹⁸⁹ Regional Development Plans 2014-2020, URL: <http://www.mrrb.government.bg/?controller=articles&id=521>, Access date: 10/05/2018

¹⁹⁰ Website of Ministry of Regional Development, URL: <http://www.mrrb.government.bg/regionalni-planove-za-razvitiie-na-rajonite-ot-nivo-2-za-perioda-2014-2020-g-prieti-s-reshenie-na-ms/> -, Access date: 10/05/2018

The draft NAS provides a list of strategic objectives for nine economic sectors, including agriculture, biodiversity and ecosystem services, energy, forestry, human health, tourism, transport, the urban environment (including infrastructure and construction) and water. The overarching objectives relate to mainstreaming adaptation in the policies and strategies within each sector, as well as to building capacity, raising awareness and increasing climate resilience. The process of integrating these objectives has not yet begun, as the NAS is not yet approved.

Outside the policy options planned as a part of the response to the EU Adaptation Strategy, the most recent river basin management plans in 2016¹⁹¹ provide for the development of environmental protection and water management adaptation measures. These plans focus on the elaboration and implementation of drought management plans. This entails, *inter alia*, options for the construction of facilities to capture and use biogas in waste water treatment plants, water savings and efficiency, reduction of erosion in water catchment areas. In addition, it includes resilience selection criteria for project funding that are based on an assessment of climate impacts on water resources and water use.

Flood risk management plans¹⁹² for all four river basins in the country were implemented on 29th December 2016 under the Floods Directive¹⁹³. The plans were developed on the basis of preliminary flood risk assessments completed in 2011. The Ministry of Environment and Water has developed hazard and flood risk maps and methodologies for preliminary assessment of flood risks. The areas at significant flood risk were identified in 2013 in relation to disaster management.

In 2011, the “Programme of measures to adapt forests in the Republic of Bulgaria and mitigate the negative impact of climate change on them”¹⁹⁴ was adopted by the Ministry of Agriculture, Food and Forestry. Forestry is also covered by the draft NAS. To avoid overlap between policies, coordination between the 2011 forestry adaptation programme and the NAS is planned in the draft NAS. Finally, the Ministry of Agriculture, Food and Forest has adopted the National Forest Strategy 2013 – 2020^{195,196}, which also includes measures to strengthen the climate resilience of forest ecosystems.

SCOREBOARD

Step A: Preparing the ground for adaptation

¹⁹¹ River Basin Management Plans in 2016-2021, URL: <http://www.moew.government.bg/bg/vodi/planove-za-upravlenie/planove-za-upravlenie-na-rechnite-basejni-purb/>, Access date: 10/05/2018

¹⁹² Ministry of Energy and Environment web site, section on Flood Risk Management Plans with links to the respective plans, URL: http://www5.moew.government.bg/?page_id=24259, Access date: 10/05/2018

¹⁹³ Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks (Text with EEA relevance), URL: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32007L0060>, Access date: 15/05/2018

¹⁹⁴ Forestry program, URL: http://www.iag.bg/data/docs/Programa_ot_merki.pdf, Access date: 10/05/2018

¹⁹⁵ National Forest Strategy 2013, URL: http://www.mzh.government.bg/MZH/en/ShortLinks/cross_compliance/Gorskisektor.aspx, Access date: 10/05/2018

¹⁹⁶ Национална стратегия за развитие на горския сектор в Република България за, URL: <http://www.strategy.bg/StrategicDocuments/View.aspx?lang=bg-BG&Id=875> - Access date: 10/05/2018

1 Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

In Bulgaria, a Climate Change Policy Directorate was established within the Ministry of Environment and Water (MOEW). The body is responsible for the transposition of all EU laws and policies relating to climate change into national law. It is also responsible for the coordination of the policy-making processes relating to the NAS.¹⁹⁷

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

Horizontal coordination mechanisms exist within the governance system, with division of responsibilities in relation to climate adaptation measures. Article 3, paragraph 4 of the Climate Change Mitigation Act governs the establishment of the National Expert Council on Climate Change, as an advisory body to assist the MoEW in the implementation of state policy on climate mitigation and adaptation. The Council consists of representatives of the different governmental ministries, National Association of Municipalities in Republic of Bulgaria, Regional governmental authorities, the Bulgarian Academy of Sciences, environmental NGOs and businesses. In this sense, the body provides both horizontal and vertical coordination.

Furthermore, a National Coordination Council on Climate Change was created to support the coordination of the operational process relating to the implementation of climate mitigation and adaptation policies. It is led by the MoEW and involves representatives of all relevant ministries, at deputy minister level, and some agencies fostering the development of the NAS. The MoEW is also assisted by the National Expert Council on Climate Change referred to above.

Both bodies take part in the reviews of all reports prepared as a part of the NAS development, and are currently reviewing the draft NAS and NAP.¹⁹⁸ Within the Government, institutions with responsibilities for integration of climate change (both mitigation and adaptation) include: the Ministry of Agriculture, Food and Forestry; the Ministry of Transport, IT and Communications; the Ministry of Finance; the Ministry of Interior; the Ministry of Foreign Affairs; the Ministry of Health; the Ministry of Education and Science; the Ministry of Labour and Social Policy; and the Environment Executive Agency. Moreover, some adaptation measures have been taken up at the national level by the Ministry of Economy, the Ministry of Energy, and the Ministry of Regional Development and Public Works. The draft NAS makes it clear that each individual Ministry would be responsible for implementing and mainstreaming the measures outlined in the NAS in their respective sector.

¹⁹⁷ Climate policies information, URL: <http://www.moew.government.bg/bg/klimat/>, Access Date: 10/05/2018

¹⁹⁸ Personal communication with MS contact.

Further horizontal coordination is planned in the draft NAS to support capacity building activities, although it is not clear whether this would be done by the National Expert Council on Climate Change and National Coordination Council on Climate Change.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.

Yes / In progress / No

At national level, the coordination of municipalities on different issues is carried out through a National Association of Municipalities in the Republic of Bulgaria (NAMRB). All municipalities are members of NAMRB (a total of 265). NAMRB's activity is focused on three main areas:

- Representation of municipalities interests in central governmental affairs: research, analysis, evaluation and development of proposals for change and improvement of policy on local government; and lobbying
- Support to municipalities in executing their powers: studying of municipal opinions and developing consensus positions and strategies; providing a wide range of consulting services and training programs; issuing thematic and advisory guides; and providing its own training centre for municipalities
- Participation in Bulgarian and international forums; and organisational strengthening of NAMRB.

The NAMRB enables municipalities to influence the policy making process in climate adaptation policy through representatives in the National Expert Council on Climate Change (see Indicator 1b).

To ensure efficiency and coordination between competent institutions, the MOEW established a National Coordination Council on Climate Change. All relevant documents regarding the development of the NAS were presented to the Council and its representatives had the opportunity to review the documents and to give their opinions and remarks, which are reflected in the documents.

2 Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

The NAS and NAP are being developed with wide public participation through ongoing public consultation and consideration of all key milestones in the development of the NAS at the National Expert Council on Climate Change. For this purpose, an operational body - the National Coordination Council on Climate Change (consisting of deputy ministers and experts from the competent departments) has been established to review, evaluate and deliver opinions and proposals on individual documents before submitting them for discussion to the National Expert Council on Climate Change. This is to provide support at all levels and in all sectors while developing the NAS and for the measures, which will be included in the NAP.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

The draft NAS does not include any explicit transboundary cooperation measures. Nevertheless, in the initial development of the draft NAS, a framework document was developed to underpin the preparation of the NAS: “National climate change risk and vulnerability assessment for the sectors of the Bulgarian economy”. This document assesses the risk of climate change related natural disasters in Bulgaria based on various climate models and scenarios. The economic sectors included are agriculture, water, urban environment (including urban infrastructure and construction), energy, transport, construction and infrastructure, ecosystems and biodiversity, human health and tourism. The framework document also includes a separate chapter on cross-border cooperation on issues related to climate impacts¹⁹⁹.

In addition, Bulgaria is a member of various transboundary initiatives:

- Bulgaria is a member of The EU Strategy for the Danube Region which has facilitated transboundary cooperation between Bulgaria and Romania on issues relevant to climate adaptation. The actions include joint planning and capacity building and best practice sharing.
- Bulgaria also participates in the IPA Cross-border Cooperation Programmes: Bulgaria – Serbia²⁰⁰, Bulgaria-Turkey²⁰¹ and Bulgaria-Macedonia²⁰². These programmes include a priority axis towards protecting the environment and promoting climate adaptation and mitigation, risk prevention and management.
- In 2013, under the IPA Bulgaria – Serbia programme, a project called "Click"-Climate change - Kick-off" was developed, which aims to raise public awareness of the climate impacts. It assessed how to adapt to climate change by developing the capacity of NGOs to participate actively in the preparation and implementation of measures and policies for adaptation.
- In relation to the preparation of Bulgaria’s regional river basins management plans for 2016-2021, Bulgaria has signed declarations on transboundary river cooperation with Greece and Turkey. These declarations have facilitated various meetings and exchange of information for the preparation of the regional river basins management plans (in Bulgaria).²⁰³
- In addition, the Bulgaria-Romania Cross-border Cooperation Programme 2014-2020²⁰⁴ supports joint action on tackling flood risks, desertification and heatwaves. This programme includes measures for promoting climate adaptation, risk prevention

¹⁹⁹ UNFCCC, Report of the technical review of the sixth national communication of Bulgaria, URL: <https://unfccc.int/sites/default/files/resource/docs/2015/idr/bgr06.pdf>, Access date: 16/05/2018

²⁰⁰ IPA Cross-border Cooperation Programme Bulgaria – Serbia, URL: <http://www.ipacbc-bgrs.eu/sr>, Access date: 16/05/2018

²⁰¹ IPA CBC Bulgaria-Turkey, URL: <http://www.ipacbc-bgrtr.eu/>, Access date: 16/05/2018

²⁰² IPA CBC Bulgaria-Macedonia, URL: <http://www.ipa-cbc-007.eu/>, Access date: 16/05/2018

²⁰³ Министерство на Околната среда и водите, План за управление на речните басейни, 2016-2021, page 16, URL: http://www5.moew.government.bg/?wpfb_dl=17218, Access date: 16/05/2018

²⁰⁴ Interreg V-A Romania-Bulgaria, URL: <http://www.interregrobg.eu/en/>,

and management. The same type of programme is also running between Bulgaria and Greece²⁰⁵, and aims at maintaining a sustainable and climate adaptable cross-border area.

Step B: Assessing risks and vulnerabilities to climate change

3 Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / **In progress** / No

Climate change is monitored by the National Institute of Meteorology and Hydrology at Bulgarian Academy of Science (NIMH-BAS).²⁰⁶ There is only one Global Atmosphere Watch station in the country (Rojen). Hydrological information is presented on a separate website²⁰⁷. The National Institute of Meteorology and Hydrology has overall responsibility for research and operational activities in meteorology, agrometeorology and hydrology in Bulgaria.

A programme of the Ministry of Agriculture for adaptation of forests to climate change, established in 2011, includes systems for monitoring the following: (i) early detection and warning about forest fires, (ii) forest diseases, and (iii) grass coverage in high altitude mountains. The programme also outlines measures relating to improving forest health and resilience, and ensuring the availability of technology for land and air patrolling and fire control.²⁰⁸

The National Institute of Meteorology and Hydrology at the Bulgarian Academy of Science publishes a monthly hydro-meteorological bulletin²⁰⁹. It provides a national overview of the main processes and phenomena of the meteorology, agrometeorology, hydrology and ecology. Operational information gathered from NIMH's national network enables a rapid and overall assessment of the impact of these phenomena and processes on different spheres of the economy and public life.

In addition, a National Report on the State of the Environment in Bulgaria is developed every year by experts of the of the Executive Environmental Agency, the MOEW and other institutions. The Report includes a chapter on climate change where current information can

²⁰⁵ Interreg V-A Greece-Bulgaria <http://www.greece-bulgaria.eu/> Access date: 16/05/2018

²⁰⁶ National Institute of Meteorology and Hydrology at Bulgarian Academy of Science (NIMH-BAS), URL: <http://www.meteo.bg/en>, Access date: 16/05/2018

²⁰⁷ National Institute of Meteorology and Hydrology, URL: <http://hydro.bg/>, Access date: 16/05/2018

²⁰⁸ Program of Measures of the Ministry of Agriculture for adaptation of the forests of the Republic of Bulgaria to climate change by vulnerability zones, URL: http://www.iag.bg/data/docs/Programa_ot_merki.pdf Access date: 16/05/2018

²⁰⁹ Monthly hydro-meteorological bulletin, URL <http://www.meteo.bg/en> Access date: 16/05/2018

be found relating to rainfall, temperature and snow characteristics, assessment of indicators, climate phenomena and climate scenarios for Bulgaria.²¹⁰

No specific observation system is currently in place to monitor extreme weather events and their impacts.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / **In progress** / No

Much of the current knowledge regarding the observation of extreme climate events and their impacts derives from the Intergovernmental Panel on Climate Change (IPCC) Working Group II Fifth Assessment Report (IPCC 2014) or from EU-funded projects (e.g. CLAVIER (Climate Change and Variability: Impact on Central and Eastern Europe) project²¹¹ funded by FP6).

The CLAVIER project supports research on linkages between climate change and its impact on weather patterns, air pollution, extreme events, and water resources. An evaluation of the economic impact on agriculture, tourism, energy supply and the public sector is conducted in this project as well.

The CECILIA (Central and Eastern Europe Climate Change Impact and Vulnerability Assessment) project²¹² provides high resolution simulations covering the region. It captures complex topographical and land-use features related to climate impacts on large urban and industrial areas, including hydrology, water quality, and water management (focusing on medium-sized river catchments and the Black Sea coast).

Scenarios and projections for the coming decades derive from the CLAVIER and CECILIA projects mentioned above or from the HadCM3 model.

The preparation of the “Assessment of the Vulnerability of the Sectors of the Bulgarian Economy to Climate Change”²¹³ included relevant research from the EU-funded PESETA and PESETA II projects implemented by the European Commission’s Joint Research Centre (JRC).

The “National climate change risk and vulnerability assessment for the sectors of the Bulgarian economy” (2014) was developed by using different scenarios and climate models. The assessments of expected changes in temperature and rainfall were based on IPCC SRES-

²¹⁰Климат, URL: <http://eea.government.bg/bg/soer/2015/climate/climate0> Access date: 16/05/2018

²¹¹ CLAVIER project, URL: <http://www.clavier-eu.org/?q=node/5> Access date: 16/05/2018

²¹²CECILIA project, URL: <http://www.cecilia-eu.org/>, Access date: 17/05/2018

²¹³ Sectoral vulnerability assessments (BG), URL: <http://www.moew.government.bg/bg/klimat/mejdunarodni-pregovori-i-adaptaciya/adaptaciya/////>, Access date: 17/05/2018

scenarios using global (HadCM2, HadCM3 and ECHAM4, LMDZ v4, etc.) and regional (HIRHAM, REMO5.7, REMO5.0, LMDZ-regional, etc.) climate models. The global models used were low resolution; a significantly higher resolution was achieved with the help of regional models. The surveys affecting Bulgaria are generally realized in international projects, which is why much of their results relate not only to Bulgaria but also to larger territories (mainly Central and South-Eastern Europe).

The draft NAS states that the IPCC SRES-scenarios in projections about air temperature and precipitation have been replaced by the IPCC Working Group II Fifth Assessment Report (IPCC 2014). For the purpose of this analysis, computer simulations of the expected changes in temperatures and rainfall in the four RCP- scenarios (RCP 2.6, RCP 4.5, RCP 6 and RCP 8.5) of the IPCC AR5 (2013/2014) were performed. The results obtained were generated using the analytical tools of the Web-Based Research Platform Climate Explorer of the Royal Netherlands Meteorology Institute (KNMI). The data sets used were GCM: CMIP5 (full set) and GCM: CMIP5 extremes (full set) respectively for the annual and seasonal values and for the extreme values. CMIP5 (full set) was created during the Fifth Phase of the Climate Model Intercomparison Project (CMIP5) and assembled 42 global models used in the IPCC Fifth Assessment Report. Climate projections across the four climate variables scenarios cover three 20-year periods (2016-2035, 2046-2065 and 2081-2100), which is consistent with the approach adopted in the IPCC Fifth Assessment Report.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.

Yes / **In progress** / No

In early June 2014, a framework document “National climate change risk and vulnerability assessment for the sectors of the Bulgarian economy”²¹⁴ was finalised. It addressed: agriculture, forestry, water, urban environment (including urban infrastructure and construction), energy, transport, construction and infrastructure, ecosystems and biodiversity, human health and tourism. A separate chapter on cross-border cooperation on issues related to climate impacts is included in the document.

The framework document on risk and vulnerability assessment should serve as a basis for the further development of the NAS. The competent authorities will be involved in the development of measures for each sector, as well as NGOs and the scientific community.

Another very important issue to be integrated in the NAS is insurance. The MOEW has already developed an analytical document "Financial disaster risk management and insurance options for climate adaptation in Bulgaria". The document was prepared with the financial and technical support of the World Bank. The document's purpose is to analyse the role and

²¹⁴ National climate change risk and vulnerability assessment for the sectors of the Bulgarian economy
КЛИМАТ / СТРАТЕГИЧЕСКИ ДОКУМЕНТИ / АНАЛИЗ И ОЦЕНКА НА РИСКА И УЯЗВИМОСТТА
НА СЕКТОРИТЕ В БЪЛГАРСКАТА ИКОНОМИКА, URL:
http://www5.moew.government.bg/?page_id=51457, Access date: 17/05/2018

importance of the insurance business for the prevention of risks that occur as a result of climate change and for the development of adaptation measures.

In accordance with the reimbursable advisory services agreement signed between the MOEW and the IBRD in July 2017, the Bank presented an interim report to the Ministry with the main findings from the draft sector assessments of the following sectors: agriculture, biodiversity and ecosystems, energy, forestry, human health, tourism, transport, urban environment (including urban infrastructure and construction), and water. In addition, a draft of NAS and NAP was presented in May 2018.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

In the publication "National climate change risk and vulnerability assessment for the sectors of the Bulgarian economy", a separate chapter on cross-border cooperation on issues related to climate impacts is included.

The main objective of this report is to assess the risk of natural disasters typical of the Bulgarian geographical area on the basis of climate models and scenarios for the country nevertheless consideration is given to climate impacts that will have significant cross-border effect to the management of cross-border river basins. In this respect, due to the peculiarities of local geography, Bulgaria is less dependent on the distribution of water resources than neighbouring countries. However, in view of the expected climate change, it is projected that the cross-border river basins will face major challenges such as: deficiency of water resources and drought, flood risk management and expected pressure on water consumption.

Furthermore, the lead policy document on disaster risk management, the National Disaster Risk Reduction Strategy 2014–2020²¹⁵, supports the identification and prioritization of areas for trans-boundary and trans-regional cooperation, as well as long-term coordination of disaster risk reduction.

Finally, the draft NAS recognises that the development of transboundary adaptation measures would be required in the area of forestry.

4 Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / **In progress** / No

²¹⁵ Стратегия за намаляване риска от бедствията, URL: <http://www.strategy.bg/StrategicDocuments/View.aspx?lang=bg-BG&Id=894>, Access date: 17/05/2018

The draft NAS contains a chapter²¹⁶ on the knowledge gaps in relation to climate impacts and adaptation options for each of the nine sectors of interest (see Section B2 above). The sectoral measures in the NAP are prioritised according to the identified knowledge gaps and the aim is to address them.

One of the main knowledge gaps outlined by the NAS is the limited academic capacity in the field of climate change. The climate impacts in most sectors are under-researched. There are data gaps in climate and biodiversity models, which mean that the national projections are not detailed enough to support the implementation of adequate adaptation measures.

5 Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).

Yes / **In progress** / No

All policy information and vulnerability assessments are published on the MoEW website, section Climate, subsection International Negotiations and Adaptation/Adaptation²¹⁷.

The National Expert Council on Climate Change²¹⁸ serves as a science-policy interface, as it includes stakeholders, such as ministries, agencies, municipalities, NGOs and the scientific community (e.g. representatives of the Bulgarian Academy of Science).

The National Coordination Council on Climate Change comprises representatives of relevant ministries, at Deputy-Minister level, and some agencies. The Council supports the MoEW in the development of the NAS as well as in enhancing capacity to integrate adaptation considerations in policies, programmes and investments.

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / **In progress** / No

The draft NAS contains planned measures for capacity building and improving awareness on climate impacts and adaptation across the nine sectors of interest. The activities related to these measures have not yet begun, as the NAS has not been formally approved.

²¹⁶ Chapter 2.1, Proposal for a National Climate Change Adaptation Strategy and Action Plan, URL: [http://www.moew.government.bg/static/media/ups/tiny/%D0%9F%D0%98%D0%9A/%D0%9C%D0%9F%D0%90/Strategy%20and%20Action%20Plan%20-%20Full%20Report%20-%20Draft%20\(2018-05-03\)%20-%20EN%20V4.EM.pdf](http://www.moew.government.bg/static/media/ups/tiny/%D0%9F%D0%98%D0%9A/%D0%9C%D0%9F%D0%90/Strategy%20and%20Action%20Plan%20-%20Full%20Report%20-%20Draft%20(2018-05-03)%20-%20EN%20V4.EM.pdf), Access date: 10/05/2018

²¹⁷ Adaptation page on the MoEW website Адаптация, URL: <http://www.moew.government.bg/bg/klimat/mejdunarodni-pregovori-i-adaptaciya/adaptaciya/>, Access date: 17/05/2018

²¹⁸ National Expert Council on Climate Change Климат, URL: <http://www.moew.government.bg/bg/klimat/>, Access date: 17/05/2018

The World Bank is providing ongoing ‘advisory services’ to the Government, supporting capacity building and training in the delivery of the NAS. The Government is represented by the MoEW as an institutional coordinator of the preparation process²¹⁹.

Since 2014, Sofia University "St. Kliment Ohridski"²²⁰ started a Master’s programme "Climate Change and Water Management". The programme is focused on the preparation of specialists for analysis and assessment of climate change and integrated water resources management.

Step C: Identifying adaptation options

6 Adaptation options’ identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

The draft NAS proposes sectoral measures based on the sectoral vulnerability assessments contained in the framework document “National climate change risk and vulnerability assessment for the sectors of the Bulgarian economy” and the Draft Sector Assessments prepared by the World Bank, as a part of the reimbursable advisory services agreement signed between the MOEW and the IBRD (see Indicator 3c). The framework document covers the following sectors: agriculture, forestry, water, urban environment (including urban infrastructure and construction), energy, transport, construction and infrastructure, ecosystems and biodiversity, human health and tourism. Each sector is assessed by a system of indicators regarding vulnerability to future climate change in the period 2016-2035. The draft sector assessments propose a range of priority adaptation actions, arranged according to the following categories: information and knowledge, institutional capacity building, policy reform, and investments. For each of these measures, the section also includes cost-benefit analysis information and provides inputs on monitoring and evaluation (e.g. oversight, implementation, and reporting responsibility, indicator and target). Adaptation options will be prioritised whereas cross-cutting issues, trade-offs and synergies will be discussed.

No explicit reference is made to geographical specificities in the draft NAS or the vulnerability assessments.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

²¹⁹World Bank website, with reference to the inception workshop on preparing a National Adaptation Strategy, URL: <http://www.worldbank.org/en/events/2017/03/01/inception-workshop-in-bulgaria>, Access date: 17/05/2018

²²⁰Sofia University, URL: https://www.uni-sofia.bg/index.php/eng/the_university, Access date: 17/05/2018

Yes / No

In the preparation of the draft NAS and in support of priority setting for the identified adaptation options, each sector undertook a prioritisation exercise. This included organising stakeholder meetings following a multi-criteria analysis approach. In addition, the information given in the sector assessment reports was used. The approach produced a tentative short list of priority actions for each sector. Additional assessment/ranking of priority options is provided for some sectors (including, biodiversity and ecosystems services, tourism, and water) based on expert judgment and/or additional feedback from stakeholders.²²¹

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes/ **In Progress** / No

The draft NAS builds on vulnerability assessments as well as the Disaster Risk Management Assessment report. In addition, disaster risk management is listed as an overarching cross-sectoral adaptation measure that should be taken into consideration in the development of all adaptation policies and measures²²².

A Disaster Risk Reduction Council²²³ was created as a permanent body to the Council of Ministers to ensure coordination and cooperation in the implementation of state policy in the field of disaster protection. The Council performs the functions of a national disaster risk reduction platform in implementation of the National Strategy for Disaster Risk Management, the Hyogo Framework for Action 2005–2015, and Sendai Framework for Disaster Risk Reduction 2015–2030.

The leading national document on disaster risk reduction, the National Strategy for Disaster Risk Reduction²²⁴ envisages to enhance coordination between stakeholders (e.g. the disaster risk reduction and climate adaptation community) by:

- The expansion of the scope of activities of the Consultative Council, which supports the work of the Council of Ministers, and transforming the former into an Active National Platform for reducing risks from disasters

²²¹ Chapter 5.2, Proposal for a National Climate Change Adaptation Strategy and Action Plan, URL: [http://www.moew.government.bg/static/media/ups/tiny/%D0%9F%D0%98%D0%9A/%D0%9C%D0%9F%D0%90/Strategy%20and%20Action%20Plan%20-%20Full%20Report%20-%20Draft%20\(2018-05-03\)%20-%20EN%20V4.EM.pdf](http://www.moew.government.bg/static/media/ups/tiny/%D0%9F%D0%98%D0%9A/%D0%9C%D0%9F%D0%90/Strategy%20and%20Action%20Plan%20-%20Full%20Report%20-%20Draft%20(2018-05-03)%20-%20EN%20V4.EM.pdf), Access date: 10/05/2018

²²² Assessment of the Disaster Risk Management Sector, URL: [http://www.moew.government.bg/static/media/ups/tiny/%D0%9F%D0%98%D0%9A/%D0%9C%D0%9F%D0%90/DRM%20-%20Full%20Report%20-%20First%20Draft%20\(2018-04-27\)%20-%20EN%20-%20for%20printing%20v2.pdf](http://www.moew.government.bg/static/media/ups/tiny/%D0%9F%D0%98%D0%9A/%D0%9C%D0%9F%D0%90/DRM%20-%20Full%20Report%20-%20First%20Draft%20(2018-04-27)%20-%20EN%20-%20for%20printing%20v2.pdf), Access date: 10/05/2018

²²³ Съвет за намаляване на риска от бедствия към Министерския съвет за подпомагане формирането и осъществяването на държавната политика в областта на защитата при бедствия URL: http://www.saveti.government.bg/web/cc_801/1, Access date: 17/05/2018

²²⁴ Стратегия по намаляването на риска от бедствия, URL: <http://www.strategy.bg/StrategicDocuments/View.aspx?lang=bg-BG&Id=894> Access date: 10/05/2018

- The establishment of an efficient mechanism for coordination and efficient flow of information among all stakeholders; and
- Development of systems for monitoring, forecasting and early warning in relation to disasters.

Finally, the National Coordination Council on Climate Change includes representatives from the Chief Directorate Fire Safety and Civil Protection (CD FSCP) at the Ministry of Interior.

7 Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / **In Progress** / No

Regarding cross-cutting adaptation action, the World Bank is providing ongoing ‘advisory services’ to the Government; supporting capacity building and training in the delivery of the NAS. The draft NAS states that the implementation of adaptation measures would be supported by EU funding, state funding and, potentially, private funding from energy companies. Nevertheless, one of the key barriers to climate adaptation pointed out in the draft NAS is the lack of financial resources and over-dependence on the EU²²⁵. Each suggested measure in the draft NAS includes indicative investment cost estimates to support the funding allocation.

Step D: Implementing adaptation action

8 Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / **No**

National frameworks for Environmental Impact Assessment (EIA)²²⁶ and Strategic Environmental Assessment (SEA)²²⁷ have been implemented because of Directives 2011/92/EU and 2001/42/EC. The definition of “environmental impact” adopted in both documents stipulates that any impacts on the environment should be considered,

²²⁵ Proposal for a National Climate Change Adaptation Strategy and Action Plan, p.58, URL:

[http://www.moew.government.bg/static/media/ups/tiny/%D0%9F%D0%98%D0%9A/%D0%9C%D0%9F%D0%90/Strategy%20and%20Action%20Plan%20-%20Full%20Report%20-%20Draft%20\(2018-05-03\)%20-%20EN%20V4.EM.pdf](http://www.moew.government.bg/static/media/ups/tiny/%D0%9F%D0%98%D0%9A/%D0%9C%D0%9F%D0%90/Strategy%20and%20Action%20Plan%20-%20Full%20Report%20-%20Draft%20(2018-05-03)%20-%20EN%20V4.EM.pdf), Access date: 10/05/2018

²²⁶ Конвенция а оценка на въздействието върху околната среда в трансграничен контекст, URL:

http://www.moew.government.bg/static/media/ups/tiny/file/Industry/EIA/KONVENCIOQ_za_ocenka_na_vyzdejstviето_vyrhu_okolnata_sreda_v_transgranichen_kontekst.pdf, Access date: 17/05/2018

²²⁷ Протокол за стратегическа екологична оценка към Конвенцията за оценка на въздействието върху околната среда в трансграничен контекст, URL:

http://www.moew.government.bg/static/media/ups/tiny/file/Industry/SEA/protokol_SEA.pdf, Access date: 17/05/2018

including human health, flora and fauna, biodiversity, soil, climate, air, water, land, natural landmarks and cultural heritage, and the interactions between them. However, no further reference to climate adaptation is made in the documents. Despite that fact, the draft NAS recognises that there is increased consideration of climate adaptation in EIA and SEA projects.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / No

The National Strategy for Disaster Risk Reduction²²⁸ was adopted in 2014. It recognises the impact of climate extremes related to increased occurrence of storms, floods, extended periods of drought, and devastating forest fires. However, there is no evidence of how future climate projections are considered in disaster risk management plans and associated risk analysis. The Ministry of Regional Development has issued an order²²⁹ on the development of a thorough analysis and mapping of disaster risk that would also include climate impacts. Preparation of this analysis has already started and is being overseen by the Bulgarian Association of Science²³⁰.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / No

Climate adaptation is considered in land-use and urban planning policies at national and regional levels. The National Concept for Spatial Development for the period 2013-2025 (NCSD)²³¹ is a mid-term strategic document, which outlines directions for land-use planning, governance and protection of national territory and waters. One of the key objectives of the NCSD is to align spatial planning of cities and regions with the threats and challenges of climate change, in addition to globalization, demographic changes, and energy dependence. The development plan for Northern Central Bulgaria is an example of how climate adaptation is being taken into account, including in relation to the enhancement of environmental protection. The TURAS project for the capital city of Sofia is an example of how spatial urban planning policies are seeking to enhance the sustainability of urban areas by promoting

²²⁸National Disaster Risk Reduction Strategy, URL:http://www.preventionweb.net/files/38902_drrstrategybulgariaannex2bg.pdf, Access date: 17/05/2017 -

²²⁹НАРЕДБА ЗА УСЛОВИЯТА, РЕДА И ОРГАНИТЕ ЗА ИЗВЪРШВАНЕ НА АНАЛИЗ, ОЦЕНКА И КАРТОГРАФИРАНЕ НА РИСКОВЕТЕ ОТ БЕДСТВИЯ, URL:
<http://www.strategy.bg/FileHandler.ashx?fileId=2564>, Access date: 17/05/2018

²³⁰Изработване на анализ, оценка и картографиране на геоложкия риск, URL:
<http://www.bas.bg/%D0%BF%D0%BE%D1%80%D1%82%D1%84%D0%BE%D0%BB%D0%B8%D0%BE/%D0%B8%D0%B7%D1%80%D0%B0%D0%B1%D0%BE%D1%82%D0%B2%D0%B0%D0%BD%D0%B5-%D0%BD%D0%B0-%D0%B0%D0%BD%D0%B0%D0%BB%D0%B8%D0%B7-%D0%BE%D1%86%D0%B5%D0%BD%D0%BA%D0%B0-%D0%B8-%D0%BA%D0%B0%D1%80%D1%82%D0%BE%D0%B3/>, Access date: 17/05/2018

²³¹National Concept for Spatial Development, URL:
http://www.bgregio.eu/media/Programirane/NKPR_28012013_Last_en.pdf, Access date: 17/05/2018

climate resilience. Plans for further mainstreaming of climate adaptation in urban and spatial planning is planned in the draft NAS. However, climate impacts have not yet been addressed in maritime spatial planning policies, and are not mentioned in the draft NAS.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / **In Progress** / No

Coordinated actions to mainstream adaptation into national policies and policy instruments have not yet started. The Climate Change Act asks sectoral ministries to mainstream climate adaptation in their respective policies. Implementing this requirement in practice will require streamlining processes and much better interaction between the MoEW and the sectoral ministries, as well as between the sectoral ministries and the scientific community. In addition, the draft NAS includes planned measures to mainstream climate adaptation in policies related to the nine key sectors considered in the document. Each respective Ministry will be in charge of implementing adaptation policies and mainstreaming adaptation in other policies within their sector of expertise.

Despite mainstreaming of adaptation not being currently coordinated across sectors, the Ministry of Regional Development and Public Works has included adaptation measures in the country's six regional development plans, as described in relation to Indicator 8c. In addition, the National Forest Strategy 2013 – 2020²³², adopted by the Ministry of Agriculture, Food and Forest, includes measures to strengthen the climate resilience of forest ecosystems²³³.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

The MoEW developed an analytical document entitled “Financial disaster risk management and insurance options for climate adaptation in Bulgaria”. The document was prepared with the financial and technical support of the World Bank and its purpose is to analyse the role and importance of the insurance business for the prevention of risks that result from climate change and for the development of adaptation measures. This document provides an entry point for enhancing further inclusion of insurance policies into the NAS. In addition, insurance mainstreaming within sectoral adaptation measures is planned in the draft NAS.

9 Implementing adaptation

²³²Национална стратегия за развитие на горския сектор в Република България за периода 2013 - 2020 г., URL: <http://www.strategy.bg/FileHandler.ashx?fileId=4209>, Access date: 17/05/2018

²³³ ПРОГРАМА ОТ МЕРКИ ЗА АДАПТИРАНЕ НА ГОРИТЕ В РЕПУБЛИКА БЪЛГАРИЯ И НАМАЛЯВАНЕ НА НЕГАТИВНОТО ВЛИЯНИЕ НА КЛИМАТИЧНИТЕ ПРОМЕНИ ВЪРХУ ТЯХ, URL: http://www.iag.bg/data/docs/Programa_ot_merki.pdf, Access date: 17/05/2018

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / In Progress / **No**

Some autonomous adaptation actions are being carried out, for instance, by some cities or at sectoral level for agriculture, forestry, water management, and flood risk management. Examples of such regional actions have been provided earlier in the text, in relation to Indicator 8c and in Section A2.

At the same time, as the draft NAS was only published on 4th May 2018, implementation of policies and measures will not begin until the NAS is reviewed and officially approved.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / **No**

No clear mechanism has been set out in the draft NAS at this stage. Nevertheless, the National Expert Council on Climate Change includes regional representatives of the National Association of Municipalities in the Republic of Bulgaria (NAMRB).

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / **No**

Apart from various guidelines issued by the European Commission, no specific procedures or guidelines have been issued or used by the Bulgarian authorities for assessing climate impacts on major projects or programmes and for facilitating their adaptation. However, the development of sectoral climate adaptation guidelines is planned in the draft NAS.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.

Yes / **No**

Stakeholders were involved in the development of the draft NAS using a multi-criteria analysis (see Section B1). In addition, the draft NAS outlines key stakeholders for each sector of interest and states that stakeholders should be included in the process of developing measures. However, the mechanism for stakeholder involvement is not defined.

Step E: Monitoring and evaluation of adaptation activities

10 Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / **No**

For the time being no system is in place for reporting on the implementation of the NAS and NAP pending their adoption.

Provisions for monitoring and evaluation are included in the draft NAS. Moreover, the NAP summarises the adaptation measures for all sectors identified in the NAS. The focus is on implementation of priority adaptation measures, including consideration of responsible institutions, resources, timeline, targets, and monitoring indicators. A full list of the monitoring indicators is contained in Annex 3 of the draft NAS²³⁴.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / **No**

The draft NAS does not explicitly make clear how sectoral policy implementation will be monitored. The ministries are responsible for mainstreaming climate policies in their respective sectors and for developing and implementing adaptation measures for climate change, in coordination with the MoEW and in consultation with National Expert Council. Responsible ministries and governmental agencies include the Ministry of Agriculture and Food (MAFF); the Ministry of Economy (MEC); the Ministry of Transport, Information Technology, and Communications (MTITC); the Ministry of Finance (MF); the Ministry of Interior (MI); the Ministry of Exterior (MEC); the Ministry of Health (MH); the Ministry of Education and Science; the Ministry of Labour and Social Policy; and the Executive Environment Agency (ExEA).

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / **No**

The draft NAS does not make clear how regional, sub-national or local action will be monitored.

11 Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

²³⁴ Annex 3, Proposal for a National Climate Change Adaptation Strategy and Action Plan, URL: [http://www.moew.government.bg/static/media/ups/tiny/%D0%9F%D0%98%D0%9A/%D0%9C%D0%9F%D0%90/Strategy%20and%20Action%20Plan%20-%20Full%20Report%20-%20Draft%20\(2018-05-03\)%20-%20EN%20V4.EM.pdf](http://www.moew.government.bg/static/media/ups/tiny/%D0%9F%D0%98%D0%9A/%D0%9C%D0%9F%D0%90/Strategy%20and%20Action%20Plan%20-%20Full%20Report%20-%20Draft%20(2018-05-03)%20-%20EN%20V4.EM.pdf), Access date: 10/05/2018

The draft NAS states that regular, five-yearly, updates of the NAS are planned, as a check on the direction that has been taken, together with a review of the actions that are being implemented and a revision of the NAP, as appropriate.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / **No**

No evidence seems to be available on what mechanism (if any) is going to be used for involving stakeholders in future evaluations of adaptation policy.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 Coordination structure		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	<u>Yes</u> / In progress / No
2 Stakeholders' involvement in policy development		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 Current and projected climate change		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	Yes / <u>In progress</u> / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	Yes / <u>In progress</u> / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	Yes / <u>In progress</u> / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No
4 Knowledge gaps		

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	Yes / <u>In progress</u> / No
5 Knowledge transfer		
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	Yes / <u>In progress</u> / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	Yes / <u>In progress</u> / No
Step C: Identifying adaptation options		
6 Identification of adaptation options		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	Yes/ <u>In Progress</u> / No
7 Funding resources identified and allocated		
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / <u>In Progress</u> / No
Step D: Implementing adaptation action		
8 Mainstreaming adaptation in planning processes		
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	Yes / <u>No</u>
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	Yes / <u>No</u>
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the	<u>Yes</u> / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	impacts of climate change	
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	Yes / <u>In Progress</u> / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 <i>Implementing adaptation</i>		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / In Progress / <u>No</u>
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	Yes / <u>No</u>
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	Yes / <u>No</u>
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	Yes / <u>No</u>
Step E: Monitoring and evaluation of adaptation activities		
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
11 <i>Evaluation</i>		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	Yes / <u>No</u>

Adaptation preparedness scoreboard for Croatia

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List of abbreviations

CCCCMA	Coordination Commission for Policy and Measures for Climate Change Mitigation and Adaptation
CDRRP	Croatian Disaster Risk Reduction Platform
DHMZ	Meteorological and Hydrological Service
draft NAS	Draft Climate Change Adaptation Strategy in the Republic of Croatia for the period to 2040 with outlook to 2070
draft NAP	Draft Action Plan for implementing the Climate Change Adaptation Strategy in the Republic of Croatia for the period from 2019 to 2023
DUZS	State Directorate for Protection and Rescue
EMFF	European Maritime and Fisheries Fund
EIA	Environmental impact assessment
EAFRD	European Agricultural Fund for Rural Development
ERDF	European Regional Development Fund
ESF	European Social Fund
ESIF	European Structural and Investment Funds
EU	European Union
EUSAIR	EU Strategy for the Adriatic-Ionian Region
EUSDR	EDU Strategy for the Danube Region
FZOEU	Fund for Environmental Protection and Energy Efficiency
HAOP	Croatian Environment and Nature Agency
HZJZ	Croatian Public Health Institute
ICZM	Integrated Coastal Zone Management
IPCC	Intergovernmental Panel on Climate Change
MFOP	Maritime and Fisheries Operational Programme 2014-2020
MMR Regulation	REGULATION (EU) No 525/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC
MZOE	Ministry of Environment and Energy of the Republic of Croatia
NAS	National Adaptation Strategy
NAP	National Adaptation Plan

NDRA	National Disaster Risk Assessment
OPCC	Operational Program Competitiveness and Cohesion 2014-2020
RCP	Representative Climate Pathways
RDP	Rural Development Program 2014-2020
RBMP	River Basin Management Plan
SEA	Strategic environmental assessment
UNEP/MAP	United Nations Environment Programme / Mediterranean Action Plan
UNFCCC	United National Framework Convention on Climate Change
ZZJZ	Public Health Institute dr. Andrija Štampar

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

The draft National Adaptation Strategy²³⁵ (NAS) and the draft National Action Plan (NAP)²³⁶ have been developed within a project funded through the EU Transition facility²³⁷. The project lasted from May 2016 to November 2017, and the official drafts of both documents were finalised and presented to the public in November 2017. The draft documents will first undergo a strategic environmental assessment (SEA) procedure in 2018, including a public hearing and public consultation, collection and addressing of comments. Finalisation of the draft NAS and NAP for submission to the governmental and the parliamentary adoption procedure is expected by end of 2018, and the documents are expected to come into effect in 2019²³⁸. The draft NAS is based on the Air Protection Act²³⁹, and covers the period until 2040 with a view to 2070, and is based on the results of climate modelling carried out for these two time-periods. Following consultations with key stakeholders in July 2017, the draft NAS document was finalised (White Paper) to include conclusions from e-consultations held in October 2017. The draft NAP has also been prepared for the first five years (2019-2023). The draft NAP and draft NAS focus on 10 sectors identified as most vulnerable to climate impacts: hydrology, water and marine resources, agriculture, forestry, biodiversity, physical planning and coastal zone management, tourism, energy, fisheries, risk management and health. In addition, they include two supra-sectoral measures: strengthening capacities for applied research in the area of climate modelling, analysis, and interpretation, and development of impact indicators for vulnerable sectors.

Until the NAS and NAP are adopted, the 6th and 7th National Communications to the United Nations Framework Convention on Climate Change (UNFCCC)²⁴⁰ (submitted in 2014 and in May 2018 respectively) formally set the overarching framework and preconditions for activities aiming at adaptation to climate change effects. These are primarily related to the upgrading and completion of a climate change monitoring and forecasting system, strengthening of applied research for adaptation measures, and building awareness and capacities.

²³⁵ 2017; Draft Climate Change Adaptation Strategy in the Republic of Croatia for the period to 2040 with a view to 2070 (White book); URL: <http://prilagodba-klimi.hr/wp-content/uploads/docs/Draft%20CC%20Adaptation%20Strategy.pdf>; accessed on 03.05.2018

²³⁶ 2017; Draft Action Plan for implementing the Strategy on Adaptation to Climate Change in the Republic of Croatia for the period from 2019 to 2023; URL: <http://prilagodba-klimi.hr/wp-content/uploads/docs/Draft%20CC%20Action%20Plan.pdf>; accessed on 03.05.2018

²³⁷ MZOE web, news page; <http://www.mzoip.hr/hr/ministarstvo/vijesti/predstavljen-nacrt-strategije-prilagodbe-klimatskim-promjenama.html>; accessed on 03.05.2018

²³⁸ Personal communication with MS contact

²³⁹ Zakon o zaštiti zraka, #Official Gazette #130/11, 47/14, 61/17; URL: http://narodne-novine.nn.hr/clanci/sluzbeni/2011_11_130_2601.html; accessed on 03.05.2018

²⁴⁰ 6th National Communication to the UNFCCC; URL: https://unfccc.int/files/national_reports/annex_i_natcom/application/pdf/hrv_nc6.pdf; accessed on 03.05.2018; accessed on 03.05.2018

Adaptation to climate change features as one of the general objectives in the country's 10-year Sustainable Development Strategy²⁴¹, which was adopted in 2009.

A2. Adaptation strategies adopted at subnational levels

For the time being, there are no adaptation strategies being developed at subnational level.

Adaptation action plans

B1. National adaptation plan

The NAP covering a five-year period was drafted in November 2017, in parallel with the draft NAS. The national legal framework (Air Protection Act²⁴²) foresees the adoption of a NAP by the Croatian Government.

B2. Adaptation plans adopted at sub-national level

The national legal framework (Air Protection Act) requires that counties and towns adopt a programme for air and ozone layer protection and climate mitigation and adaptation. In addition, the Environmental Protection Act²⁴³ requires that counties and towns adopt an environmental protection programme to implement the relevant measures from the national environmental protection plan. The majority of towns have fulfilled these obligations; regional and local government units (counties and towns) are also carrying out a number of activities that are relevant to climate adaptation: settlements and housing, municipal affairs, spatial and urban planning, protection and improvement of the natural environment, fire and civil protection. In addition, a number of adaptation projects have been carried out at local and regional level, in particular in the area of data gathering and awareness-raising of local and regional stakeholders on adaptation, and pilot vulnerability assessments for a coastal area.

Examples of adaptation planning activities at the local and regional level include:

- Within the European Commission's project "Adaptation strategies for European cities"²⁴⁴ the town of Zadar in 2013 developed their local Vision document on adaptation and an Action plan²⁴⁵. The focus is so far mainly on the energy sector, i.e. promoting sustainable energy practices among citizens.
- The City of Zagreb carried out in 2013 an analysis of anticipated climate change effects. A set of 47 measures was defined with the goal of improving Zagreb's climate resilience. They include measures for protection against heat waves (buildings and green infrastructure), water management, adaptation of transport infrastructure, improvement of energy infrastructure and landslides.

²⁴¹ Strategija održivog razvitka Republike Hrvatske; URL: http://narodne-novine.nn.hr/clanci/sluzbeni/2009_03_30_658.html; accessed on 03.05.2018

²⁴² Zakon o zaštiti zraka; URL: https://narodne-novine.nn.hr/clanci/sluzbeni/2017_06_61_1381.html

²⁴³ Zakon o zaštiti okoliša; URL: http://narodne-novine.nn.hr/clanci/sluzbeni/2013_06_80_1659.html; accessed on 03.05.2018 http://narodne-novine.nn.hr/clanci/sluzbeni/2013_06_80_1659.html; accessed on 03.05.2018

²⁴⁴ Climate Adapt project website; URL: <http://climate-adapt.eea.europa.eu/metadata/publications/eu-cities-adapt-adaptation-strategies-for-european-cities-final-report>; accessed on 03.05.2018

²⁴⁵ City of Zadar website - about Climate Adapt participation; URL: <http://www.grad-zadar.hr/eu-cities-adapt-701/>; accessed on 03.05.2018

- The UNEP/MAP's project "Integrating impacts of climate variability and change into integrated coastal zone management (ICZM)" prepared for Šibenik-Knin County an ICZM Plan²⁴⁶ as a tool to address climate variability and change impacts by adaptation measures.

B3. Sectoral adaptation plans

The national legal framework requires that adaptation measures are implemented in the following vulnerable sectors: water resources, agriculture, land and marine biodiversity and ecosystems, coastal management, tourism and public health. However, there are very limited adaptation actions embedded in sectoral strategies and action plans (some actions are embedded in the energy and water sectors).

Climate impacts on the water regime were considered qualitatively during the preparation of the 2016-2021 River Basin Management Plan (RBMP)²⁴⁷. However, the methodology for assessing the climate impacts on water regime changes has not yet been adopted. The RBMP specifies that all planning documents in the water sector shall be aligned with the NAS.

The Flood Risk Management Plan for the 2016-2021 planning period (part of the RBMP) contains a measure of the analysis of the climate impact on the concepts of protection from adverse effects of water and flood risk management, and a revision of the programme of measures is intended to include measures for climate adaptation.

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

The responsibility for climate change policy in Croatia falls within the competence of the Ministry of Environment and Energy (MZOE), Directorate for climate activities, sustainable development and protection of air, soil and of light pollution. This includes development of strategic and planning documents and carrying out the work of a national contact authority for reporting to EU bodies and other international bodies on climate adaptation policy. MZOE is responsible for the development and implementation of the NAS and NAP, supported by the two organisational units under the responsibility of MZOE (Croatian Environment and Nature Agency – HAOP²⁴⁸, and Environmental Protection and Energy Efficiency Fund - FZOEU), as well as the Meteorological and Hydrological Service²⁴⁹ (DHMZ).

²⁴⁶ 2016; Obalni plan Šibensko-kninske županije; URL: <http://sibensko-kninska-zupanija.hr/stranica/obalni-plan-ibensko-kninske-upanije/209>; accessed on 03.05.2018

²⁴⁷ Odluka o donošenju plana upravljanja vodnim područjima 2016.–2021.; URL: https://narodne-novine.nn.hr/clanci/sluzbeni/2016_07_66_1623.html; accessed on 03.05.2018

²⁴⁸ HAOP website; URL: <http://www.haop.hr/>; accessed on 16.05.2018

²⁴⁹ DHMZ website; URL: <http://www.meteo.hr/>; accessed on 03.05.2018

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

The Government of Croatia established the Inter-Sectoral Coordination Commission for Policy and Measures for Climate Change Mitigation and Adaptation (CCCCMA) for the first time in Autumn 2014²⁵⁰. The new Decision on establishment of the CCCCMA came into force in January 2018²⁵¹, that no longer includes names of technical working group members but leaves its set up at the discretion of the minister for environment, as the CCCCMA chairman. The purpose of the CCCCMA, which is administratively supported by MZOE, is to give recommendations to the Government, monitor and evaluate the implementation and planning of mitigation and adaptation policy and measures in Croatia, in line with the Air Protection Act and to improve the horizontal coordination in climate change policy making among the state sectoral actors. The CCCCMA is organised at two levels:

- The Coordination Group, nominated from the lines of public officials (assistant ministers) from the following sectoral ministries: environment (including energy and nature protection), labour, foreign affairs, science and education, economy and entrepreneurship, regional development and EU funds, finance, sea, transport and infrastructure, agriculture, construction and physical planning tourism, health, and demography
- Two technical groups: one for climate adaptation, and another for low carbon development, set up from the lines of practitioners in sectoral ministries, expert institutions, economic actors and NGOs working on climate-relevant issues – the new technical groups are still to be nominated by the Minister for Environment.

Based on the opinions and proposals of technical working groups, the Coordination Group makes recommendations on the overall policy and measures for mitigation and adaptation to climate change to the Croatian government, providing support in the implementation of policies and measures and promoting synergies and mainstreaming climate change into other public policies.

The CCCCMA was instrumental in deciding on strategic goals, policies, measures and methodologies for dealing with adaptation, which started the process of development of an adaptation strategy and action plan. The draft NAS proposes that the existing CCCCMA takes the leading role in coordinating the NAS and NAP implementation and monitoring, as well as coordinating a more active involvement of sectoral/resource ministries in the implementation of NAS.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / **In progress** / No

²⁵⁰ Odluka o osnivanju Povjerenstva za međusektorsku koordinaciju za politiku i mjere za ublažavanje i prilagodbu klimatskim promjenama, Official gazette #114/14; URL: https://narodne-novine.nn.hr/clanci/sluzbeni/2014_09_114_2171.html; accessed on 04.05.2018

²⁵¹ Odluka o osnivanju povjerenstva za međusektorsku koordinaciju za politiku i mjere za ublažavanje i prilagodbu klimatskim promjenama, Official gazette #9/18; URL: <http://www.propisi.hr/print.php?id=13274>; accessed on 16.05.2018

Regional and local planning for adaptation is carried out by the respective regional and local administrations. As the adaptation policy process is in formulation, a temporary coordination mechanism has been set up between national, regional and local stakeholders in the form of participation of regional and local governments in public consultation during the process of drafting the NAS and NAP.

Although not specifically for adaptation, there are mechanisms in place that provide vertical coordination between local, regional and national level in development, spatial planning and SEA procedures, as well as in standard legislation and policy making structures. For the efficient operation of local and regional government units in climate adaptation, the draft NAS acknowledges the necessity to significantly strengthen their capacities, both strategically (through developing regional development plans and spatial plans that will include consideration of climate adaptation), as well as technical training by experts in specific areas of climate adaptation.

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

Based on the initial inter-sectoral consultation that was carried out through the CCCCMA²⁵², which brings together national authorities, academia, business, industry and non-governmental organisations, a public consultation process was implemented. The public consultation is required by the national legal framework (Air Protection Act²⁵³) for the drafts of strategies and plans, and so it was planned and carried out in the frame of the technical assistance project “Strengthening the capacity of the Ministry of Environment and Energy for adaptation to climate change and preparation of the Draft Climate Change Adaptation Strategy”.

Within the process of drafting the NAS, a series of 10 workshops for experts in the sectors covered under the NAS (see Section A1) were carried out regarding climate modelling, applying the results of modelling and scenarios for impact and vulnerability assessment, assessing measures, etc. Another series of 10 workshops was aimed at civil servants at national, regional and local level and the public concerned (Gospić²⁵⁴, Osijek, Rijeka²⁵⁵,

²⁵² Odluka o osnivanju Povjerenstva za međusektorsku koordinaciju za politiku i mjere za ublažavanje i prilagodbu klimatskim promjenama; Official Gazette #9/18; URL: <http://www.propisi.hr/print.php?id=13274>; accessed on 03.05.2018

²⁵³ Zakon o zaštiti okoliša; Official gazette #130/11, URL: http://narodne-novine.nn.hr/clanci/sluzbeni/2011_11_130_2601.html; and #47/14, http://narodne-novine.nn.hr/clanci/sluzbeni/2014_04_47_874.html; accessed on 03.05.2018

²⁵⁴ Project news – Stakeholder workshop in Osijek; <http://prilagodba-klimi.hr/2016/11/16/osijek-zupanijska-ulica-4-zupanijska-vijecnica-za-sluzbenike-na-nacionalnoj-i-lokalnoj-razini-te-za-zainteresiranu-javnost-odrzana-je-radionica-o-utjecaju-klimatskih-promjena-i-o-mjerama-p/>; accessed on 03.05.2018 Project news – Stakeholder workshop in Osijek; <http://prilagodba-klimi.hr/2016/11/16/osijek-zupanijska-ulica-4-zupanijska-vijecnica-za-sluzbenike-na-nacionalnoj-i-lokalnoj-razini-te-za-zainteresiranu-javnost-odrzana-je-radionica-o-utjecaju-klimatskih-promjena-i-o-mjerama-p/>; accessed on 03.05.2018

Zadar²⁵⁶, Varaždin²⁵⁷, Dubrovnik²⁵⁸, four events in Zagreb²⁵⁹. The aim was to discuss and raise awareness of climate impacts, inform on the process of development of the NAS and engage stakeholders. The key topics included information on expected climate change, impacts, vulnerability and possible climate adaptation in key sectors for the geographical area of the workshops.

The working version of the Climate Change Adaptation Strategy (Green Paper) was prepared and published on the project website in July 2017²⁶⁰, with a call to stakeholders and interested public to give their opinion, suggestions and comments to improve and harmonise the document. In addition, meetings were organised with ministries and agencies from sectors covered by the NAS to present and discuss the Green Paper. Comments were considered during preparation of the final draft of NAS (White Paper²⁶¹).

The White Paper was also published on the project page and passed an internet consultation with the interested public.

Finally, the public will also have an opportunity for participation through public hearing and e-consultation during the strategic environmental assessment procedure that will be carried out for the NAS, planned during 2018.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

Transboundary cooperation in terms of climate adaptation is present but limited to river basin management issues, in the context of international river commissions for Sava and Danube Rivers, especially on floods.

Croatia also takes part in the implementation of the two macro-regional strategies (EU Strategy for the Adriatic and Ionian Region, EUSAIR; and EU Strategy for the Danube Region, EUSDR) by participating in regional cooperation projects to address various climate-related challenges shared in the region, through research, knowledge transfer, capacity

²⁵⁵ Project news – Stakeholder workshop in Rijeka; URL: <http://prilagodba-klimi.hr/2017/02/16/rijeka-riva-boduli-1-za-sluzbenike-na-nacionalnoj-i-lokalnoj-razini-te-za-zainteresiranu-javnost-odrzana-je-radionica-o-utjecaju-klimatskih-promjena/>; accessed on 03.05.2018

²⁵⁶ Project news – Stakeholder workshop in Zadar; URL: <http://prilagodba-klimi.hr/2017/03/15/zadar-za-sluzbenike-na-nacionalnoj-i-lokalnoj-razini-te-za-zainteresiranu-javnost-odrzana-je-radionica-o-utjecaju-kp/>; accessed on 03.05.2018

²⁵⁷ Project news – Stakeholder workshop in Varaždin; URL: <http://prilagodba-klimi.hr/2017/03/21/varazdin-velika-skupstinska-dvorana-zupanijske-palace-franjevacki-trg-7-za-sluzbenike-na-nacionalnoj-i-lokalnoj-razini-te-za-zainteresiranu-javnost-odrzana-je-radionica/>; accessed on 03.05.2018

²⁵⁸ Project news – Stakeholder workshop in Dubrovnik; URL: <http://prilagodba-klimi.hr/2017/04/03/dubrovnik-velika-vijećnica-grada-dubrovnika-pred-dvorom-1-za-sluzbenike-na-nacionalnoj-i-lokalnoj-razini-te-za-zainteresiranu-javnost-odrzana-je-radionica-o-utjecaju-klimatskih-promjena/>; accessed on 03.05.2018

²⁵⁹ Project news - Stakeholder workshops in Zagreb; URL: <http://prilagodba-klimi.hr/category/vijesti/http://prilagodba-klimi.hr/category/vijesti/http://prilagodba-klimi.hr/category/vijesti/>; accessed on 03.05.2018

²⁶⁰ Draft NAS project website (Green paper); URL: <http://prilagodba-klimi.hr/wp-content/uploads/2017/11/ZELENA-KNJIGA.pdf>; accessed on 13.06.2018

²⁶¹ Draft NAS project website (White paper); URL: <http://prilagodba-klimi.hr/wp-content/uploads/docs/Nacr%20Strategije%20prilagodbe.pdf>; accessed on 13.06.2018

building and awareness activities, such as DriDanube – Drought Risk in the Danube Region²⁶² project.

The Water and Climate Adaptation Plan for the Sava River Basin²⁶³ (covering five countries including Croatia) was developed by the International Sava River Basin Commission (ISRBC) in 2015, as a guidance document for adaptation measures in navigation, hydropower, agriculture, flood protection, economic evaluation of climate impacts. It suggests a methodology to examine effects of (only) climate change on those sectors, although the integrated effects have not been considered due to lack of data. A joint operational flood forecasting and early warning system for the riparian countries in the Sava River Basin²⁶⁴ was launched in June 2016²⁶⁵ and should be finalised by September 2018. In addition, a Joint Flood Risk Management Plan for the Sava River Basin is in preparation, scheduled for finalisation by July 2018. An Outline of the Climate Adaptation Strategy and basin-wide priority measures for the Sava River Basin²⁶⁶ was prepared in January 2018 for ISRBC, for consultation purposes.

Transboundary cooperation has been addressed in the draft NAP through one measure for the water sector: “Development of international cooperation in the implementation of monitoring of the state of the inter-state watercourses and the Adriatic Sea with the aim of sustainable management and protection” in terms of project cooperation and knowledge exchange within existing international processes/commissions and bilateral cooperation with neighbouring countries.

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / **In progress** / No

The Croatian Meteorological and Hydrological Service conducts meteorological observations to monitor the impacts of climate change for general climate indicators. There is still work needed to expand the set of climate change indicators (e.g. to coastal, marine, biodiversity etc.). There is a need to modernise the existing climate observation and prediction system,

²⁶² Dri-Danube project website; URL: <http://www.interreg-danube.eu/approved-projects/dridanube>, accessed on 16.05.2018

²⁶³ Project information “Water and Climate Adaptation Plan for the Sava River Basin“; URL: https://www.savacommission.org/project_detail/18/1; accessed on 15.05.2018

²⁶⁴ Presentation of the project “Flood forecasting and warning system for the Sava River Basin“; URL: http://www.savacommission.org/dms/docs/dokumenti/events/workshop_on_flood_risk_management_measures_and_links_to_eu_wfd/presentations/11.pdf; accessed on 15.05.2018

²⁶⁵ Project news “Flood Forecasting and Warning System for the Sava River“; URL: <https://www.royalhaskoningdhv.com/en-gb/news-room/news/pre-release-of-flood-forecasting-and-warning-system-for-sava-river-basin/6956>; accessed on 16.05.2018

²⁶⁶ Thomas Dworak; 2018; Outline of the Sava Climate Adaptation Strategy for the Sava River Basin; URL: http://www.savacommission.org/dms/docs/dokumenti/peg_rbm/ad.3.1_wm_issues_doc_8_outline_of_the_climate_adaptation_strategy_for_the_sava_rb.pdf

namely improving the quality and availability of meteorological data (including climatological and hydrological data) and infrastructure that will allow a better understanding of climate change and as a result enable adequate adaptation policy measures. Modernisation of the meteorological network – METMONIC²⁶⁷ started in 2015 and is planned to go on until 2022. Contributions to this project are made by DHMZ, HAOP, the Croatian Waters and other research and monitoring institutions through EU-funded and bilateral donor projects.

Meteorological data are available on extreme weather events of climate change relevance, such as heatwaves, floods, strong winds and thunderstorms causing forest fires, and snow and ice. Furthermore, there are data on related health impacts and infrastructural damage costs, all with varying degrees of detail. Data on heatwaves and their impacts have been systematically monitored since 1983 by the Public Health Institute dr. Andrija Štampar” (ZZJZ) but only for the Zagreb City area. Data on floods are available from the early 20th century onwards for the entire country’s territory by Croatian Waters, and data on forest fires is available from 1981 (State Directorate for Protection and Rescue - DUZS). DHMZ provides climate monitoring data on extreme weather events (systematically covering period from 1961 onwards) and cooperates with DUZS and other sectoral institutions to provide warnings for citizens and set up precautionary, protection and rescue measures, including transboundary actions and data exchange for cases of floods and fires²⁶⁸.

The Ministry of Finance records damage due to natural disasters, in cooperation with the State Commission for the Assessment of Natural Disasters²⁶⁹. The statistical data on extreme weather events, coupled with climate scenarios, provide for more precise projections and can result in stronger prevention and response measures, which will be further elaborated in the future strategy for disaster risk reduction. Improvement of data integration, inventorying and monitoring of climate-related environmental indicators has, therefore, been included among the priority measures in the draft NAS.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

Within the project of the draft NAS and draft NAP development, in addition to the historical climate simulation for the period 1971-2000, scenarios and projections have been produced for Croatia. In these scenarios, the Croatian Meteorological and Hydrological Service took geographical specificities into account using the regional climate model RegCM on the basis of the calculated change (forecasts) for the future climate in two periods: 2011-2040 and 2041-2070, using the IPCC AR5 scenarios RCP4.5 and RCP8.5. The spatial integration domain covered the wider Europe area (Euro-CORDEX) combined with marginal conditions

²⁶⁷ METMONIC project page; URL: <http://klima.hr/razno.php?id=projekti¶m=metmonic>; accessed on 17.05.2018

²⁶⁸ DUZS; Procjena rizika od katastrofa za Republiku Hrvatsku; 2015; URL: <http://stari.duzs.hr/download.aspx?f=dokumenti/Clanci/ProcjenarizikaodkatastrofauRH..pdf>; accessed 17.05.2018

²⁶⁹ Odluka o imenovanju državne komisije za procjenu šteta od elementarnih nepogoda; OG #43/96; URL: https://narodne-novine.nn.hr/clanci/sluzbeni/full/1996_05_43_844.html; accessed 17.05.2018

from four global climate models (GCM, Cm5, EC-Earth, MPI-ESM, HadGEM2). Climate simulations until the end of the century were done with a 50 km horizontal resolution²⁷⁰. For climatological parameters with higher spatial variability (precipitation, snow cover, wind, etc.) or depending on the different characteristics of small spatial scales (orography, land-sea contrast), a finer horizontal resolution of 12.5 km was planned. However, due to the complex orography, particularly in the coastal belt of Croatia, this demanding numerical modelling extends beyond the NAS drafting process, and is expected to be finalised by the end of 2018.

A comprehensive assessment of climate impacts and vulnerabilities was carried out as part of the NAS development process in May 2017, using the climate projections until 2040 and 2070. The measures of the Croatian draft NAS were determined according to the moderate RCP4.5 scenario, as the most common scenario used in drafting adaptation strategies.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

A vulnerability assessment was developed in May 2017²⁷¹ in the framework of the NAS development covering the eight most vulnerable sectors and two cross-sectoral thematic areas, including economic, social and environmental impacts.

The Air Protection Act²⁷² recognises sectors exposed to climate impacts and prescribes the obligation of undertaking adaptation measures in those sectors (hydrology and water resources, agriculture, forestry, biological diversity and natural inland ecosystems, biological diversity and marine ecosystems, coast and coastal area, tourism, and human health). Vulnerable sectors are also defined in the 6th National Communication to the UNFCCC (2014)²⁷³ and in the 7th National Communication to the UNFCCC (2018)²⁷⁴

²⁷⁰ EPTISA Adria d.o.o. for MZOE; 2017; Rezultati klimatskog modeliranja na sustavu HPC Velebit za potrebe izrade nacrtu Strategije prilagodbe klimatskim promjenama Republike Hrvatske do 2040. s pogledom na 2070. i Akcijskog plana; URL: <http://prilagodba-klimi.hr/wp-content/uploads/2017/11/Klimatsko-modeliranje.pdf>; and Dodatak rezultatima klimatskog modeliranja na sustavu HPC VELEbit: Osnovni rezultati integracija na prostornoj rezoluciji od 12,5 km; URL: http://prilagodba-klimi.hr/wp-content/uploads/docs/Dodatak_Klimatsko_modeliranje_VELEbit_12.5km.pdf; accessed on 03.05.2018

²⁷¹ EPTISA Adria d.o.o. for MZOE; 2017; Izvještaj o procijenjenim utjecajima i ranjivosti na klimatske promjene po pojedinim sektorima; URL: <http://prilagodba-klimi.hr/wp-content/uploads/docs/Procjena-ranjivosti-na-klimatske-promjene.pdf>; accessed on 03.05.2018

²⁷² Zakon o zaštiti okoliša; Official gazette #130/11, URL: http://narodne-novine.nn.hr/clanci/sluzbeni/2011_11_130_2601.html; and #47/14, http://narodne-novine.nn.hr/clanci/sluzbeni/2014_04_47_874.html; accessed on 03.05.2018

²⁷³ Ministry of Environmental and Nature Protection; 2014; Sixth National Communication and first Biennial Report of the Republic of Croatia under the United Nations Framework Convention on Climate Change (UNFCCC); URL: http://unfccc.int/files/national_reports/annex_i_natcom/application/pdf/hrv_nc6.pdf; accessed on 03.05.2018

²⁷⁴ UNFCCC; Seventh national communication and third biennial report of the Republic of Croatia under the United Nations Framework Convention on Climate Change (UNFCCC); 2018. Croatia; URL: https://unfccc.int/sites/default/files/resource/4786521_Croatia-NC7-BR3-1-VII.%20NIRH_EN_30.4.2018.%20%281%29.pdf; accessed on 03.05.2018

Eight key sectors and two cross-sectoral thematic areas have been selected for vulnerability analysis²⁷⁵ for which the climate impacts were described in the framework of the NAS drafting process: hydrology; water and marine resources; agriculture; forestry; fisheries; biodiversity; energy; tourism; health; spatial planning and coastal areas management; and disaster risk management. Vulnerability assessment was based on modelling results and scenarios based on the Intergovernmental Panel on Climate Change (IPCC) Representative Concentration Pathway RCP4.5 medium scenario and regional climate model RegCM, as well as previous research on climate impacts and adaptation in Croatia per sector (including sectoral environmental, social and economic impacts, impacts on infrastructure – buildings, transport, energy – and transboundary climate change risks assessment). Projections and assessment results provided the insights on climate impacts per sector, as well as impact interactions between different sectors, and listed the possible responses to the challenges identified. The Risk Assessment for the Republic of Croatia was adopted in November 2015²⁷⁶. Its revision is planned by Autumn 2018, together with the assessment of risk management capacities for eight major risks, followed by a Strategy for Disaster Risk Reduction, which is planned for drafting in the last quarter of 2018 and adoption in 2019. Three questions were addressed within the risk assessment: 1) How does climate change affect risks? 2) What is the expected timeframe for the effects? 3) What are the reference documents that the analysis is based on? Eleven risks have been processed (earthquake, flood, plant diseases, animal diseases, soil salinisation, drought, industrial accidents, open space fires, extreme temperatures, snow and ice, and epidemics and pandemics), nine of which are related to climate change. Climate change is treated as a driver for events (such as drought, extreme temperatures, extreme precipitations, soil salinisation and floods) and is, therefore, an important factor in the risk analysis, as it affects either the intensity or frequency of the event. In addition to an analysis of threats, calculation includes analysis of vulnerability of society to disasters.

A risk and vulnerability assessment was also conducted for the human health sector on heatwaves. Every year, the protocol on procedure and recommendations for protection from heat is adopted (last in July 2017²⁷⁷), with the goal to reduce risk to individuals and institutions during heat waves by implementing necessary preparedness and response procedures at the national and local level. A heatwave alert system is established for the entire territory of the Republic of Croatia and is active in the period from May to October. During that period, DHMZ constantly monitors the temperature and, in the case of 70% chance that the temperature will exceed the threshold (about 35°C, depending on region), informs the Ministry of Health and the Croatian Institute for Public Health (HZJZ) on the occurrence of a heatwave, which then forwards the alert.

²⁷⁵ EPTISA Adria d.o.o. for MZOE; May 2017; Izvještaj o procijenjenim utjecajima i ranjivosti na klimatske promjene po pojedinim sektorima, URL: <http://prilagodba-klimi.hr/wp-content/uploads/2017/11/Procjena-ranjivosti-na-klimatske-promjene-final.pdf>; accessed on 03.05.2018

²⁷⁶ DUZS; 2015; URL: Procjena rizika od katastrofa za Republiku Hrvatsku; URL: http://www.platforma.hr/images/dokumenti/Procjena_rizika_RH_FINAL.pdf; accessed on 03.05.2018

²⁷⁷ Ministry of Health; 2017; Protokol o postupanju i preporuke za zaštitu od vrućine; URL: <https://zdravlje.gov.hr/UserDocsImages/2017%20programi%20i%20projekti/PROTOKOL%20-%20VRUCINA.pdf>; accessed on 03.05.2018

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

Some information on transboundary risks is given for relevant sectors in the May 2017 vulnerability assessment, including hydrology and water resources, forestry (forest fires), biodiversity and energy. The draft NAP addresses transboundary risks through one single measure in the water sector: “Development of international cooperation in the implementation of monitoring of the state of the inter-state watercourses and the Adriatic Sea with the aim of sustainable management and protection”, in terms of project cooperation and knowledge exchange within existing international processes/commissions and bilateral cooperation with neighbouring countries

Furthermore, transboundary risks are also considered in some of the transboundary cooperation initiatives mentioned in Indicator 2b.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / In progress / No

As part of the draft NAS development, analysis of research activities was carried out and presented in the document “Overview of research on impacts of climate change and adaptation”²⁷⁸. This information was used to identify gaps in knowledge and information, and for identifying the topics for future research. Based on approximately 200 references from research projects, reports, studies, articles and databases analysed (collectively referred to as “research”), the research for individual sectors was found to be fragmentary, lacking a comprehensive analysis of an entire sector or of an entire climate impact phenomenon. In all vulnerable sectors there are ample data; however, research is focused on, for example, individual species or crops, individual activity types, narrow geographic areas, specific health impacts etc. In consultation with key sectoral experts and institutions, extensive recommendations were collected for future research needed in each sector to fill the current knowledge gaps. Examples include: to focus research on larger populations (health), to complete the inventory of species (biodiversity, forestry), and to improve data integration in cross-cutting areas, such as disaster risk management. The assessment showed a big gap in the research on economic impacts of climate change and cost-effectiveness of various adaptation measures.

The recently finalised project: "Capacity Building of the Ministry of Environment and Energy for climate adaptation and preparation of the Draft Strategy for adaptation to climate change"²⁷⁹ aimed at strengthening technical knowledge on individual aspects of adaptation.

²⁷⁸ EPTISA Adria d.o.o., Pregled dosadašnjih istraživanja i aktivnosti vezanih uz utjecaj klimatskih promjena i prilagodbu klimatskim promjenama u Republici Hrvatskoj, URL: <http://prilagodba-klimi.hr/dokumenti/>

²⁸⁰ Draft NAS development - project website; URL: <http://prilagodba-klimi.hr/>; accessed on 03.05.2018

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / In progress / No

Two specific webpages/portals provide resources and information on climate adaptation issues:

- Draft NAS development – Project webpage²⁸⁰
- MZOE – Adaptation to Climate Change²⁸¹

The draft NAS development website contains resources prepared as a part of drafting the NAS, such as the report on climate modelling, impact and vulnerability assessment reports, analysis of available research on climate change and adaptation, a capacity building needs assessment, a brochure for the general public, an overview of the NAS and NAP drafting process and the final drafts of NAS and NAP. General information on adaptation policy issues, adaptation activities in Croatia and internationally is provided on the MZOE's page on Adaptation to Climate Change. Climate data (historical data, climate projections, publications etc.) are available through the Meteorological and Hydrological Service²⁸².

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / In progress / No

There are ongoing actions on capacity building, mainly related to one-off projects for participation, but so far not in a coordinated manner in the absence of a NAS having been adopted. Preparation of education and training materials on climate adaptation concepts and practices as well as further trainings are envisaged by several draft NAS measures in all 10 vulnerable sectors.

- MZOE plans to implement climate-change resilience and climate adaptation schemes at national and local level to create the preconditions for implementing the NAS and NAP, funded through EU funds.²⁸³ The recently finalised project: "Capacity Building of the Ministry of Environment and Energy for climate change adaptation and preparation of the Draft Strategy for adaptation to climate change"²⁸⁴ produced an assessment of capacity building needs for addressing climate adaptation at all governance levels and among key public and private stakeholders across 10

²⁸⁰ Draft NAS development - project website; URL: <http://prilagodba-klimi.hr/>; accessed on 03.05.2018

²⁸¹ MZOE webpages on adaptation; URL: <http://www.mzoip.hr/en/climate/climate-change-adaptation.html>; accessed on 03.05.2018

<http://www.mzoip.hr/en/climate/climate-change-adaptation.html>

²⁸² DHMZ climate portal; URL:

<http://klima.hr/klima.php?id=k5><http://klima.hr/klima.php?id=k5><http://klima.hr/klima.php?id=k5>; accessed on 03.05.2018

²⁸³ Personal communication with MS contact.

²⁸⁴ Draft NAS development – project website; URL: <http://prilagodba-klimi.hr/>; accessed on 16.05.2018

vulnerable sectors. The draft NAS defines the following major areas for capacity building: Increasing human (professional), material and financial resources for the implementation of planned adaptation measures, especially through available programs for which EU funds are already secured.

- Further education of public and private sector experts on climate change and sector-specific adaptation needs.
- Targeted training of civil society experts for further education of the public.

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

The official final draft of the NAS (White Paper) published in November 2017 proposes a set of 80 adaptation measures and activities for eight vulnerable sectors and two cross-sectoral thematic areas, as well as two measures that can be considered as multi-sectoral (climate modelling, and development of the implementation impact indicators for the NAS), in response to sectoral risks and geographical specificities identified.

The largest number of proposed measures falls within the so-called “non-structural” measures (administrative, political, legislative, technical and planning measures, measures to raise awareness of the need for climate adaptation, data gathering, monitoring and scientific-research work). A relatively small number of so-called “structural” measures includes certain technical interventions such as construction of protective dams and walls, construction of hydro-technical facilities, as well as afforestation, building of green infrastructure, strengthening the absorption capacity of land for the absorption of excess water, etc.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

Options for vulnerable sectors were identified taking into account climate modelling and the impact and vulnerability assessment. Possible measures were discussed in workshops with over 130 stakeholders: sectoral experts, as well as local and regional authorities and interested general public, together with the criteria for selection of priority measures. The resulting 80 so-called ‘sectoral’ measures were divided into five groups based on the national priorities of the NAS, which were identified by stakeholders during the process of harmonising the concept of climate adaptation in the Republic of Croatia and prioritised as very high, high, or medium priority for implementation, using multi-criteria analysis²⁸⁵.

²⁸⁵ EPTISA Adria d.o.o.; 2017; Izrada radne verzije Strategije prilagodbe klimatskim promjenama u Republici Hrvatskoj za razdoblje do 2040. godine s pogledom na 2070. godinu (Zelena knjiga); URL: <http://prilagodba-klimi.hr/wp-content/uploads/2017/11/ZELENA-KNJIGA.pdf>

Five national priorities have been identified, within which climate adaptation measures are to be implemented:

1. Ensuring sustainable regional and urban development
2. Ensuring preconditions for the economic development of rural areas, coastal areas and islands
3. Ensuring sustainable energy development
4. Strengthening of the management capacities through a networked monitoring and early warning system
5. Ensuring continuity of research activities that were assessed with very high priority.

Most measures ranked as “very high importance” in the draft NAS were at the same time identified under the European Structural and Investment Funds (ESIF) programming priorities for the period 2014-2020, for which funding is available under Operational Program Competitiveness and Cohesion (OPCC) 2014-2020, the Rural Development Program (RDP) 2014-2020 and the Maritime and Fisheries Operational Programme (MFOP) 2014-2020. The revision of programming documents for the use of ESIF for the period 2014-2020 is envisaged in 2018. As such, some financial resources may be provided for priority measures in the “very high importance” category, which would have been contracted in the period up to 2020. This primarily relates to the use of funds from the European Regional Development Fund (ERDF), the European Agricultural Fund for Rural Development (EAFRD) and the European Maritime and Fisheries Fund (EMFF), where financing of climate adaptation measures is defined in Climate Change Adaptation Strategy, but also includes European Social Fund (ESF).

The selection of measures in the draft NAP 2019-2023 has covered 42 (out of 82) sectoral measures that satisfy the ‘very high importance’ criterion from the draft NAS, and at the same time fall under the funding priorities of the three national operational programmes (OPCC, RDP and OMFP) for 2014-2020 funded through ESIF (ERDF, EAFRD and EMFF). As such, implementation of most measures could start relatively soon upon adoption of the draft NAS.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / In progress /No

The Croatian Disaster Risk Reduction Platform (CDRRP) is a country-level coordination mechanism led by DUZS, organised in working groups according to 11 major risk groups identified in the National Disaster Risk Assessment (NDRA). Each working group is led by one or more relevant sectoral institutions. MZOE is a permanent member in the CDRRP Committee²⁸⁶ and an active member in the Risk Assessment Working Group. At the national level, the impact of climate change on disaster risk has been addressed in developing the NDRA, which serves as a good practice example of a process where all stakeholders were actively involved and tasked to undertake risk reduction under their competence. The Platform serves as an active body for developing a disaster risk reduction strategy, which will

²⁸⁶ Decision on the establishment of working groups in the frame of National Platform for Disaster Risk Reduction, URL: http://www.platforma.hr/images/dokumenti/Odluka_Vlade_o_osnivanju_HP_2016.pdf; accessed on 17.05.2018

include adaptation of risk assessment and intervention plans to account for current and projected climate extremes.

Disaster risk reduction has been addressed through six measures in the draft NAS, out of which the following three have been included in the draft NAP for the period 2019-2023:

- Mapping of water sources outside the public water supply system
- Multi-sectoral risk assessment for various threat/risk scenarios associated with climate change
- Expansion of NDRRP to include climate change-related indicators for the development of an early warning system.

Measures for strengthening capacities for disaster and accident assessment and recovery, and developing models for coverage of risks and damages related to climate change will be addressed in later stages.

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / **In progress** /No

Activities to promote climate adaptation are defined within the framework of the OPCC²⁸⁷ 2014 – 2020 (thematic objective ‘Promoting climate adaptation, risk prevention and management’). Until adoption of the draft NAS, the framework for climate adaptation activities is determined in accordance with the 6th and 7th National Communication to the UNFCCC. OPCC interventions are focused on improvement of the system for monitoring and evaluation of climate change, improvement of the disaster management system and addressing flood management risks. In addition, the RDP includes climate adaptation measures in the agriculture sector.

Croatia uses financial resources from the sale of emission allowances through the FZOEU to co-finance national component priorities, for the period until 2020, relating to air quality, biodiversity and climate, including cross-cutting adaptation measures and various applied research activities in the field of climate adaptation.

The draft NAS envisages total implementation costs of EUR 3 680 000 000 (EUR 780 000 000 for the first five-year NAP), out of which State Budget resources would account for 0.23%, and the remainder would be financed from the ESIF and private sector (including public-private partnership). More than half of the estimated amount refers to implementation of "structural" measures, particularly in the sectors of agriculture and forestry ("no regret measures"), and to a lesser extent in energy and tourism. The average annual cost of implementing the draft NAS is estimated at EUR 70 million. Compared to average annual damage costs in the period from 1980 to 2015 resulting from extreme weather events (around EUR 80 million per year), benefits of implementing the draft NAS will be significant despite the high costs.

²⁸⁷ Operational Programme Competitiveness and Cohesion 2014 - 2020; URL: https://strukturnifondovi.hr/wp-content/uploads/2017/03/OPKK_eng-1.pdf; accessed on 17.05.2018

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

Amendments to the Regulation on Environmental Impact Assessment²⁸⁸ (EIA) were adopted to transpose the EIA Directive in January 2017. Developers are expected to assess climate change impacts and vulnerabilities of each project, and EIA reports are also assessed against potential climate-driven disaster risks. Similarly, the national SEA regulation²⁸⁹ also requires consideration of aspects related to climate adaptation.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / No

Croatia has started to adapt risk assessment and intervention plans to account for current and projected climate extremes. At the national government level, the impact of climate change to disaster risk has been addressed in developing the NDRA. Intense periods of rainfall and severe droughts have been taken into account²⁹⁰, as the most frequent climate extremes in Croatia. The NDRA will be used to inform development of the national disaster risk reduction strategy. Drafting of the strategy is planned for last quarter of 2018, with adoption expected in 2019. Early warning systems are in place for all major hazards, with outreach to communities.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / No

The July 2017 amendments to spatial planning legislation²⁹¹ include provisions related to spatial plans covering marine areas where due attention must be paid to long-term changes caused by climate change and to increasing climate resilience. The National Spatial Development Plan²⁹² stipulates that the spatial planning policy should include consideration of climate impacts and disaster risk reduction needs, however, this policy is not yet followed

²⁸⁸ Uredba o procjeni utjecaja na okoliš, Official gazette #61/14 , URL: https://narodne-novine.nn.hr/clanci/sluzbeni/2014_05_61_1138.html; and OG #3/2017, URL: https://narodne-novine.nn.hr/clanci/sluzbeni/2017_01_3_118.html; accessed on 17.05.2018

²⁸⁹ Uredba o strateškoj procjeni utjecaja strategije, plana i programa na okoliš, Official gazette #3/2017; URL: http://narodne-novine.nn.hr/clanci/sluzbeni/2017_01_3_117.html; accessed on 15.05.2018

²⁹⁰ Croatia: National Progress Report on the implementation of the Hyogo Framework for Action (2011-2013); url: <http://www.preventionweb.net/english/policies/v.php?id=29329&cid=43> ; accessed on 15.05.2018

²⁹¹ Zakon o izmjenama i dopunama Zakona o prostornom uređenju, Official gazette 650/2017; URL: https://narodne-novine.nn.hr/clanci/sluzbeni/2017_07_65_1494.html; accessed on 17.05.2018

²⁹² Odluka o izradi Državnog plana prostornog razvoja, Official gazette #39/2018; URL: https://narodne-novine.nn.hr/clanci/sluzbeni/2018_04_39_746.html; accessed on 17.05.2018

in practice. Other land use, spatial and urban planning policies do not yet specifically address climate impacts.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / **In progress** / No

The Air Protection Act²⁹³ recognises vulnerable sectors exposed to climate impacts and obliges integration of integrating adaptation measures in those sectors. However, adaptation considerations are only included currently in the water management sector (the RBMP and Flood Risk Management Plan for the 2016-2021 planning period) and, since 2017, in spatial planning through updates to sectoral legislation²⁹⁴, although there is not yet concrete evidence of adaptation considerations being included in planning documents. Integration of adaptation in these sectors was driven by EU legislation, combined with policy recommendations arising from the work of international river commissions in which Croatian authorities actively participate.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

No evidence could be found that adaptation is mainstreamed in insurance or alternative policy instruments to provide incentives for investments in risk prevention. Such a measure is planned in the frame of the draft NAS, but not for the first five-year implementation period.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / In progress / **No**

In the absence of a NAS or a NAP, it can be concluded that coordinated implementation of the adaptation measures, as defined in action plans, has not yet started.

Adaptation considerations have only recently been included in two sectors: physical planning legislation and water management sectoral plans. Implementation in both sectors is at the moment only planned.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / **No**

²⁹³ Zakon o zaštiti okoliša, Official gazette #130/11: http://narodne-novine.nn.hr/clanci/sluzbeni/2011_11_130_2601.html, and #47/14; http://narodne-novine.nn.hr/clanci/sluzbeni/2014_04_47_874.html; accessed on 17.05.2018

²⁹⁴ Odluka o izradi Državnog plana prostornog razvoja, Official gazette #39/2018; URL: https://narodne-novine.nn.hr/clanci/sluzbeni/2018_04_39_746.html; accessed on 17.05.2018

Pending the adoption of the draft NAS and draft NAP, systematic cooperation mechanisms for fostering adaptation at local or regional level do not seem to be yet in place. Adaptation is limited to one-off participation in European projects and initiatives, such as the Covenant of Mayors for Climate and Energy, in which 13 Croatian towns and municipalities are signatories with adaptation commitments²⁹⁵. A regional ORIENTGATE project²⁹⁶ (2012-2015) created a partnership in 13 countries to network and exchange data on the impacts of climate variability and climate change on water regimes, forests and agro-ecosystems, which includes 2 Croatian partner institutions.

In the frame of international river commissions, data and experience exchange is enabled at sub-regional level among the countries with regard to development of joint operational flood forecasting, and early warning system and a Joint Flood Risk Management Plan for the Sava River Basin.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / No

The EU “Guidance on integrating climate change and biodiversity into EIA²⁹⁷ and SEA²⁹⁸”, is translated into Croatian, as well as the EU “Guidance for project managers: How to increase resilience of vulnerable investments to climate change²⁹⁹”, are available on the MZOE website and actively recommended to developers and EIA/SEA experts. The purpose of the “Guidance for project managers” is to help manage additional climate change risks and to complete the EIA reports. It is designed as a tool that can help reduce climate-induced losses in different kinds of investments, thus, increasing the resilience of investment projects and economies. Authorised professionals use the guidance when drafting EIA and SEA reports.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / No

²⁹⁵ Covenant of Mayors – signatories with adaptation commitments; URL:

<https://www.covenantofmayors.eu/about/covenant-community/signatories.html>; accessed on 17.05.2018

²⁹⁶ Orientgate project website; URL: <http://www.orientgateproject.org/index.php?page=city-of-koprivnica-hr>; accessed on 17.05.2018

²⁹⁷ EU; 2013; Smjernice za uključivanje klimatskih promjena i bioraznolikosti u procjene utjecaja na okoliša; URL:

http://www.mzoip.hr/doc/smjernice_za_ukljucivanje_klimatskih_promjena_i_bioraznolikosti_u_procjene_utjecaja_na_okolis.pdf; accessed on 17.05.2018

²⁹⁸ EU; 2013; Smjernice za integriranje klimatskih promjena i bioraznolikosti u strateške procjene utjecaja na okoliša; URL:

http://www.mzoip.hr/doc/smjernice_za_integriranje_klimatskih_promjena_i_bioraznolikosti_u_strateske_procjene_utjecaja_na_okolis.pdf; accessed on 17.05.2018

²⁹⁹ EU DG CLIMA; 2012; Neformalni dokument Smjernice za voditelje projekata: Kako povećati otpornost ranjivih ulaganja na klimatske promjene; URL: http://www.mzoip.hr/doc/smjernice_za_voditelje_projekta.pdf; accessed on 17.05.2018

As the process of formulating national adaptation policy is in its early phases, there do not seem to be many opportunities for stakeholders' involvement in the implementation of adaptation policies and measures. However, processes for stakeholder involvement in policymaking are laid down in general laws regulating public policy development, and are systematically implemented at all governance levels; no specific additional measures are envisaged for adaptation.

The draft NAS generally acknowledges importance of stakeholder awareness raising and participation. In this respect, strengthening of local and regional government capacities is planned, both strategically (development of regional development plans and spatial plans that will include the component of climate adaptation), as well as through technical training in specific areas of climate adaptation.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / **No**

No reports on adaptation at the central level have been published, as the NAS and NAP are yet to be adopted.

According to Air Protection Act with its 2014 amendments³⁰⁰, reports on implementation of adaptation measures are to be submitted to the European Commission in line with Article 15 of the EU Regulation No. 525/2013³⁰¹. Upon adoption of the NAS and NAP, reporting on the implementation of the NAS will follow formats and deadlines for reporting under EU legislation. Wherever possible, reporting procedures will rely on existing systems, with the necessary further development of the MZOE and HAOP capacities for monitoring and reporting. Currently, most of HAOP's activities in the field of climate change are related to greenhouse gas data collection and monitoring of climate impacts on species and habitats. These activities will need to expand and a database will need to be created based on the indicators proposed for monitoring the individual measures and activities listed in the draft NAS and draft NAP.

Eighty-one indicators have been proposed for monitoring adaptation measures in the priority sectors. There are an additional 15 climate indicators, most of which are already included in the National List of Indicators prepared by HAOP. The legal basis of the list is defined by the

³⁰⁰ Zakon o izmjenama i dopunama Zakona o zaštiti zraka, Official gazette #47/2014; URL: https://narodne-novine.nn.hr/clanci/sluzbeni/2014_04_47_874.html, accessed on 16.05.2018

³⁰¹ Regulation No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC; URL: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32013R0525>; accessed on 16.05.2018

Environmental Protection Act³⁰² and the Regulation on the Environmental Information System³⁰³.

The draft NAS and draft NAP propose that CCCMA will monitor the implementation of the NAP at its sessions, review reports and propose measures to remove obstacles and improve implementation.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

No reports on adaptation in vulnerable sectors have been published, as the NAS and NAP are yet to be adopted. Nevertheless, according to Article 118a of the Air Protection Act, central state administration bodies and other public authorities that are competent in relation to a range of activities (meteorology, environmental protection, agriculture, fishery, forestry, water management, energy, physical planning, nature protection, sea, tourism and protection of human health) have an obligation to submit periodical five-year reports to the ministry responsible for environmental protection on their activities related to climate adaptation. These reports feed into periodical reporting to the European Commission on implementation of adaptation measures. The first reporting was conducted at the beginning of 2015.

Integration of climate adaptation into sectoral strategies and planning documents has been generally planned in the draft NAS, and the draft NAP specifically lists measures to integrate adaptation into several vulnerable sectors (tourism, spatial planning system, biodiversity, forestry). The adaptation measures will be coordinated between the MZOE and respective sectoral ministries. Upon adoption of the draft NAS and draft NAP the relevant national authorities will be required to integrate them in their policies and secure sufficient funding for implementation.

From the draft NAP or draft NAS, it is unclear how the dissemination of monitoring results will be organised.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / **No**

The national legal framework requires reporting between different levels of government (national, counties and cities) on issues such as legislation and development planning.

Specifically, for climate adaptation, a five-year reporting obligation (see Indicator 10b) includes regional and local-level authorities in the listed sectors. First reporting was conducted in early 2015 and included a review of the implementation of measures and

³⁰² Zakon o zaštiti okoliša, Official Gazette #80/13, URL: https://narodne-novine.nn.hr/clanci/sluzbeni/2013_06_80_1659.html; #78/15, URL: http://narodne-novine.nn.hr/clanci/sluzbeni/2015_07_78_1498.html; #12/18, URL: https://narodne-novine.nn.hr/clanci/sluzbeni/full/2018_02_12_264.html; accessed on 16.05.2018

³⁰³ Uredba o informacijskom sustavu zaštite okoliša, Official Gazette #68/08; URL: <http://narodne-novine.nn.hr/clanci/sluzbeni/339831.html>; accessed on 16.05.2018

actions, their impacts, and identification of obstacles. The resultant report served as a basis for creating new action plans.

From the draft NAP or draft NAS, it is unclear how the dissemination of monitoring results of sub-national actions will be organised.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

The first interval for evaluation will be after the first NAP 2019-2023 has expired. Any subsequent revisions of the NAS will depend on the information that will be generated by the implementation monitoring system, as well as the general climate change monitoring system.

Nevertheless, given the unusually long lifespan of the draft NAS, until 2070, a periodic review of all adaptation actions has not been clearly defined.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / **No**

No evidence of stakeholder engagement in monitoring, evaluation or review is available, as implementation of the NAS and NAP has not yet started. In the draft NAS and draft NAP, stakeholder involvement is not specifically planned. Nevertheless, as indicated above, reporting is planned on implementation by sectoral ministries, and local and regional governments coordinated by the CCCCMA.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 <i>Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	Yes / <u>In progress</u> / No
2 <i>Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 <i>Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	Yes / <u>In progress</u> / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No
4 <i>Knowledge gaps</i>		
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	<u>Yes</u> / In progress / No
5 <i>Knowledge transfer</i>		

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	<u>Yes</u> / In progress / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	Yes / <u>In progress</u> / No
Step C: Identifying adaptation options		
6 <i>Identification of adaptation options</i>		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	<u>Yes</u> / In progress / No
7 <i>Funding resources identified and allocated</i>		
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / <u>In progress</u> / No
Step D: Implementing adaptation action		
8 <i>Mainstreaming adaptation in planning processes</i>		
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	Yes / <u>No</u>
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	Yes / <u>No</u>
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	Yes / <u>In progress</u> / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 <i>Implementing adaptation</i>		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / In progress / <u>No</u>
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	Yes / <u>No</u>
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	<u>Yes</u> / No
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	Yes / <u>No</u>
Step E: Monitoring and evaluation of adaptation activities		
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
11 <i>Evaluation</i>		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	Yes / <u>No</u>

Adaptation preparedness scoreboard for Cyprus

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List of abbreviations

ARI	Agricultural Research Institute
CCRA	Climate Change Risk Assessment
CYCOFOS	Cyprus Coastal Ocean Forecasting and Observing System
DFMR	Department of Fisheries and Marine Research
DRR	Disaster Risk Reduction
ESIF	European Structural and Investment Funds
MCA	Multi-Criteria Analysis
MS	Member States
NAP	National adaptation plan
NAS	National adaptation strategy
NOA	Greek National Observatory of Athens
NTUA	National Technical University of Athens
MARDE	Ministry of Agriculture, Rural Development and Environment
PA	Partnership Agreement
SGL	State General Laboratory

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

Cyprus prepared a combined national adaptation strategy (NAS) and national adaptation plan (NAP) in 2014³⁰⁴. An updated NAS has been developed recently and formally adopted by the Cypriot Government in 2017³⁰⁵, which includes an evaluation of the effects of climate change on 11 vulnerable policy areas (sectors) in Cyprus. Moreover, the updated NAS identifies adaptation measures and actions for each vulnerable sector and states clearly the need for revision and evaluation of the NAS at regular intervals.

The adaptation policy process has been aided by the CYPADAPT³⁰⁶ project, which was co-financed by the EU through the LIFE+ instrument. This project started in September 2011 and was completed in March 2014. The beneficiary was the Department of Environment of the Ministry of Agriculture, Rural Development and Environment (MARDE), the authority responsible for climate change in Cyprus.

A2. Adaptation strategies adopted at sub-national levels

For the time being there is no centralised information or evidence about adaptation strategies being developed at regional, sub-regional or local levels³⁰⁷. However, local actions are taking place. MARDE is in contact with the Union of Municipalities and the Union of Communities to collect this information and organise training days to inform the local authorities on the adaptation actions relevant to their regions.

Adaptation action plans

B1. National adaptation plan

³⁰⁴ CYPADAPT, 2014, Ανάπτυξη εθνικής στρατηγικής για την προσαρμογή στις αρνητικές επιπτώσεις της κλιματικής αλλαγής στην Κύπρο, URL: http://cypadapt.uest.gr/wp-content/uploads/2014/12/19/deliverable_5.1_greek.pdf, Date accessed: 14/05/2018

³⁰⁵ ΥΠΟΥΡΓΕΙΟ ΓΕΩΡΓΙΑΣ, ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ ΚΑΙ ΠΕΡΙΒΑΛΛΟΝΤΟΣ, ΤΜΗΜΑ ΠΕΡΙΒΑΛΛΟΝΤΟΣ, Απρίλιος 2017, ΕΘΝΙΚΗ ΣΤΡΑΤΗΓΙΚΗ ΓΙΑ ΤΗΝ ΠΡΟΣΑΡΜΟΓΗ ΣΤΗΝ ΚΛΙΜΑΤΙΚΗ ΑΛΛΑΓΗ, URL: [Cyprus National Adaptation Strategy 2017](http://cypadapt.uest.gr)

³⁰⁶ CYPADAPT, URL: <http://cypadapt.uest.gr/>, Date accessed: 14/05/2018

³⁰⁷ Personal communication with MS contact

An updated NAP was adopted in 2017³⁰⁸. The combined NAS/NAP mentioned the adaptation measures for each vulnerable policy area (sector) in Cyprus, as they were identified using the CYPADAPT software tool. The updated NAP follows the same methodology as the combined NAS/NAP but is a more detailed document that lists potential climate impacts along with their potential risk/hazard, the competent authority and the timeline for the completion of each measure.

B2. Adaptation plans adopted at sub-national level

No sub-national adaptation plans have been adopted. Some activities related to climate adaptation have taken place at the local level but not as part of a programmed/planned process under the framework of the NAP.

B3. Sectoral adaptation plans

Sectoral adaptation plans have been included in the NAP for each of the 11 policy areas mentioned above, including a set of adaptation measures that have been prioritised.

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

In Cyprus, MARDE is the central body coordinating the adaptation policy-making process and has led the preparation and adoption of the NAS. The adaptation policy process has been aided by the CYPADAPT project, (2011-2014), which was co-financed by the EU through the LIFE+ instrument and was coordinated by the Department of Environment of MARDE. The Ministry was also responsible for preparing a combined NAS/NAP in 2014, which was updated and formally adopted in May 2017.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

³⁰⁸ ΥΠΟΥΡΓΕΙΟ ΓΕΩΡΓΙΑΣ, ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ ΚΑΙ ΠΕΡΙΒΑΛΛΟΝΤΟΣ, ΤΜΗΜΑ ΠΕΡΙΒΑΛΛΟΝΤΟΣ, ΠΑΡΑΡΤΗΜΑ ΙΙ, 2017, ΣΧΕΔΙΟ ΔΡΑΣΗΣ ΠΡΟΣΑΡΜΟΓΗΣ ΣΤΗΝ ΚΛΙΜΑΤΙΚΗ ΑΛΛΑΓΗ, URL: [Cyprus National Adaptation Plan 2017](#), Date accessed: 14/05/2018

As indicated above, the responsible authority for the development and implementation of the NAS and NAP is the Department of Environment of MARDE.

During the development of the NAS, an ad-hoc consultation process was in place with the relevant authorities, academic research institutions and the private sector.

The responsibility for the implementation of specific sectoral actions lies within the responsible authorities for each specific action (e.g. the Department of Agriculture for agricultural issues). In November 2017, meetings with all relevant stakeholders took place to assess the status of implementation of the activities included in the NAP³⁰⁹. Previously, a CYPADAPT Adaptation Steering Committee (established in November 2011) facilitated and monitored the progress of NAS. The Committee was further divided into thematic sub-committees. The Environment Department was the coordinator, bringing together government departments, local authorities, universities, research institutions, consultants, NGOs and consumer organisations.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / **In progress** / No

Vertical coordination mechanisms are not currently operational beyond the national level coordination of cities and communities. It is anticipated that further vertical coordination will be applied by the responsible organisation for each thematic topic to support the implementation phase.

2 Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

The active engagement of stakeholders and experts (relevant ministerial departments, associations, non-governmental organizations, universities, research institutes, etc.) was recognised from the beginning of the NAS development as a key element for the assessment of vulnerability, the identification and evaluation of adaptation measures and most importantly, for the development of the NAS. Stakeholders were involved in several phases of the CYPADAPT project, particularly during: Phases 2 and 3 (respectively, assessment of current and future impact; adaptation and vulnerability assessment); Phases 4 and 5

³⁰⁹ Personal communication with MS contact.

(identification and assessment of the adaptation measures); and Phase 6 (development of the NAS).

The 6th National Communication to the UN Framework Convention on Climate Change (UNFCCC)³¹⁰ indicates that the outcome of the evaluation of proposed adaptation measures would, after public consultation, be finalised and used for the elaboration of the NAS. The draft NAS went through two different consultation phases before it was published. The 1st phase presented the draft NAS to the sectoral Steering Committees of the LIFE project for comments. The 2nd phase consisted of a public consultation for a period of 2 months, which sought feedback on the evaluation criteria, the scoring system and the adaptation measures as well as input to the Multi-Criteria Analysis (MCA) tool database.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / **No**

Transboundary cooperation to address common challenges with relevant neighbouring countries (cooperation between Mediterranean countries) is currently under development. The NAS states that Cyprus will pursue cooperation with neighbouring countries with the aim to prevent and tackle sea pollution. However, no specific planned actions are described. Nevertheless, a proposal to support adaptation actions between EU and non-EU neighbouring countries has been recently submitted for EU funding under the LIFE Integrated Projects programme. Moreover, the cooperation agreements between Cyprus-Greece-Israel and Cyprus-Greece-Egypt consider climate adaptation.³¹¹ However, the limited scope of plans for transboundary cooperation do not qualify for a positive score.

Step B: Assessing risks and vulnerabilities to climate change

3 Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / In progress / No

The Meteorological Service of Cyprus has a well-established database on observed key climate variables (temperature, rainfall, sunshine) that provides valuable information for climate impact studies.

³¹⁰ Department of Environment Ministry of Agriculture, Rural Development and Environment, December 2013, Cyprus- Sixth National Communication accompanied by the Biennial Report under the UNFCCC, URL: [http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/cyp_nc6\[1\].pdf](http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/cyp_nc6[1].pdf), Date accessed: 14/05/2018

³¹¹ Personal communication with MS contact.

The Cyprus Oceanographic Centre carries out ocean research and studies, forecasts and monitors the deep-sea water characteristics. It operates the Cyprus Coastal Ocean Forecasting and Observing System (CYCOFOS) and the online marine database Cyprus Oceanographic Online Database (BYTHOS), providing scientific data on Eastern Mediterranean.

The Department of Fisheries and Marine Research (DFMR) carries out research and monitors marine ecology and biodiversity, the coastal/marine water quality and the marine aquaculture.

The Agricultural Research Institute (ARI) conducts research in agriculture, plant and livestock science, proposes and evaluates new scientific and technological methods and suggests new procedures for the sustainable utilisation of natural resources and the improvement of animal and plant production.

The State General Laboratory (SGL) carries out research to support the development and application of policies and to provide solutions to existing or emerging problems mainly in the areas of food safety, environment and public health. Detailed analysis of observed and potential climate impacts has been included in the CYPADAPT project.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

The Meteorological Service has acquired the PRECIS model from the UK for running climatic forecasts. Future climate has been projected by using PRECIS16 as the main Regional Climate Model and the A1B emissions scenario³¹². The climate projections were examined in two future periods: the near future period 2021-2050 and the distant future period 2071-2100. The derived values of various climatic parameters in Cyprus for both future stages were compared to the reference values for the control period 1960-1990. The climate projections for the 2021- 2050 period were made by using six additional simulation models of the ENSEMBLES prediction system beside PRECIS16, whereas for the 2071-2100 period the A2 and B2 emissions scenarios were used in addition to A1B. For scenarios and projections, the draft NAS considers the future period 2021-2050. This has been chosen specifically in order to assist stakeholders and policymakers to consider impacts, assess vulnerabilities and plan adaptation measures.

³¹² Nakićenović and Swart, 2000: IPCC Special Report on Emissions Scenarios. A Special Report of Working Group III of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK

Geographical specificities have been taken into account on a country-wide basis in some sectors, such as water resources. Geographical issues within Cyprus have also been considered for some sectors, particularly in relation to biodiversity and forestry.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

A first vulnerability assessment on the most important economic sectors was made within the CYPADAPT project. Key climate change risks and priority policy areas were identified. Past research had already indicated that the sectors that would require priority attention on the design and application of adaptation actions for Cyprus would be water resources, coasts, biodiversity and tourism.

Cyprus's first detailed Climate Change Risk Assessment (CCRA) was published in 2016³¹³. It provides an overview of potential risks and opportunities of climate change for Cyprus until 2100 and its findings will inform the development of adaptation plans by the Government and the competent authorities. The vulnerability assessment³¹⁴ has focused on 11 priority sectors. These include water resources, land use, seaside areas, biodiversity, forestry, agriculture, fisheries, tourism, energy, infrastructure and public health.

The selection of the policy areas was based on the categorization of policy areas for integrating adaptation, as these were identified in the European Commission's White Paper entitled "Adapting to climate change: Towards a European framework for action". The general concept of the methodology followed was adopted by the "Impacts, Adaptation and Vulnerability" Assessment Reports of the IPCC (2001) while the assessment was further elaborated by the CYPADAPT project team. The main sources of information used at international and European levels were technical reports of the IPCC, the European Commission, the European Environment Agency and the Joint Research Centre. In addition, an extensive literature review was undertaken, several academic/research institutions and private companies in Cyprus were consulted, and communication with numerous national authorities and organizations in Cyprus was established. Finally, various departments contributed, such as the Ministry of Agriculture, Rural Development and Environment, the Ministry of Energy, Commerce, Industry and Tourism, the Ministry of Transport,

³¹³ Ministry of Agriculture, Rural Development and Environment, Department of Environment, August 2016, The Cyprus Climate Change Risk Assessment Evidence Report, URL: [http://www.moa.gov.cy/moa/environment/environmentnew.nsf/276491E82F8428E1C22580C30034ABF2/\\$file/Evidence-Report-v1_final.pdf](http://www.moa.gov.cy/moa/environment/environmentnew.nsf/276491E82F8428E1C22580C30034ABF2/$file/Evidence-Report-v1_final.pdf), Date accessed: 14/05/2018

³¹⁴ Papadaskalopoulou, Assessment of Cyprus' vulnerability to climate change and development of a national adaptation strategy, URL: http://uest.ntua.gr/adaptoclimate/proceedings/full_paper/papadaskalopoulou_et_al_v.pdf, Date accessed: 14/05/2018

Communications and Works, the Ministry of Health, the Ministry of Interior and the Ministry of Labour, Welfare and Social Insurance of Cyprus.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / In progress / **No**

While there are transboundary cooperation mechanisms in place (see Indicator 2b) no specific assessments have yet been completed³¹⁵. Transboundary cooperation is mentioned in the NAS with regard to tackling marine pollution, but without specific mechanisms being planned.

4 Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / **In progress** / No

Some knowledge gaps were identified during the development of the NAS, and during the meetings with all stakeholders that took place after the adoption of the NAS. The combined NAS/NAP document states that: “An interdisciplinary team will conduct periodic reviews of the literature review on the climate change effects and the adaptation measures on the health sector” (p236)³¹⁶.

The work carried out in the preparation of the Cyprus NAS under the CYPADAPT project had two research institutions as key partners, the National Technical University of Athens (NTUA), and the Greek National Observatory of Athens (NOA), working together with MARDE. The vulnerability assessment carried out to inform the NAS (see Indicator 3c) identifies many research needs to properly inform the country's adaptation policy.

Some research into the assessment of existing and future impacts on vulnerable economic sectors is being financed and carried out through one-off projects. It has been decided to assess all knowledge gaps related to climate impacts and adaptation and identify possible sources of funding for their research.

5 Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

³¹⁵ Personal communication with MS contact.

³¹⁶ CYPADAPT, 2014, Ανάπτυξη εθνικής στρατηγικής για την προσαρμογή στις αρνητικές επιπτώσεις της κλιματικής αλλαγής στην Κύπρο, URL: http://cypadapt.uest.gr/wp-content/uploads/2014/12/19/deliverable_5.1_greek.pdf, Date accessed: 14/05/2018

Yes / **In progress** / No

During the development of its NAS, Cyprus developed a CYPADAPT portal³¹⁷ to support the dissemination of information on climate adaptation. The platform was designed to be a knowledge base and communication platform for adaptation, linked to Climate-ADAPT and other platforms. The potential users identified were the government, local authorities, universities, research institutions, NGO's and other stakeholders and citizens. The platform was expected to provide access and share information and views on many different issues concerning adaptation options, climate impacts, vulnerability, case studies, research activities, legislation, financing opportunities, tools for adaptation planning and useful links. However, the platform has not been updated since 2014.

MARDE's Department of Environment launched an online blog in Greek (ClimateCY³¹⁸), where news, information and positions relating to adaptation were uploaded. However, the latest news update was in 2012.

As part of the CYPADAPT project, in preparing development of the NAS, there has been wide interaction between academia and policymakers, including through steering committees and working groups. However, it is unclear how the NAS or NAP will facilitate further dialogue and exchange between academia, policy and decision-makers.

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / **In progress** / No

The NAP mentions certain actions that support capacity building. More specifically, the NAP includes provisions for a campaign to raise awareness among farmers on the importance of preserving water and the opportunities from using recycled water, as well as appropriate plant and animal species for different climate conditions. However, education materials or specific training activities to build adaptation capacity or to help stakeholders to adapt to climate change are not yet available. The NAP also includes an action to use the media to raise awareness among the general public on how to protect against heatwaves and a campaign on the effects of climate change on human health.

Step C: Identifying adaptation options

6 Adaptation options' identification

³¹⁷ CYPADAPT 2011, URL: <http://cypadapt.uest.gr/>, Date accessed: 16/05/2018

³¹⁸ Link can't be found anymore, but a useful link is the following:

<https://climate-adapt.eea.europa.eu/countries-regions/countries/cyprus>, Date accessed: 14/05/2018

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

Overall, over 200 measures for enabling adaptation to the impacts of climate change across 11 policy sectors are included in the NAS, which take account of the geographical specificities of Cyprus. The various measures identified in the NAS aim to address all of the identified policy sectors and risks identified in the 2016 CCRA. These measures range in character from policy plans, strategies, legislative actions, guidelines, economic incentives to new infrastructure, knowledge dissemination activities or research.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

In order to prioritise the options and facilitate the choices per sector, an MCA tool was developed. The NAS development also involved opinion surveys for the qualitative prioritisation of adaptation options in all of the 11 selected sectors. The MCA tool covered all of the identified adaptation measures. The criteria selected for the evaluation of the adaptation measures were:

- Efficiency of the measure
- Environmental concerns
- Supporting the prevention of climate impacts
- Urgency for implementing the measure
- Usefulness of implementation irrespective of climate change
- Technical viability
- Economic viability
- Public acceptance

The MCA tool processes stakeholders' evaluations on the proposed adaptation measures and produces alternative adaptation scenarios, based on: the degree of climate vulnerability, the weights assigned to the evaluation criteria, and the weights assigned to the different stakeholder groups (competent national authorities, relevant national authorities, research institutes, NGOs, sectoral unions and associations and civil society organisations). The adaptation measures with the highest performance against the evaluation criteria are identified and integrated into the NAP.

In the NAS, a "Sustainable Adaptation Scenario" is presented, which assigns equal weight to the technical, environmental and social criteria. As the economic evaluation of measures is a

more complicated process, economic criteria have not been taken into account during this phase. A separate cost-benefit analysis for the selected adaptation measures will be conducted.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes/ **In Progress** / No

Disaster risk reduction practitioners are involved in adaptation planning. The disaster risk reduction planning has started at a strategic level and is part of the responsibilities of the Department of Defence³¹⁹.

7 Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / **In Progress** / No

The NAS mentions budgetary allocations to climate adaptation actions, such as the development of a detailed risk assessment (see Indicator 3c) or the development of a national adaptation platform (see Indicator 5a). Other elements such as coordination, governance, capacity building, indicators and projections do not yet seem to have specific resources allocated in the NAS, as yet.

Costs of climate impacts and costs/benefits of adaptation, in general, have yet to be identified. The Cyprus Audit Office stressed that the CYPADAPT proposed measures should be prioritized according to a cost-benefit analysis, and those with the lower cost and the highest contribution to adaptation should be implemented first. According to the After-LIFE Communication Plan³²⁰, which complemented the NAS, the adaptation measures identified have been included under the funding priorities foreseen in the Partnership Agreement (PA) 2014-2020 of the Republic of Cyprus, a comprehensive strategic document for the utilisation of the European Structural and Investment Funds (ESIF).

Step D: Implementing adaptation action

8 Mainstreaming adaptation in planning processes

³¹⁹ Personal communication with MS contact.

³²⁰ CYPADAPT, After-LIFE Communication Plan DELIVERABLE 6.6, URL: http://cypadapt.uest.gr/wp-content/uploads/20141222/deliverable_6.6.pdf, Date accessed: 14/05/2018

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / **No**

As the revised Environmental Impact Assessment (EIA) Directive³²¹ is now in place, the Cypriot authorities have started to harmonise national legislation and mainstream adaptation. The deadline for transposition was May 2017. A national law, reflecting the revised EIA Directive, is drafted and is now undergoing a third reading in the House of Representatives³²². Climate adaptation will be included in the next revision of the national law on Strategic Environmental Assessment (SEA).

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / **No**

Plans for disaster risk reduction do not factor in projected climate extremes that may occur in the future. In addition, the NAS does not mention specific disaster preparedness plans or how these account for climate adaptation. The NAP does, however, mention that emergency preparedness plans, in general, should account for managing injuries and diseases that may occur as a result of climate change.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / **No**

A description of land use, spatial or urban planning policies where adaptation is mainstreamed is lacking. There is reportedly a coastal area management programme (CAMP-Cyprus) within the framework of implementing Integrated Coastal Zone Management in Europe. However, there is no evidence of the programme mainstreaming consideration of climate impacts and vulnerability.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / **In Progress** / No

³²¹ Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

³²² Personal communication with MS contact.

Specific measures have been included in the NAP, so that future updates to water policy (such as the Cyprus River Basin Management Plan³²³), spatial planning and infrastructure will take adaptation into account.

There is some initial progress in the forestry sector, as the Ministry's Department of Forests has been developing a 10-year action plan regarding the adaptation of Cyprus forests to climate change. In addition, the Cyprus Institute presented a Climate Change Adaptation Plan for the Pedieos River Basin to the Environment Committee of the Cyprus Parliament in February 2017.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

No evidence could be found that adaptation is mainstreamed in insurance policies or alternative policy instruments to provide incentives for investments in risk prevention.

9 Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / In Progress / **No**

Cyprus has in place a separate NAP document to address sectoral adaptation measures. The implementation of several adaptation measures in the 11 vulnerable sectors has begun but there is no further information on the extent of their completion. The measures with an immediate deadline (by 2018) refer to soil resources, coastal zones, tourism, biodiversity, health and energy sectors. However, the timeline for other measures varies between end of 2020, 2040 or more vague deadlines and no start dates are specified.

Some autonomous adaptation actions are being undertaken at sectoral level. For example, the Institute of Agricultural Research and the Ministry's Department of Forests are undertaking projects which facilitate adaptation. Moreover, the Cyprus Institute presented a Climate Change Adaptation Plan for the Pedieos River Basin to the Environment Committee of the Cyprus Parliament in February 2017.

³²³ Ministry of Agriculture, Rural Development and Environment, April 2011, Cyprus River Basin Management Plan, URL: [http://www.moa.gov.cy/moa/wdd/wdd.nsf/all/1AE1F4E1B33E432CC22578AF002C0E71/\\$file/RBMP_EN.pdf?openelement](http://www.moa.gov.cy/moa/wdd/wdd.nsf/all/1AE1F4E1B33E432CC22578AF002C0E71/$file/RBMP_EN.pdf?openelement), Date accessed: 14/05/2018

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, sub-national)

Yes / **No**

Even though some implementation is underway, co-operation mechanisms have not yet been fully developed. However, the NAP sets out a few actions for different government departments and other authorities, such as the Ministries of Environment, Health, Agriculture, Public Infrastructure, Planning and Housing, local authorities and the National Meteorological Service.

There are a number of instances of cooperation with wider regional authorities³²⁴, municipalities, community groups and private local enterprises, including:

- CAMP-Cyprus, which is implementing activities in the southern peri-urban coastal area of Larnaca town with regard to: (i) biodiversity, (ii) capacity assessment, (iii) strategic environmental assessment and (iv) environmental economics and economic instruments. It involves the co-operation of Larnaca municipality and the communities of Pervolia, Meneou and Kiti
- The COASTANCE project for coastal zone adaptation, which includes an assessment of the coastal risks and management measures for the pilot case of Mazotos area in Larnaca District
- The MAREMED project on adaptation in coastal areas in which the Larnaca District Development Agency is partnering with 14 regions from five countries.³²⁵

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / **No**

Apart from various guidelines issued by the European Commission, there are no specific procedures or guidelines issued or used by the Cyprus authorities for assessing climate impacts on major projects or programmes and for facilitating their adaptation.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / **No**

³²⁴ Each wider region (District) comprise of a number of Municipalities

³²⁵ Maritime Regions cooperation for the Mediterranean, URL: <http://www.maremed.eu/index.php?act=1,2,3>,
Date accessed: 16/05/2018

Stakeholders have been defined during the development of the NAS and NAP and were involved throughout the process of their development. The Department of Environment continuous to involve all relevant stakeholders in the process of developing the implementation and implementation of the NAS and NAP.

The active engagement of stakeholders and experts (from ministerial departments, associations, non-governmental organizations, universities, research institutes, etc.) was recognised from the beginning of the NAS development as key to the assessment of vulnerabilities, the identification and evaluation of adaptation measures and, most importantly, for the development of the NAS. Stakeholders were involved in several phases of NAS development, particularly during: assessment of current and future impacts, assessment of vulnerabilities, identification and assessment of adaptation measures. Moreover, the MCA tool processes stakeholders' evaluations on the proposed adaptation measures.

Step E: Monitoring and evaluation of adaptation activities

10 Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / **No**

A Monitoring Strategy³²⁶ was developed to complement the NAS, and proposed the establishment of a Monitoring Team. The results of the Monitoring Strategy are expected to provide the basis for the preparation of the second NAP. Monitoring reports are scheduled every year from 2017 to 2019. The preparation of the 2018 update has just started but it has not yet been published. All the stakeholders have been included throughout the process and particularly during monitoring the progress of the implementation of the adaptation measures.

The preparation of four monitoring reports by the Monitoring Team was foreseen for the periods:

- T1: 01/09/2014 – 30/11/2015
- T2: 01/12/2015 – 28/02/2017
- T3: 01/03/2017 – 31/05/2018
- T4: 01/06/2018 – 31/08/2019

³²⁶ CYPADAPT, 2014, Strategy for monitoring the implementation of the National Adaptation Plan of Cyprus to climate change (English summary), Deliverable 5.2, URL: http://cypadapt.uest.gr/wp-content/uploads/20141219/deliverable_5.2_english.pdf, Date accessed: 14/05/2018

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

Evidence for monitoring of integration climate adaptation in sectoral policies has not been published yet.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / No

There is no mention in the NAS or NAP of a requirement or expectation for sub-national organisations to report on their progress on adaptation to the national Government or the general public.

11 Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

The Council of Ministers' decision, which adopted the NAS and NAP in May 2017, clearly states that the NAS will be reviewed annually.

Data are collected for each adaptation measure and a review is being prepared. The deadline for submitting the review to the Department of Environment was 15th May 2018. The preparation of an updated NAS and NAP will then follow, which will be sent to the relevant stakeholders and then to the Council of Ministers for adoption.

11b. Stakeholders are involved in the monitoring and review of national adaptation policy

Yes / No

Reviews coordinated by the Department of Environment involve all stakeholders, as stated in the Council of Ministers' decision that adopted the NAS and the NAP in May 2017. The process of the review follows the following steps:

- Previous version of the NAP/NAS are sent to all involved stakeholders
- Sectoral meetings take place with directly involved stakeholders
- Overall meetings take place for the overview of the NAS/NAP review

- The final draft version of the reviewed NAS/NAP is forwarded for final comments to all stakeholders
- The final draft version of the reviewed NAS/NAP is forwarded to the Council of Ministers for adaptation.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 <i>Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	Yes / <u>In progress</u> / No
2 <i>Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	Yes / <u>No</u>
Step B: Assessing risks and vulnerabilities to climate change		
3 <i>Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	<u>Yes</u> / In progress / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / In progress / <u>No</u>
4 <i>Knowledge gaps</i>		
4a	Work is being carried out to identify, prioritise and	Yes / <u>In progress</u> /

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	address the knowledge gaps	No
5 Knowledge transfer		
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	Yes / <u>In progress</u> / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	Yes / <u>In progress</u> / No
Step C: Identifying adaptation options		
6 Identification of adaptation options		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	Yes/ <u>In Progress</u> / No
7 Funding resources identified and allocated		
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / <u>In Progress</u> / No
Step D: Implementing adaptation action		
8 Mainstreaming adaptation in planning processes		
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	Yes / <u>No</u>
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	Yes / <u>No</u>
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	Yes / <u>No</u>

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	Yes / <u>In Progress</u> / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 Implementing adaptation		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / In Progress / <u>No</u>
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	Yes / <u>No</u>
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	Yes / <u>No</u>
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	Yes / <u>No</u>
Step E: Monitoring and evaluation of adaptation activities		
10 Monitoring and reporting		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
11 Evaluation		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	<u>Yes</u> / No

Adaptation preparedness scoreboard for The Czech Republic

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List of abbreviations

CHMI	Czech Hydrometeorological Institute
CR	Czech Republic
DRR	disaster risk reduction
EIA	Environmental Impact Assessment
EUMETNET	European Meteorological Services Network
MMR	Mechanism for Monitoring and Reporting
NAP	National Adaptation Plan
NAS	National Adaptation Strategy
RBMP	River Basin Management Plans
RCM	regional climate model
SEA	Strategic Environmental Assessment
V4	Visegrad group
WRI	T.G. Masaryk Water Research Institute

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

The National Adaptation Strategy (NAS)³²⁷ of the Czech Republic was adopted in October 2015 by Government Resolution No. 861³²⁸. The NAS assesses the climate impacts prevalent in the Czech Republic and defines appropriate adaptation measures, including their linkages to mitigation. The priority sectors are forest management, agriculture, water regime in landscape and water management, urban landscape, biodiversity and ecosystem services, health, tourism, transportation, industry and energy, emergencies and protection of the population and environment.

A2. Adaptation strategies adopted at subnational levels

One regional and six adopted local adaptation strategies cover a population of 1 884 707, i.e. 18 % of the Czech population. The one adaptation strategy at regional level on which the Ministry of the Environment, currently, has information is for the City of Prague and was adopted in 2017. Prague is both a municipality and a greater territorial self-governing unit (region)³²⁹ and the strategy addresses ca. 12% of the country's total population. Two (Kopřivnice in 2017³³⁰, Hlučín in 2017³³¹) adaptation strategies were adopted by the relevant municipal councils and four adaptation strategies (Hrádek nad Nisou in 2016³³², Nový Bor in 2016³³³, Plzeň in 2017³³⁴, Brno in 2016³³⁵) were presented to the municipal council and are used as non-binding documents for the ongoing elaboration of comprehensive development strategies of municipality or spatial planning. The city of Krnov is also preparing a conceptual note on climate adaptation and has run a public consultation within the frame of a project

³²⁷ Ministry of the Environment, Strategy on Adaptation to Climate Change in the Czech Republic (2015), URL: [https://www.mzp.cz/C1257458002F0DC7/cz/zmena_klimatu_adaptacni_strategie/\\$FILE/OEOK-Adaptacni_strategie-20151029.pdf](https://www.mzp.cz/C1257458002F0DC7/cz/zmena_klimatu_adaptacni_strategie/$FILE/OEOK-Adaptacni_strategie-20151029.pdf) English executive summary: [https://www.mzp.cz/C125750E003B698B/en/strategy_adaptation_climate_change/\\$FILE/OEOK_Adaptation_strategy_20171003.pdf](https://www.mzp.cz/C125750E003B698B/en/strategy_adaptation_climate_change/$FILE/OEOK_Adaptation_strategy_20171003.pdf)

³²⁸ Government Resolution no. 861/ 2015, URL: <https://apps.odok.cz/attachment/-/down/VPRAA3VATUSE>

³²⁹ Information on this and the strategy itself can be downloaded from IPR Praha website, URL: <http://www.iprpraha.cz/adaptacnistrategie>

³³⁰ CI2, o.p.s. (2017), Adaptacni strategie na zmenu klimatu pro mesto Koprivnice, URL: http://adaptace.ci2.co.cz/sites/default/files/souboryredakce/navrhova_cast_strategie_koprivnice_030417.pdf

³³¹ CI2 Adaptace mest na klimatickou zmenu webpage, URL : <http://adaptace.ci2.co.cz/cs/hlucin-schvalil-adaptacni-strategii> , Date accessed : 1/6/2018

³³² Adaptacni strategie na zmenu klimatu pro Hradek nad Nisou, URL : http://adaptace.ci2.co.cz/sites/default/files/souboryredakce/adaptacni_strategie_pro_hradek_nad_nisou.pdf

³³³ Adaptacni strategie na zmenu klimatu pro Novy Bor, URL : http://adaptace.ci2.co.cz/sites/default/files/souboryredakce/adaptacni_strategie_novy_bor.pdf

³³⁴ Adaptacni strategie mesta Plzne, Latest draft available at URL : <https://ukr.plzen.eu/rozvoj-mesta/mezinarodni-projekty/urbanadapt/urbanadapt.aspx>

³³⁵ Brno municipality webpage, URL: <https://www.brno.cz/strategie/urbanadapt-klimaticka-zmena/> , Date accessed: 1/6/2018

(which ran until the end of 2017).³³⁶ Currently, two additional cities are in the process of developing an adaptation strategy – Ostrava³³⁷ and Opava.³³⁸

The Czech Republic has to date five signatories to the Covenant of Mayors for Climate & Energy (CoM) with respect to adaptation: Prague (population 1 246 780), Liberec (106 000), Litoměřice (24 101), Písek (29 800) and Brno (377,973)³³⁹. Some other cities and towns are preparing their adaptation strategies as well.

In addition to the development of an adaptation strategy, cities and towns often include adaptation considerations within their other strategic documents, such as development plans.

Adaptation action plans

B1. National adaptation plan

The Czech Republic adopted its National Action Plan on Adaptation to Climate Change (NAP) in January 2017³⁴⁰ by Government Resolution No. 34³⁴¹. The NAP aims to implement the NAS and is structured according to climate impacts identified in the Czech Republic: long-term droughts; floods and flash floods; temperature increase; extreme meteorological events (heavy rainfall, extremely high temperatures and heat waves; extreme wind); and wild fires. The NAP contains 33 specific targets and one cross-cutting target focused on education and awareness-raising. These targets will be implemented through 52 priority measures detailed into 160 priority tasks.

B2. Adaptation plans adopted at sub-national level

As noted above, there are five cities in the Czech Republic that are signatories to the CoM with respect to adaptation. Although some of these Czech cities have started preparing an adaptation action plan, none have been implemented yet.

B3. Sectoral adaptation plans

The Strategy for Environmental Safety 2016-2020 with an outlook to 2030, implements the Sendai Framework for Disaster Risk Reduction 2015-2030. This strategy includes measures for disaster risk reduction connected with climate impacts, notably extreme meteorological events.

³³⁶ Adaptace mest na klimatickou zmenu webpage, URL: <http://adaptace.ci2.co.cz/cs/2017-krnov-klimaticky-odpovedne-mesto> , Date accessed: 1/6/2018

³³⁷ Ekotoxa, Adaptacni strategie mesta Ostravy, URL: <https://www.ekotoxa.cz/blog/adaptacni-strategie-ostrava/>, Date accessed : 15/5/2018

³³⁸ Personal communication with MS contact.

³³⁹ Covenant of Mayors for Climate & Energy, Adaptation, the Czech Republic, URL: <https://www.covenantofmayors.eu/about/covenant-community/signatories.html> , Date accessed: 1/6/2018

³⁴⁰ National Action Plan on Adaptation to Climate Change in Czech Republic (2017), URL: https://www.mzp.cz/cz/narodni_akcni_plan_zmena_klimatu

³⁴¹ Government Resolution no. 34/ 2017, URL: <https://apps.odok.cz/attachment/-/down/RCIAAHVB5M6W>

The Policy of Protection from Impacts of Drought and Water Scarcity was adopted by the Government in July 2017. The document describes the main adverse trends in climate and hydrological conditions in the last three decades, as well as future expected climate impacts on water balance. The document identified strategic goals, such as increased knowledge of current and future drought and water scarcity risks, better preparedness based on operational plans and measures, increased public awareness, a balance between the availability of water resources and water demand across all sectors, and a restored natural water regime of the landscape.

The climate impacts are considered in the second river basin management plans (RBMP), when assessing the trends of water use up to the year 2021. The programme of measures contains a "Drought and water scarcity" measure, which defines climate change risks. Due to the fact that the second RBMP was adopted whilst the NAS was being drafted, the NAS is not fully reflected in the second RBMP. The outcomes of the NAS and the NAP will be taken into account in the third RBMP. Flood risk management plans, as well as the Action Plan for Organic Farming 2016-2020, also take into account climate change issues. The Rural Development Programme 2014-2020 supports the implementation of adaptation measures within the agricultural sector.

SCOREBOARD

Step A: Preparing the ground for adaptation

1 Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

In the Czech Republic, the Ministry of the Environment is the national coordinator for NAS development, adoption, implementation and evaluation.³⁴² The Department of General Nature and Landscape Protection was responsible for the coordination and preparation of the document and the Department of Energy and Climate Protection was actively involved in the NAS preparatory phase, including consultations with the Czech Hydrometeorological Institute (CHMI).

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

During the development phase of the NAS, interdepartmental groups of experts from all relevant ministries and institutions for each sector were established. The work was conducted

³⁴² Ministry of the Environment, Czech Republic, URL: https://www.mzp.cz/cz/zmena_klimatu , Date accessed: 16/5/2018

in 12 working groups covering specific sectors (biodiversity, forest management, agriculture, water balance in landscape and water management, industry and energy, health and hygiene, crisis management, etc.) coordinated by the Ministry of the Environment.

The main stakeholders involved in the preparation of the NAS were national-level institutions, i.e. relevant ministries: the Ministry of Agriculture (water, agriculture, forestry), the Ministry of Health (health and hygiene), the Ministry of Transport (adaptation of transportation), the Ministry of Industry and Trade (supply of electricity), the Ministry of Regional Development (spatial planning and regional development), the Ministry of the Interior (civil protection and warning systems), the Ministry of Education, Youth and Sports and selected scientific and research institutions, e.g. the Czech Hydrometeorological Institute (CHMI) and the T.G. Masaryk Water Research Institute (WRI).

Each of the 12 working groups consisted of representatives from relevant ministries, expert departments of the Ministry of the Environment, and in some cases also the CHMI and WRI. A coordinator from the Ministry of the Environment facilitated each working group. The institution responsible for each sector developed inputs related to the specific sector (e.g. water issues were prepared by the Ministry of the Environment and the Ministry of Agriculture, forest management by the Ministry of Agriculture, etc.).

With regard to the coordination mechanism during the implementation phase, an inter-ministerial working group on climate change issues was established in January 2015. This group cooperates, consults and works further on the basis of the NAS and was involved in the preparation process of the NAP. An adaptation platform was established in January 2016 within the framework of this working group and its preparation of the NAP. This platform continues to actively operate and is currently used for the purpose of the evaluation of the NAP. The Ministry of the Environment, as the main coordinator of this process, is actively communicating with other relevant ministries and actors within the frame of the current evaluation of the NAP.

Relevant ministries are also responsible for their respective implementation tasks defined in the NAS as well as in the NAP.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.

Yes / In progress / No

Stakeholders, including representatives from regions and municipalities, had a chance to participate directly in preparation of the NAP through the inter-ministerial consultations. Some of them actively participated in this process and submitted written comments.

The main target of the communication strategy of the NAP is not only to ensure access to information but also to include public and other stakeholders in the implementation of the NAS. In the future, the evaluation and monitoring of the NAS and adaptation measures set in the NAP will be secured through the inter-ministerial working group on climate change issues, which has also some members from non-governmental non-profit organisations. Furthermore, the communication strategy aims to use two-way communication (bottom-up and top-down communication) between the Ministry of the Environment and public, including National Network of Local Action Groups in the Czech Republic, or Union of the Towns and Municipalities of the Czech Republic. The inter-ministerial working group on climate change issues will be serving as communication mediator for this communication.

In order to enhance coordination, the Ministry of the Environment of the Czech Republic became a national coordinator of the CoM in 2017.

2 Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

The development of the NAS involved only the sectoral national ministries and the relevant scientific and research institutions, such as the Global Change Research Institute of the Czech Academy of Sciences (CzechGlobe) and Charles University Environment Centre. These stakeholders were also consulted on the final draft of the NAS. Business, non-governmental sectors, interest groups and other stakeholders did not participate in the formulation of the NAS.

However, the Strategic Environmental Assessment (SEA) process of the NAS allowed the general public to provide written comments, and included a public hearing. Stakeholders also had the opportunity to participate directly on the preparation of the NAP via the inter-ministerial consultations and participation in thematic working groups. Several stakeholders provided written comments, including Chamber of Commerce and Confederation of Employers and Business Union, Czech Geological Survey, Association of Municipal and Private Forest Owners, Forest Management Institute, Institute of Botany AS CR, The Water Supply and Sewerage Association of the Czech Republic, Green Circle (network of NGO dealing with environmental issues), Chance for Buildings and others.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

Transboundary cooperation for climate adaptation was considered when drafting the NAS and NAP. The national experts from the Czech Republic and Slovenia organised meetings where they exchanged experiences and lessons learned from the preparation of the NAS and NAP. In addition, an onsite exchange of adaptation practice was organised in the Czech Republic.

Furthermore, the Czech Republic has frameworks for bilateral cooperation with neighbouring countries, i.e. Germany (Czech-German Commission on Environment and its working groups), Austria, Slovakia and Poland. There is close cooperation in the field of water management. The Czech Republic has bilateral commissions with all neighbouring states in relation to transboundary rivers and their management (e.g. transboundary early warning systems, flood prevention measures etc.). The Czech Republic participates actively in the activities of the international commissions for Elbe, Oder and Danube river basins. Transboundary projects are supported through the Interreg EUROPE 2014-2020 (Bavaria, Saxony, Poland, Austria and Slovakia) in the fields of risk prevention, flood management systems and cooperation of rescue services.

The Visegrad group (V4) also addresses issues related to climate adaptation in specific sectors (water management, nature protection etc.) at a political level and within its working groups.

The Czech Republic is actively involved in the EU Strategy for the Danube Region and in the activities of its Priority Area 5, Environmental Risks, which, among others, addresses the challenges of water scarcity and droughts and focuses on the implementation of Danube-wide flood risk management plans, taking into account potential climate impacts as well.

The Czech Republic is a Party to the Framework Convention on the Protection and Sustainable Development of the Carpathians (Carpathian Convention). In 2014, the Fourth Meeting of the Conference of the Parties to the Carpathian Convention adopted the Strategic Agenda on Adaptation to Climate Change in the Carpathian Region, which is being implemented mainly through the activities of the Working Group on Adaptation to Climate Change under the Convention.³⁴³ In October 2017, a new article (Article 12bis) on “Climate Change” was adopted at the Fifth Meeting of the Conference of the Parties.³⁴⁴

Within the macro-regional strategies, the Czech Republic is a member of European Meteorological Services Network (EUMETNET).

³⁴³ Fourth Meeting of the Conference of the Parties to the Framework Convention on the Protection and Sustainable Development of the Carpathians, URL: http://www.carpathianconvention.org/tl_files/carpathiancon/Downloads/03%20Meetings%20and%20Events/COP/2014_COP4_Mikulov/Follow%20Up/DOC5_Joint%20AplineCarpathianStatement_FINAL.pdf, Date accessed: 15/5/2018

³⁴⁴ Carpathian Convention website, URL: http://www.carpathianconvention.org/tl_files/carpathiancon/Downloads/03%20Meetings%20and%20Events/COP/2017_COP5_Lillafuered/outcomes_documents/Article%20on%20Climate%20Change_FINAL_ADOPTED.pdf, Date accessed: 1/6/2018

Step B: Assessing risks and vulnerabilities to climate change

3 Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / **In progress** / No

The Czech Hydro-Meteorological Institute (CHMI) provides information on actual weather conditions and alerts to extreme hydrological and meteorological situations. It also publishes data and information on climate change science, observations, scenarios and impacts. Regarding climate impacts, a general qualitative description of impacts with some key figures from the modelling analysis is given.

Monitoring of water courses undertaken by the CHMI, based on specific indicators, provides different applicable data series showing climate impacts. The CHMI performs the function of a state institute for the area of air quality protection, hydrology, water quality, climatology and meteorology, with a competence to establish and operate State monitoring and observation networks, including international data exchange pursuant to the WMO principles.

Regarding climate extremes, the warning system has been further improved on the basis of the innovated Integrated Warning Service System in the Czech Republic. This system includes forecast warning information on 26 dangerous phenomena and each phenomenon is assigned a danger level (low, medium, extreme). A large number of stations with operative presentation of measured data and forecasts have been placed on the website of the reporting and forecasting flood service.³⁴⁵

Observation and collection of information on climate change and its impacts (i.e. droughts) is supported by several institutions: the Committee on the Environment of the Czech Academy of Sciences and its institutes (CzechGlobe and others³⁴⁶), the National Forestry Committee, University departments and sectoral institutes.

Currently the indicators showing effects of extreme weather events are developed for floods, such as Return Period of Floods and Flood Effects. Indicators for climate impacts and extreme weather events, such as damage, casualties, and financial losses are currently being developed for the NAP.

³⁴⁵ Reporting and forecasting flood service webpage, URL: <http://hydro.chmi.cz/hpps/#> , Date accessed: 1/6/2018

³⁴⁶ CzechGlobe website, URL: <http://www.intersucho.cz/en/>, Date accessed: 1/6/2018

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

A Comprehensive Study on Impacts, Vulnerability and Risks Sources Connected to Climate Change in the Czech Republic from November 2015 was conducted for the Ministry of the Environment by EKOTOXA.³⁴⁷ It provides an assessment of impacts and vulnerabilities to climate adaptation in the Czech Republic at a general level as well as per adaptation-related sector. This assessment is mainly based on a study from 2011, analysing the results of a research project that developed scenarios and projections to assess the economic, social and environmental impacts of climate change. The assessment also includes information on indicators and a cost-benefit analysis.³⁴⁸

The main model used for climate scenarios to date in the Czech Republic is the ALADIN-CLIMATE/CZ regional climate model. The basis for the estimates of impacts is a specific project allowing the integration of the regional climate model (RCM) ALADIN-CLIMATE/CZ with the A1B emissions scenario for 1961-2100 at a horizontal resolution of 25 km, completed in 2011. The projections (which do not cover key uncertainties due to climate models or socioeconomic scenarios) have been used to screen the environmental impacts of climate change in specific sectors (water management, agriculture and forestry sectors) and to inform the initial identification of potential adaptation options.

The Comprehensive Study on Impacts³⁴⁹ mentioned above also has a section with an overview of the latest developments in this field, mentioning several recent projects involved in modelling climate change impacts in the Czech Republic, and/or projects developing systems to monitor and share data on such impacts. An example is the CzechAdapt project (2015-2016)³⁵⁰ which developed a regularly updated online database to show the impacts of climate change, vulnerability assessments and adaptation measures for the Czech Republic based on the best available methods, e.g. GCM CMIP5 models and regional models coming from another project, EUROCORDERX – a coordinated downscaling programme.³⁵¹ There are

³⁴⁷ A Comprehensive Study on Impacts, Vulnerabilities and Risks Sources Connected to Climate Change in the Czech Republic (2015), URL:

[https://www.mzp.cz/C1257458002F0DC7/cz/studie_dopadu_zmena_klimatu/\\$FILE/OEOK-Komplexni_studie_dopady_klima-20151201.pdf](https://www.mzp.cz/C1257458002F0DC7/cz/studie_dopadu_zmena_klimatu/$FILE/OEOK-Komplexni_studie_dopady_klima-20151201.pdf)

³⁴⁸ CHMI (2011), Specification of existing estimates of climate change impacts in hydrology, water management, agriculture and forestry sectors and proposals for adaptation measures

³⁴⁹ A Comprehensive Study on Impacts, Vulnerabilities and Risks Sources Connected to Climate Change in the Czech Republic (2015), URL:

[https://www.mzp.cz/C1257458002F0DC7/cz/studie_dopadu_zmena_klimatu/\\$FILE/OEOK-Komplexni_studie_dopady_klima-20151201.pdf](https://www.mzp.cz/C1257458002F0DC7/cz/studie_dopadu_zmena_klimatu/$FILE/OEOK-Komplexni_studie_dopady_klima-20151201.pdf)

³⁵⁰ CzechAdapt project, URL: <http://www.klimatickazmena.cz/cs/>, Date accessed: 1/6/2018

³⁵¹ EUROCORDERX project, URL: <http://www.euro-cordex.net/>, Date accessed: 1/6/2018

also a couple of regional projects, focusing on specific Czech regions and adaptation sectors (AdaptaN³⁵², UrbanAdapt³⁵³).

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.

Yes / In progress / No

Some assessments of risks and vulnerabilities have been carried out through research projects. The most complex one so far has been the aforementioned research project from 2011 on “Specification of existing estimates of climate change impacts in hydrology, water management, agriculture and forestry sectors and proposals for adaptation measures” coordinated by the CHMI³⁵⁴. The outcomes were used in the preparation of the NAS, as mentioned above.

The Comprehensive Study on Impacts, mentioned above³⁵⁵, provides an assessment of climate risks / vulnerability for all ten priority sectors of the NAS. Further analysis of the expected impacts of water regime / water management, agriculture, forestry, health, urbanised landscape and biodiversity in the Czech Republic is done by the CHMI.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

For the time being, climate risks and vulnerability assessments within the framework of the NAS and NAP do not take transboundary risks into account. Nevertheless, this issue is partially covered through transboundary cooperation of the Czech Republic with the neighbouring states in the field of water management (transboundary water protection in the framework of the UNECE and in the international basins of Danube, Elbe and Oder rivers), as described in Indicator 2b. However, it is yet to be defined how this transnational cooperation will address climate change, and how it will relate to the NAS and NAP. Both the NAS and NAP will be updated in 2020.

4 Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

³⁵² Regional project AdaptaN, URL: <http://www.adaptan.net/>, Date accessed: 1/6/2018

³⁵³ Regional project UrbanAdapt, URL: <http://urbanadapt.cz/en>, Date accessed: 1/6/2018

³⁵⁴ CHMI (2011), Specification of existing estimates of climate change impacts in hydrology, water management, agriculture and forestry sectors and proposals for adaptation measures

³⁵⁵ A Comprehensive Study on Impacts, Vulnerabilities and Risks Sources Connected to Climate Change in the Czech Republic (2015), URL:

[https://www.mzp.cz/C1257458002F0DC7/cz/studie_dopadu_zmena_klimatu/\\$FILE/OEOK-Komplexni_studie_dopady_klima-20151201.pdf](https://www.mzp.cz/C1257458002F0DC7/cz/studie_dopadu_zmena_klimatu/$FILE/OEOK-Komplexni_studie_dopady_klima-20151201.pdf)

Yes / **In progress** / No

There is cooperation between policy-makers within the Ministry of the Environment and the Ministry of Agriculture, and scientific organisations in defining and working on research priorities. Accordingly, the NAS contains a number of measures to improve the knowledge base on adaptation and research focus areas. There is also a list of institutions that focus on climate adaptation research. Some of them participate in the National Climate Programme, which creates research teams and publishes results.

The NAP contains the same research priorities mentioned in the NAS and mentions that the National Policy on Research, Development and Innovation for 2016-2020 includes research in global changes, i.e. also on climate adaptation. Moreover, the research and development strategy of the Ministry of the Environment for 2016-2025 is coherent with this national research policy.

In addition, there are several funding programmes which are indirectly linked with the research gaps. The national programme ADAPT operated between the 2008-2016. Since then the financing of this programme has stopped. The main objective of the programme was the modernisation of the monitoring system in order to secure more accurate projections of extreme weather events and to adapt to them. The final evaluation report of this programme was submitted to the Ministry of Finance of the Czech Republic on 31st July 2017 but has not yet been approved. There is no plan to continue this programme in the future.³⁵⁶ Other programmes were funded by Norwegian grants between 2009-2014, with some work to be continued in the 2015-2021 funding period.

5 Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).

Yes / In progress / No

The Ministry of the Environment publishes general and specific information on its website regarding climate adaptation, key documents and links to other relevant sources.³⁵⁷ CHMI publishes climate adaptation information on key climate impacts and scenarios in the Czech Republic.³⁵⁸ It also provides questions and answers, a glossary, the main international documents and other basic facts, besides the hydro-meteorological information.

³⁵⁶ Personal communication with MS contact.

³⁵⁷ Ministry of Environment website, URL: http://www.mzp.cz/cz/adaptace_na_zmenu_klimatu, Date accessed: 1/6/2018

³⁵⁸ Cesky Hydrometeorologicky Ustav webpage, URL: <http://portal.chmi.cz/historicka-data/pocasi/zmena-klimatu/zakladni-informace>, Date accessed: 1/6/2018

There are several other web portals with information on climate change and climate adaptation.³⁵⁹

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / In progress / No

A general communication strategy is part of the NAS and the NAP. The former specifies types of awareness-raising events related to the relevant sectors, targeted activities for media and the public. The NAS includes a general approach to environmental education and the legal basis for it (i.e. programmes for schools, awareness raising campaigns, exhibitions, etc.), which involves cooperation between the Ministry of the Environment and the Ministry of Education, Youth and Sports.

The NAS also defines the need to mainstream climate adaptation into educational programmes and relevant strategic materials, and attributes the ministries responsible for doing so. There is no mentioning of training.

To improve capacity building in the field of climate adaptation, as announced in the NAS and NAP, a State Programme for environmental education and awareness raising for 2016-2025, adopted in 2016, incorporates climate change as a focal area.³⁶⁰ The aim of this State Programme's climate objective is to raise awareness about climate change and its impacts in the Czech Republic and to encourage support for education programmes and campaigns in this field.

Step C: Identifying adaptation options

6 Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

The NAS sets general directions and examples of suitable adaptation measures for all ten priority sectors. Risk and vulnerability assessments carried out through various research projects and the comprehensive study have been taken into account when defining measures.

The adaptation options considered are usually based on existing practices and measures, where win-win value or low-regrets options are considered (e.g. fighting floods, rural development, agro-environmental measures, etc.). The adaptation options take into account

³⁵⁹ Zmena klimatu website, URL : <http://www.zmenaklimatu.cz/cz/>; <http://www.regio-adaptace.cz/cs/>; <http://www.adaptacesidel.cz/?news-date=2017-04-28>; <http://www.intersucho.cz/cz/>. Date accessed: 1/6/2018

³⁶⁰ Ministry of the Environment CZ, Statni program EVVO a EP na leta 2016-2025, URL: https://www.mzp.cz/cz/statni_program_evvo_ep_2016_2025, Date accessed: 16/5/2018

local conditions and also include the potential link to other sectors and to mitigation measures in that sector.

The NAP identifies the main climate risks and analyses the impacts and adaptation measures for each climate risk. As such, targets and measures for a certain climate risk are analysed for a variety of sectors. The annex to the NAP provides adaptation measures in detail, including the sector, responsible body, timeline of delivery, link to sectorial policy and financial needs.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

The selection of adaptation options in the NAS has been based on expert judgement. The prioritisation of adaptation measures proposed in the NAP per sector was made according to a robust multi-criteria analysis, in consultation between different ministries and thematic working groups. The priority was given to measures with positive impact on climate adaptation and positive spill over and cross-cutting effects on sectors and on the whole economy. The NAP measures were prioritised according to four criteria: (1) multiple adaptation effects to tackle climate impacts, (2) spill over social, economic or mitigation impacts, (3) impact on the environment and ecosystems, and (4) financial needs for implementation. Criterion (1) was evaluated by the thematic working groups and was attributed a value twice as important as criteria (2), (3) and (4). The latter were assessed by external consultants. Based on this multi-criteria analysis, adaptation measures were categorised into priority one measures and priority two measures.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes/ In Progress / No

Through the thematic working groups for the NAS and NAP development, inter-sectoral coordination between disaster risk management and climate adaptation has been established. Experts from the Safety and Crisis Management Department of the Ministry of the Environment who are responsible for disaster risk management have been involved in the preparation of the relevant NAS and NAP chapters. The Strategy of Environmental Safety 2016-2020 with an outlook to 2030³⁶¹, which implements the Sendai Framework for Disaster Risk Reduction 2015-2030, has also been prepared by climate adaptation experts. The

³⁶¹ Ministerstvo životního prostředí (2015), Koncepce environmentální bezpečnosti 2016-2020 s výhledem do roku 2030, URL: [https://www.mzp.cz/C1257458002F0DC7/cz/environmentalni_bezpecnost/\\$FILE/OKR-koncepce_environmentalni_bezpecnosti_2016_2020-20160606.pdf](https://www.mzp.cz/C1257458002F0DC7/cz/environmentalni_bezpecnost/$FILE/OKR-koncepce_environmentalni_bezpecnosti_2016_2020-20160606.pdf)

strategy includes measures for disaster risk reduction for disasters caused by climate change, mainly extreme meteorological events.

A multi-sectoral national platform on disaster risk reduction (DRR) to coordinate actions and activities related to disaster risk reduction (Sendai Framework DRR) and climate change was established in February 2015.

7 Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / **In Progress** / No

Both the NAS and the NAP identify existing and potential economic instruments to fund proposed adaptation measures. Besides the EU funds, there are several national programmes available for specific sectors: for instance, “Programme on landscape protection” and “Programme for restoration of natural functions of landscape”. Both of these programmes have a high potential value for vulnerable sectors (agriculture, water management, forestry and biodiversity adaptation), as their actions might increase climate resilience. In addition, several programmes supporting the building and/or reconstruction of fish ponds, small water reservoirs, improvement of water courses and support of the irrigation facilities are administrated by the Ministry of Agriculture, including a long-term programme for the prevention of floods.

However, there is no specific budget available for financing cross-cutting/coordinated adaptation action, or a dedicated fund to finance adaptation actions proposed in the NAS and the NAP. Most actions carried out to date have been implemented through one-off specific projects.

Step D: implementing adaptation action

8 Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

Legislation transposing the new Environmental Impact Assessment (EIA) Directive came into force on 1 November 2017. It requires assessment of projects in relation to: project impacts, i.e. on climate, vulnerability to climate change, risks of major accidents and/or disasters caused by climate change, and climate adaptation.

With regard to the SEA, the EU Directive is transposed through Act No. 100/2001 and its amendments.³⁶² The Act considers climate impacts and adaptation within its framework for systematically examining and assessing systematic examination and assessment potential environmental impacts.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / No

The Czech Republic has developed a very comprehensive multi-hazard system based on an integrated early warning system connected with a special rescue and response system. The overall system was tested on past weather extremes (floods in the last 15 years). Currently, it considers risk scenarios for floods, flash floods, drought, extreme wind and extreme high temperatures. These risk scenarios were prepared for the needs of ministries and regional governments and cities. As outlined in Indicator 6c, disaster risk reduction strategies take into account climate change risks and impacts and their future projections, particularly related to extreme weather events. The Strategy of Environmental Safety 2016-2020 with an outlook to 2030³⁶³, mentioned in Indicator 6c is an example of such a strategy.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / No

The Ministry of Regional Development, responsible for spatial planning, is involved in the inter-ministerial working group on adaptation, and the NAS and NAP contain several actions for spatial planning. The Spatial Development Policy of the Czech Republic³⁶⁴ from 2015 does not mention climate adaptation explicitly. However, it contains several priorities relating to spatial planning for sustainable development, which deal with climate adaptation, e.g. in the field of flood damage prevention and biodiversity reinforcement. It also sets out the specific spatial planning tasks with a territorial projection of areas suitable for the accumulation of surface water and for dams. The Strategy of Regional Development of the Czech Republic 2014 to 2020³⁶⁵ contains explicit references to climate impacts and the need to tackle them. Moreover, the Action Plan for the Regional Development Strategy 2017-

³⁶² Zákon č. 100/2001 Sb. Zákon o posuzování vlivů na životní prostředí a o změně některých souvisejících zákonů (zákon o posuzování vlivů na životní prostředí), URL: <https://www.zakonyprolidi.cz/cs/2001-100/zneni-20180101>, Date accessed: 16/5/2018

³⁶³ Ministerstvo životního prostředí (2015), Koncepce environmentální bezpečnosti 2016-2020 s vyhledem do roku 2030, URL: [https://www.mzp.cz/C1257458002F0DC7/cz/environmentalni_bezpecnost/\\$FILE/OKR-koncepce_environmentalni_bezpecnosti_2016_2020-20160606.pdf](https://www.mzp.cz/C1257458002F0DC7/cz/environmentalni_bezpecnost/$FILE/OKR-koncepce_environmentalni_bezpecnosti_2016_2020-20160606.pdf)

³⁶⁴ Ministry of Regional Development CZ (2015), Spatial development policy of the Czech Republic, Updated version 1, URL: https://www.mmr.cz/getmedia/d23c51e1-64c8-44f2-b1cd-6f98eb5e46ed/2015_VIII_7_SDP_update1_EN.pdf?ext=.pdf

³⁶⁵ Ministerstvo pro místní rozvoj ČR, Strategie regionálního rozvoje ČR 2014 – 2020, URL: <https://www.mmr.cz/getmedia/08e2e8d8-4c18-4e15-a7e2-0fa481336016/SRR-2014-2020.pdf>

2018³⁶⁶ does contain specific references to climate impacts and the need for climate adaptation.

The Ministry of Agriculture and the Ministry of the Environment (in line with the national Water Act) developed a general plan that defines a suite of protected sites that are morphologically, geologically and hydrologically suitable for accumulation of surface water. This general plan serves as one of the documents supporting spatial planning.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / **In Progress** / No

As the NAP was adopted in 2017, there is only limited evidence of adaptation being mainstreamed in sectoral policies to date. However, there is progress in some sectors, i.e. agriculture, water management, disaster risk management and education. For example, measures for water retention in forests and restoration of small water reservoirs have been implemented, RBMPs include adaptation measures, and the State Programme for Environmental Education and Awareness Raising contains specific targets and measures focused on education and dissemination of information regarding climate adaptation. The NAS/ NAP drive the integration of adaptation at sectoral level.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

Only limited evidence could be found that adaptation is mainstreamed in insurance policies or alternative policy instruments to provide incentives for investments in risk prevention. There are some insurance schemes in the agriculture sector that cover some specific current extreme events. Use of agriculture-related insurance is supported by the Relief and Guarantee Farming and Forestry Fund and a new fund is in preparation to cover those risks for farmers that are not insurable commercially. However, prevention and adaptation are mentioned as a tool, rather than insurance, to reduce further damage by extreme events.

9 Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In Progress** / No

³⁶⁶ Ministerstvo pro místní rozvoj ČR, Akční plán strategie regionálního rozvoje ČR 2017-2018, URL: https://www.mmr.cz/getmedia/8d2bd22a-eea0-4f85-8646-0d1e348af266/AP_SRR_17_18.pdf

There are already some sectoral action plans drafted that take climate adaptation into account, as mentioned in Indicator 8b, in particular in disaster risk reduction, water management and regional development planning. These plans have been adopted recently.

The NAP was adopted in 2017. During the NAP drafting process, existing and new adaptation actions were identified in order to ensure the continuity and improvement of adaptive capacity of the Czech Republic to future climate conditions. Implementation of the NAP is planned to be evaluated in 2019, as a basis for the preparation of an updated NAS. In the current NAS, the tasks for ministries to implement sector-specific actions have been allocated, and possible funding for adaptation actions is clearly identified. As specified in Indicator 8d, the Czech Republic adopted the State Programme for Environmental Education and Awareness Raising in 2016. It contains specific targets and measures focused on education and dissemination of information regarding climate mitigation and adaptation.

Activities in the NAP that have already been implemented include measures for water retention in forests and promotion of restoration of the water management function of small water reservoirs.

In addition, some measures undertaken by various Ministries and Departments in the agriculture, forestry, biodiversity, human health and water management sectors could also be considered relevant to climate adaptation.

The RBMPs introduced support to the implementation of the adaptation measures identified in the 2004 National Programme to Abate the Climate Change Impacts in the Czech Republic. Reportedly, the revision of the RBMPs takes due consideration of an increased frequency of floods and adds other flood risk management measures. For example, the context of climate change has been considered in the second RBMPs in order to assess the trends of water use up to the year 2021. The programme of measures contains a "Drought and water scarcity" measure, which is defining climate change risks.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / **No**

Currently there is no cooperation framework at regional or local levels. Nevertheless, the Czech Republic Strategic Framework 2030 and Czech Republic Strategy for Regional Development 2021+ identify that cooperation mechanisms need to be established at a subnational level. There is, however, cooperation through the help of NGOs and through the development of a variety of documents (methods, catalogues of measures, information

sources, etc.). Implementation of adaptation measures at local and subnational levels is also supported through funding programmes under the Ministry of the Environment.³⁶⁷

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / **No**

We could not find any procedures or guidelines for assessment of potential climate impacts on major projects or programmes aside from the EIA and SEA frameworks addressed in Indicator 8a.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.

Yes / **No**

Currently, the involvement of stakeholders is through the National Network of Local Action Groups in the Czech Republic and the national platform of Healthy cities of the Czech Republic, as stated in the NAP. This concerns particularly the following sectors: environment, water management and disaster risk management. Moreover, the topic of climate change is also one of the main topics of calls of the Ministry of the Environment for the support of Environmental Education and Consulting. However, the calls do not specify in which sectors or areas supported activities should be taking place. Current evidence shows that it concerns, for example, a measure in the area of water management, or implementation of local adaptation platforms for the initiation of adaptation activities.³⁶⁸

Step E: Monitoring and evaluation of adaptation activities

10 Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / **No**

There is a system in place to monitor the implementation of the NAP on an annual basis. However, for the time being it is only used for internal purposes by the Ministry of the Environment. The overall monitoring of the NAP and the publication of the results will only happen in 2019,³⁶⁹ since the NAP was adopted in 2017 and the NAS in 2015. A set of indicators to measure vulnerabilities to climate change and adaptation will be tracked and evaluated.

³⁶⁷ Personal communication with MS contact.

³⁶⁸ Personal communication with MS contact.

³⁶⁹ Personal communication with MS contact..

To date, one relevant publication is the report on national adaptation actions under Article 15 of the Mechanism for Monitoring and Reporting from 2015.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / **No**

A set of indicators to measure climate vulnerabilities and adaptation in priority sectors has already been developed and is being piloted. Monitoring and the publication of the results based on these indicators will happen in 2019 for data in the period of 2014-2018.³⁷⁰

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / **No**

Currently there is no monitoring and reporting system in place at regional or local levels. Nevertheless, the Strategic Framework of the Czech Republic 2030 establishes the creation of a monitoring and reporting system at subnational level as one of its tasks.

11 Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

The NAS will be reviewed and updated in 2020. From then onwards, the NAS will be reviewed once every ten years.

The NAP will be evaluated in 2019 and this evaluation will form the basis for the revision of the NAS. From then onwards, the NAP will be reviewed every 4-5 years, depending on the reporting obligations of the Czech Republic within the framework of its international commitments.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / **No**

Current monitoring is undertaken by the Ministry of Environment (see Indicator 10a). Evaluation and review of the NAS/NAP is expected in 2019-2020. Evaluation of the NAS and adaptation measures set out in the NAP will be shaped through the inter-ministerial working group on climate change. Its members include regional and local authorities' associations,

³⁷⁰ Personal communication with MS contact.

research institutions, professional or non-governmental and non-profit organisations. The communication strategy aims to use two-way communication between the Ministry of the Environment and public, including the National Network of Local Action Groups in the Czech Republic or the union of the cities and municipalities. The inter-ministerial working group on climate change will serve as a mediator of communications.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 Coordination structure		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In Progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	Yes / <u>In Progress</u> / No
2 Stakeholders' involvement in policy development		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 Current and projected climate change		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	Yes / <u>In progress</u> / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No
4 Knowledge gaps		
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	Yes / <u>In progress</u> / No
5 Knowledge transfer		

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	<u>Yes</u> / In progress / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	<u>Yes</u> / In progress / No
Step C: Identifying adaptation options		
6 Identification of adaptation options		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	<u>Yes</u> / In Progress / No
7 Funding resources identified and allocated		
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / <u>In Progress</u> / No
Step D: Implementing adaptation action		
8 Mainstreaming adaptation in planning processes		
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	<u>Yes</u> / No
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	<u>Yes</u> / No
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	Yes / <u>In Progress</u> / No
8e	Adaptation is mainstreamed in insurance or alternative	Yes / <u>No</u>

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	policy instruments, where relevant, to provide incentives for investments in risk prevention	
9 Implementing adaptation		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In Progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	Yes / <u>No</u>
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	Yes / <u>No</u>
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	Yes / <u>No</u>
Step E: Monitoring and evaluation of adaptation activities		
10 Monitoring and reporting		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
11 Evaluation		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	Yes / <u>No</u>

Adaptation preparedness scoreboard for Denmark

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List of abbreviations

DEMA	Danish Emergency Management Agency
DKK	Danish Krone
DMI	Danish Meteorological Institute
EIA	Environmental Impact Assessment
EPA	Danish Environmental Protection Agency
EUR	Euros
IPCC	Intergovernmental Panel on Climate Change
KFT	Koordineringsenhed for Forskning i klimatilpasning (Coordination Unit for Research in Climate Change Adaptation)
NAS	National Adaptation Strategy
NAP	National Adaption Plan
MEF	Danish Ministry of Environment & Food
MUDP	Environmental Technology Development and Demonstration programme
SEA	Strategic Environmental Assessment

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

In Denmark, the National Adaptation Strategy (NAS) was adopted in March 2008³⁷¹. The NAS included a description of the vulnerability of those sectors where climate change was expected to have significant consequences. The NAS focused on what would be attainable in the individual sectors within the next 10 years. It was intended that measures should be scientifically, technically and socio-economically appropriate for implementation within the given period. No revision is presently foreseen.

The NAS was based on the notion that climate adaptation is a long-term process, and that it is still uncertain what the consequences of climate change will be and how soon they will take effect. The NAS included a targeted information campaign and creation of a web portal³⁷² with the aim of ensuring that climate change was incorporated into planning and development, so that public authorities, businesses and citizens had the best possible basis for considering whether, how and when climate change should be considered.

A2. Adaptation strategies adopted at subnational levels

Adaptation strategies have not been adopted at the subnational level but all municipalities have adopted local adaptation action plans in line with the national adaptation plan (NAP).

Although not a formal responsibility or obligation, four of five regions have incorporated adaptation into their regional climate strategies: South Denmark³⁷³, North Jutland,³⁷⁴ Region Zealand³⁷⁵ and the Capital Region³⁷⁶. Central Denmark Region leads the EU-funded project 'Coast to Coast Climate Challenge', which has a goal of formulating and implementing a coordinated adaptation strategy for the region between 2017 and 2022³⁷⁷.

The NAS outlined eleven sectors (Coastal management, dikes, ports etc; Buildings and infrastructure; Water supply; Energy supply; Agriculture and forestry; Fisheries; Nature management; Land use planning; Health; Rescue preparedness; Insurance) in which climate

³⁷¹ Danish Energy Agency (2008). *Danish strategy for adaptation to a changing climate*. URL: http://www.klimatilpasning.dk/media/5322/klimatilpasningsstrategi_uk_web.pdf Date accessed: 10/05/2018

³⁷² Danish web platform on adaptation to climate change: <http://en.klimatilpasning.dk/>

³⁷³ Region of South Denmark, 2015, Regional klima- og bæredygtighedsstrategi 2016-2019. URL: <https://www.rsyd.dk/wm217286>

³⁷⁴ Region North Jutland, 2016, Klimahandlingsplan for Region Nordjylland. URL: <http://publikationer.rn.dk/rn/363/>

³⁷⁵ Region Zealand, 2015, Den Fælles Regionale Klimastrategi. URL: <http://www.regionsjaelland.dk/Miljo/groen-omstilling/Klimastrategi/Sider/default.aspx>

³⁷⁶ Denmark's Capital Region, 2011, Klimastrategi for hovedstadsregionen. URL: http://www.klimatilpasning.dk/media/1265668/regionh_klimastrategi.pdf

³⁷⁷ Coast to Coast Challenge, URL: <http://www.c2ccc.eu/om-c2c-cc/>. Date accessed: 8 May 2018.

impacts may be significant. The relevant ministries have developed sectoral adaptation strategies for transport,³⁷⁸ roads,³⁷⁹ and coasts³⁸⁰.

Adaptation action plans

B1. National adaptation plan

The National Adaptation Plan (NAP) was adopted in 2012. As of May 2018, no update is planned.

The Action Plan for a Climate-Proof Denmark³⁸¹ was launched in December 2012 and is the first NAP in Denmark. The NAP is based on the notion that a responsible climate policy must do more than just work to address climate change in the long term, it must also ensure necessary action is taken now to adapt our society to a climate that is already changing, and that all parts of society contribute to climate adaptation. Dealing with the climate challenge requires collaboration between authorities, organisations, private enterprises and individuals, regardless of whether the project is maintenance of existing roads, coastal protection, construction, or investments in new infrastructure.

The Government itself has a responsibility as the owner of infrastructure, buildings and land. However, the principal role for the Government is to establish an appropriate framework for local climate adaptation by, for example, adapting laws and regulations, but also by ensuring coordination and providing information. The Government requested all municipalities to develop their own adaptation action plans within two years. A solid framework for the efforts must support the specific parties involved, so that they can address the challenge in a socio-economically appropriate manner at the right time.

In the NAP, the Government commits to creating the basis for continued technological and knowledge development, so that Denmark will have a strong position on the global market for climate adaptation.

³⁷⁸ Danish Ministry of Transport, 2010, Transportministeriets Klimatilpasningsstrategi. URL: <https://www.trm.dk/da/publikationer/2010/klimatilpasningsstrategi>

³⁷⁹ Grauert, M., Hildebrand, G., Krogh Kristensen, N., Mørch jensen, U., Albrechtsen, N., Hald Pedersen, L., Lund Ujvári, M. & Mollerup, M., 2013, Strategi og baggrundsrapport: strategi for klimatilpasning. Danish Road Directorate, Report 452. URL: http://www.klimatilpasning.dk/media/808629/strategi_for_klimatilpasning_baggrundsrapport.pdf

³⁸⁰ Danish Environment and Food Ministry, 2016, Kystanalyse, URL: <http://kysterne.kyst.dk/kystanalyse.html>

³⁸¹ Danish Nature Agency, 2012, How to manage cloudburst and rain water. Action plan for a climate-proof Denmark. Task Force for Climate Change Adaptation, URL: http://en.klimatilpasning.dk/media/590075/action_plan.pdf

The NAP presents 64³⁸² new initiatives within five general areas of initiative: an improved framework for climate adaptation; more consultation and a new knowledge base; strengthened collaboration and coordination; green transition; and international climate adaptation.

This fiche does not cover Greenland and the Faroe Islands³⁸³.

B2. Adaptation plans adopted at subnational level

The NAP required all municipalities to develop an action plan for climate change by the end of 2013. The Government formally agreed with the association of Danish municipalities in 2012 that all municipalities should develop an adaptation action plan by the end of 2013.³⁸⁴ To support municipalities and local-level decision makers in their work, the Danish Nature Agency issued a guidance document in 2013. All 98 Danish municipalities finalised their action plans by 2014. Each plan includes a flood risk mapping and sets the priorities for local climate adaptation measures. The content of the plans was evaluated by the Government in 2017³⁸⁵, finding that although all municipalities had completed their plans, the level of detail and scope of the plans was uneven.

The Copenhagen Climate Adaptation plan³⁸⁶ was adopted in 2011 in response to the extreme, water-related consequences of climate change to which the city is exposed. In July 2011, Copenhagen experienced a cloudburst and the damages were estimated to be approximately 5 to 6 million DKK. This prompted the city to develop a specific Cloudburst Management Plan in 2012.³⁸⁷ The plan was used to develop 300 specific projects and a detailed management plan, which was approved in 2015 and will be implemented over the next 20 years.³⁸⁸ In 2017,

³⁸² Danish Nature Agency, 2012, How to manage cloudburst and rain water. Action plan for a climate-proof Denmark. Task Force for Climate Change Adaptation. Available at:

http://en.klimatilpasning.dk/media/590075/action_plan.pdf

³⁸³ Information about climate change impacts and adaptation in Greenland and the Faroe Islands can be found in e.g. Danish Ministry of Energy, Utilities, and Climate, January 2018, Denmark's Seventh National Communication and Third Biennial Report under the United Nations Framework Convention on Climate Change. URL:

http://unfccc.int/national_reports/biennial_reports_and_iar/submitted_biennial_reports/items/7550.php

³⁸⁴ Danish Ministry of Finance, 2012, Aftale om den kommunale og regionale økonomi for 2013. URL:

http://www.kl.dk/ImageVaultFiles/id_55201/cf_202/Aftale_om_kommunernes_%C3%B8konomi_for_2013.PDF

³⁸⁵ Danish Ministry of Environment and Food, 2017, Evaluering af kommunal klimatilpasning. URL :

<http://www.klimatilpasning.dk/media/1174683/evalueringsrapport.pdf>

³⁸⁶ City of Copenhagen, 2011, Copenhagen Climate Adaptation Action Plan. URL:

<http://international.kk.dk/artikel/climate-adaptation>

³⁸⁷ City of Copenhagen, 2012, Cloudburst management plan 2012. Copenhagen: Technical and Environmental Administration. Available at: http://en.klimatilpasning.dk/media/665626/cph_-_cloudburst_management_plan.pdf; in Danish at:

http://kk.sites.itera.dk/apps/kk_pub2/index.asp?mode=detalje&id=1018

³⁸⁸ City of Copenhagen, 2015, Climate Change Adaptation and Investment Statement. URL:

http://kk.sites.itera.dk/apps/kk_pub2/pdf/1499_bUxCjgovgE.pdf

a storm surge plan was developed for Copenhagen³⁸⁹. Seven other local cloudburst plans were developed in 2013.

Two out of five Danish regions have carried out studies on climate impacts and risks, as the basis for regional strategic planning for adaptation. Sectors most covered include health, water management, transport, and buildings. The Capital Region of Denmark has established a cooperation organisation with the aim of supporting municipalities, water utilities and hospitals in their effort to move from plan to action within the field of adaptation³⁹⁰.

Denmark currently has six signatories to the Covenant of Mayors for Climate and Energy in relation to adaptation³⁹¹.

B3. Sectoral adaptation plans

A few sectors, such as transport, roads and coastal protection,³⁹² have dedicated adaptation plans.

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

The overall responsibility for coordinating the integration of adaptation policy into national legislation and planning lies with the Danish Environmental Protection Agency (EPA) within the Ministry of the Environment and Food (MEF)³⁹³.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / **In progress** / No

To ensure a coordinated effort among public authorities in preparing the NAP, an organisational framework outlined in the NAS was in place from 2008 to 2011, including a

³⁸⁹ Copenhagen storm surge plan. URL: <https://www.kk.dk/sites/default/files/edoc/7932be34-6e51-450a-bc4f-fa2c2b00c1b3/c72e0cf7-3b8f-461a-bf35-536e7e239267/Attachments/18135652-23473370-1.PDF>

³⁹⁰ Klikovand. Denmark's Capital Region. URL: <http://www.klikovand.dk/english-resume/> Date accessed: 09/05/2018

³⁹¹ As 19 April 2018, includes: Albertslund, Copenhagen, Faaborg-Midtfyn, Næstved, Roskilde, and Solrød. See: <http://www.covenantofmayors.eu/about/covenant-community/signatories.html>

³⁹² Sørensen, P. & Sørensen, C., 2012, Guidelines for klimatilpasning i kystområder, Danish Coastal Authority. URL: <http://www.masterpiece.dk/UploadetFiles/10852/36/Klimatilpasningikystområderversion2.pdf>

³⁹³ Danish EPA, Climate, URL: <http://eng.mst.dk/nature-water/climate/> Date accessed: 10/05/2018

horizontal inter-ministerial coordination forum on adaptation (KoK³⁹⁴). The forum had representatives of nine national ministries, the sectoral organisation for municipalities, and the Danish regions³⁹⁵. Its role was to ensure coordination of effort between authorities, and a common knowledge base and report on sectoral initiatives³⁹⁶. Parallel work groups were set-up to support the work of the coordination forum³⁹⁷ along with a research coordination group, and group setting up the information portal.

With regards to the implementation phase, coordination is taking place in a more ad-hoc manner. For instance, in 2012 a Task Force on Climate Change Adaptation, set up to advise the coordination forum, evaluated climate vulnerabilities and potential impacts in Denmark. The report: 'Mapping climate change – barriers and opportunities for action'³⁹⁸ addresses fourteen sectors: construction and housing, coasts and ports, transport, water, agriculture, forestry, fisheries, energy, tourism, nature, health, emergency preparedness, insurance and spatial planning. This report is used in preparing sectoral priorities and serves as a decision-making tool across sectors.

Furthermore, at the beginning of 2017, a cross-ministerial committee (Ministry of Environment & Food, Ministry of Industry, Business & Financial Affairs, Ministry of Energy, Utilities, and Climate) was set up to propose and implement new initiatives to support municipalities and property owners in establishing cost-effective and holistically planned coastal flood protection and erosion protection.³⁹⁹ The Government and municipalities have agreed that municipalities and property owners will take decisions and implement coastal adaptation measures with funding from the Government,⁴⁰⁰ and in-line with the relevant risk assessment⁴⁰¹ and guidance documents.⁴⁰²

³⁹⁴ In Danish: "Tværministerielle Koordinationsforum for Klimatilpasning (KoK)"

³⁹⁵ Danish Energy Agency, 19 January 2009, Svar til Spørgsmål 232, Koordinationsforum for Klimatilpasning, Status for udmøntning af Regeringens klimatilpasningsstrategi 2009, Miljø- og Planlægningsudvalget (MPU) Alm. Del, URL: <http://www.ft.dk/samling/20091/almdel/mpu/spm/232/svar/681815/791278/index.htm>

³⁹⁶ Danish Energy Agency, 19 January 2009, Notat til Spørgsmål 232, Miljø- og Planlægningsudvalget (MPU) Alm. Del, URL: <http://www.ft.dk/samling/20091/almdel/mpu/spm/232/svar/681815/791279/index.htm>

³⁹⁷ Danish Energy Agency, 19 January 2009, Svar til Spørgsmål 232, Koordinationsforum for Klimatilpasning, Status for udmøntning af Regeringens klimatilpasningsstrategi 2008, Miljø- og Planlægningsudvalget (MPU) Alm. Del, URL: <http://www.ft.dk/samling/20091/almdel/mpu/spm/232/svar/681815/791277/index.htm>

³⁹⁸ Danish Nature Agency, May 2012, Background report, mapping climate change, barriers and opportunities for action, Task Force on Climate Change Adaptation, ISBN 978-87-7279-609-3, URL: http://en.klimatilpasning.dk/media/600858/130206_mapping_climate_change_final.pdf

³⁹⁹ Ministry of Environment & Food, Ministry of Industry, Business & Financial Affairs, Danish Ministry of Energy, Utilities, and Climate, Faktaark – Oversigt over initiativer vedr. kystbeskyttelse og klimatilpasning, URL: <http://efkm.dk/media/11405/faktaark-initiativer-vedr-kystbeskyttelse-og-klimatilpasning.pdf>

⁴⁰⁰ Local Government Denmark, 1 June 2017, Aftale om kommunernes økonomi for 2018, URL: https://www.kl.dk/ImageVaultFiles/id_85280/cf_202/-konomiaftale_2018.PDF

⁴⁰¹ Danish Environment and Food Ministry, 2016, Kystanalyse, URL: <http://kysterne.kyst.dk/kystanalyse.html>

⁴⁰² Sørensen, P. & Sørensen, C., 2012, Guidelines for klimatilpasning i kystområder, Danish Coastal Authority. URL: <http://www.masterpiece.dk/UploadetFiles/10852/36/Klimatilpasningikystomraderversion2.pdf>

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / **In progress** / No

Vertical coordination of adaptation policy is in place at some levels and there is a specific focus on flooding.

Municipalities have the main planning competencies and are identified in the NAS as the level of implementation of adaptation policy. In line with the NAS, development of detailed action plans was mandated to municipalities in 2013 after the negotiation of the Financial Agreement for Municipalities 2013 between the Government and the sectoral organisation for municipalities.⁴⁰³ The Government provided support through the establishment of a national task force with detailed and specific expertise in local adaptation issues, as well as a web-based mapping of risks for flooding, rain fall and storm surges in various time perspectives, modelled according to Intergovernmental Panel on Climate Change (IPCC) 2007 scenarios⁴⁰⁴.

Furthermore, a team of subject specialists on adaptation, flooding, and erosion has been established by the Environmental Protection Agency and Coastal Authority⁴⁰⁵. Its purpose is to advise, guide, support, and help coordinate municipalities in implementing adaptation solutions as well as to gather information about their experience. The team offers training, workshops, seminars, and customised advice to municipalities throughout the country in order to help them implement their adaptation plans.

Previously in 2011, the Ministries of the Environment and Transport identified 10 flood prone areas according to the Danish Flood Risk Act, which relates to the Directive 2007/60/EC of the European Union on the assessment and management of flood risks. The 10 flood risk areas involved 22 municipalities, which had to prepare flood risk management plans in order to reduce the flood risk through mitigation and adaptation measures. Furthermore, the plans had to be coordinated with municipal climate adaptation plans and take into account flood-related climate impacts.

A cooperation forum also exists within which the Ministry of Transport, which works together with, amongst others, the municipalities in the Greater Copenhagen area to tackle the traffic-related challenges in the area, in particular flooding of major approach roads.

⁴⁰³ Danish Ministry of Finance, 2012, Aftale om den kommunale og regionale økonomi for 2013. URL: http://www.kl.dk/ImageVaultFiles/id_55201/cf_202/Aftale_om_kommunernes_%C3%B8konomi_for_2013.PDF

⁴⁰⁴ Jensen, A., Nielsen, H.Ø. & Nielsen, M.L., 2016, Climate adaption in local governance: Institutional barriers in Danish municipalities, Aarhus University, DCE – Danish Centre for Environment and Energy, 102 pp. Scientific Report from DCE – Danish Centre for Environment and Energy No. 104 URL: <http://dce2.au.dk/pub/SR104.pdf>

⁴⁰⁵ Danish Ministry of Environment and Food, Rejseholdet, URL: <http://www.klimatilpasning.dk/rejseholdet.aspx> Date Accessed: 10/05/2018

Regions have no formal responsibilities in the field of adaptation but have started tackling it through their regional climate and development plans. Two regions in particular, the Capital Region and Central Denmark, have specific coordination bodies for municipalities and other stakeholders (see Section A2 & B2). These bodies have had a clear impact on the degree to which municipalities in those regions cooperate formally with each other and with the region on adaptation projects.⁴⁰⁶

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

In general, all major public policy initiatives in Denmark are open to public consultation and stakeholder involvement. The Danish Environmental Protection Act has a provision that authorises the Minister for the Environment and Food to stipulate regulations regarding public consultation in the preparation and amendment of plans and programmes within the scope of the Act.

Publication on a web portal⁴⁰⁷ is mandatory for all draft laws, decisions, and bills by all ministries in the Government at the time of parliamentary hearings. Relevant stakeholders are contacted directly by email. Public comments are compiled by the relevant authority in a memorandum and amendments are considered in light of the comments. All relevant hearing materials are collated on the public web portal.

While the above processes provide a general overview of stakeholder involvement, only ad-hoc examples are available specifically on how stakeholders are involved in the preparation of adaptation policies.

For instance, the Ministry of the Environment established a 'National Dialogue Forum' on adaptation in 2012, which met several times to discuss climate adaptation policy and solutions, develop the sector as a growth area for new technology and jobs, and advise the minister. Seventeen members were selected from business, universities, NGOs, municipalities, and interest organisations⁴⁰⁸.

Following storm surges in December 2016 and January 2017, the Minister for the Environment and Food held several stakeholder meetings focusing on climate adaptation,

⁴⁰⁶ Krausing, Jarl., Madsen, Simone., Jørgensen, Sune., 2017, Robusthed i kommunale klimatilpasningsplaner, Concito, URL: <https://concito.dk/udgivelser/robusthed-kommunale-klimatilpasningsplaner>

⁴⁰⁷ Høringsportalen, URL: <https://hoeringsportalen.dk/>

⁴⁰⁸ MEF, Nyt forum lægger strategi for dansk klimaindsats, URL: <http://mfvm.dk/nyheder/nyhed/nyhed/nyt-forum-laegger-strategi-for-dansk-klimaindsats/>

coastal protection and erosion. Afterwards, new initiatives⁴⁰⁹ were adopted as part of the work of a cross-ministerial committee set up at the beginning of 2017. These included, for instance, the establishment of a new flood and erosion task force to serve for a three-year period and guide municipalities in the establishment of holistically-planned solutions and the development of a central-government risk analysis tool, which will be based on previous events and guidance.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

International cooperation is highlighted as a priority action under the NAP. The Ministry of the Environment and Food collaborates with Germany and the Netherlands on climate adaptation of the Wadden Sea through the existing Trilateral Cooperation on the Protection of the Wadden Sea⁴¹⁰. Under the guidance of this cooperation forum, the three Governments developed a common Climate Change Adaptation Strategy (CCAS) in 2014⁴¹¹. The objective of the trilateral cooperation in implementing the CCAS is to focus on activities with the highest trilateral relevance, particularly the exchange of knowledge and best practice between experts and policy makers, as well as the support of trilaterally coordinated studies and pilot projects covering sites across the entire Wadden Sea. The CCAS deals with coastal risk management, nature protection and spatial planning. A monitoring report on the CCAS was published in December 2017⁴¹².

Through the Nordic Council of Ministers, Denmark has contributed to collaboration and knowledge-building in Nordic research networks on climate adaptation⁴¹³, through the top-level research initiative – Impact studies and adaptation to climate change (‘Effektstudier og tilpasning til klimaændringer’).

⁴⁰⁹ For the full list of initiatives see: Ministry of Environment & Food, Ministry of Industry, Business & Financial Affairs, Danish Ministry of Energy, Utilities, and Climate, Faktaark – Oversigt over initiativer vedr. kystbeskyttelse og klimatilpasning, URL: <http://efkm.dk/media/11405/faktaark-initiativer-vedr-kystbeskyttelse-og-klimatilpasning.pdf>

⁴¹⁰ Secretariat of The Trilateral Cooperation on the Protection of the Wadden Sea, URL: <http://www.waddensea-secretariat.org> Date accessed: 10 May 2018

⁴¹¹ 12th Trilateral Governmental Conference on the Protection of the Wadden Sea, 2014, Climate Change Adaptation Strategy, URL: http://www.wing.nl/file.php/83/annex_4-climate_strategy_final.pdf

⁴¹² Wadden Sea Board - Task Group Climate, 2017, Trilateral Climate Change Adaptation Strategy. Monitoring Report for the Trilateral Cooperation on the Protection of the Wadden Sea. Common Wadden Sea Secretariat, Wilhelmshaven, Germany, URL: http://www.waddensea-secretariat.org/sites/default/files/downloads/ccas_monitoring_report_final.pdf

⁴¹³ Nordregio, URL: <http://www.nordregio.se/en/Metameny/About-Nordregio/Modules-About-Nordregio/Geographical-scope-we-cover/Norden/Addressing-climate-change-adaptation-at-the-Nordic-level/> Date Accessed: 09/05/2018

Denmark is also a member of the European Network of the Heads of Environment Protection Agencies (EPA) Interest Group Climate Change and Adaptation⁴¹⁴.

Between 2010 and 2013, Denmark participated in the Baltadapt project, with the Danish Meteorological Institute (DMI) as lead partner. Funded by the Baltic Sea Region Programme 2007-2013, it had a total budget of EUR 2.86 million, of which EUR 2.1 million was ERDF co-financed and EUR 0.75 million was partners' contributions. The project developed a transnational Strategy for Adaptation to Climate Change in the Baltic Sea Region and a subsequent Action Plan, presented in 2013⁴¹⁵. The project was followed by The Baltic Sea Region Climate Dialogue Platform which aims to support a shared understanding of climate change challenges and promotes adaptation solutions through joint projects and actions in the Baltic Sea region.

The Danish Coastal Authority also participates in the EU funded project, Building with Nature⁴¹⁶, with the goal of making coasts, estuaries and catchments of the North Sea Region more adaptable and resilient through a number of "living laboratories", and by creating a joint transnational monitoring programme, using state-of-the-art analysis methods and developing improved designs and business cases.

The City of Copenhagen has entered into a cooperation agreement with New York City on transferring the ideas and results from the Climate Resilient Neighbourhood in Østerbro to a district of New York. The city has another cooperation agreement with Beijing on exchange of experience of solutions for the management of everyday rain and torrential downpours⁴¹⁷.

Finally, a number of Danish municipalities and stakeholders are participating in Interreg adaptation projects in the North Sea Region,⁴¹⁸ including in (FRAMES)⁴¹⁹ dealing with flood resilience, and TOPSOIL⁴²⁰ dealing with soil and water resilience.

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

⁴¹⁴ European Network of the Heads of Environment Protection Agencies, URL: http://epanet.pbe.eea.europa.eu/european_epas Date accessed: 09/05/2018

⁴¹⁵ Baltadapt. URL: http://www.baltadapt.eu/index.php?option=com_content&view=article&id=91&Itemid=222 Date accessed: 09/05/2018

⁴¹⁶ Building with Nature, URL: <http://www.northsearegion.eu/building-with-nature> Date accessed: 09/05/2018

⁴¹⁷ City of Copenhagen, 2015, Climate Change Adaptation and Investment Statement. URL: http://kk.sites.itera.dk/apps/kk_pub2/pdf/1499_bUxCjgovgE.pdf

⁴¹⁸ Inter-reg, North Sea Region, Cooperating on climate adaptation in the North Sea region URL: <http://www.northsearegion.eu/fair/news/cooperating-on-climate-adaptation-in-the-north-sea-region/> Date accessed: 09/05/2018

⁴¹⁹ Inter-reg, North Sea Region, Frames, URL: <http://www.northsearegion.eu/frames/> Date accessed: 09/05/2018

⁴²⁰ Inter-reg, North Sea Region, Top Soil, URL: <http://www.northsearegion.eu/topsoil/> Date accessed: 09/05/2018

Yes / **In progress** / No

There is an elaborate system in place for the observation of weather variables, including sea level and storm surges. Some of the data is publicly available, e.g. on the web portal⁴²¹ of the Danish Meteorological Institute (DMI). The DMI is also known globally for regional climate modelling (RCM) and is the leading national authority on regional climate projections. DMI uses Global Climate Models to monitor interactions and feedback mechanisms between atmosphere, ocean, land surface and ice on a larger scale.

DMI keeps detailed records of all weather-related events in Denmark in line with international standards. There is no clear public information on what climate-related impacts are being tracked, though information seems to be supplied to EEA, so there must be a programme in place. The economic damage caused by the Copenhagen cloudburst of 2011 was estimated at approximately 5 to 6 million DKK.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

In 2014 the Danish Meteorological Institute (DMI) prepared a report on the expected climate change in Denmark, focusing on climate change towards the end of this century. The assessment of future climate change is based on the scenarios used by the IPCC 5th Assessment Report⁴²². DMI presented the results based on the most recent IPCC, BACC, European studies and the Danish CRES project where a number of climate simulations were performed with several regional and global climate models.

The Danish EPA prepared an analysis and summary of the Working Group II Contribution to the 5th Assessment Report from IPCC, with special focus on implications for Denmark, for policy makers.⁴²³

In 2012, the Task Force on Climate Change Adaptation prepared an analysis to map climate impacts in Denmark, as well as the opportunities and challenges they present. The report was based on the scenarios used by the IPCC 4th Assessment Report⁴²⁴.

⁴²¹ DMI: Weather: <http://www.dmi.dk/vejr>; Climate: <http://www.dmi.dk/klima> and <http://research.dmi.dk/research/research-topics/climate/>; Sea: <http://www.dmi.dk/hav>

⁴²² Olesen et al., 2014, Fremtidige klimaforandringer i Danmark, Danmarks Klimacenter rapport nr. 6 2014. Danish Meteorological Institute, URL:

https://www.dmi.dk/fileadmin/user_upload/Rapporter/DKC/2014/Klimaforandringer_dmi.pdf

⁴²³ Grøndahl, Louise, Poulsen, Nanet, eds., 2014, Analyse af IPCC delrapport 2 – Effekter, klimatilpasning og sårbarhed, Danish Environmental Protection Agency, URL:

http://www.klimatilpasning.dk/media/868690/analyse_af_ipcc_delrapport_2_effekter_klimatilpasning_og_s_rbarhed_fina_3.pdf

The DMI will prepare datasets and indicators (Climate Atlas)⁴²⁵ based on IPCC's 5th Assessment Report. The datasets will be provided to the municipalities from the end of 2019 and will be further developed and updated up to 2021. Data will comprise projections and indicators of temperature, precipitation, extreme rainfall, sea level and storm surges.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / **In progress** / No

The 2012 report by the centrally convened Task Force on Climate Change Adaptation called 'Mapping climate change – barriers and opportunities for action' conducted a sectoral and cross-sectoral analysis of climate risks/vulnerability⁴²⁶. It analysed 14 sectors: construction and housing, coasts and ports, transport, water, agriculture, forestry, fisheries, energy, tourism, nature, health, emergency preparedness, insurance, and spatial planning. For each sector, it presented a basic analysis of important effects of climate change, relevant division of responsibilities between the authorities and private citizens, possibilities for adaptation, initiatives planned and in progress, and barriers and opportunities for future action. The report was based on the scenarios used by the IPCC 4th Assessment Report.

A detailed risk assessment regarding erosion and flooding was conducted for the entire Danish coastline by the MEF in 2016.⁴²⁷ It will be used as a basis for planning the significant coastal adaptation initiatives being laid out in 2017/18. DMI estimates based on the IPCC 5th Assessment Report were used as a basis for the assessment.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

The available climate risks and vulnerability assessments indicated under Indicator 3c do not take transboundary risks into account.

Nevertheless, as indicated in Indicator 2b, Denmark is involved in a range of transboundary cooperation initiatives some of which by nature consider transboundary risks as part of the vulnerability assessments conducted. These initiatives primarily focus on the Baltic Sea.

⁴²⁴ Danish Nature Agency, May 2012, Background report, mapping climate change, barriers and opportunities for action, Task Force on Climate Change Adaptation, ISBN 978-87-7279-609-3, URL: http://en.klimatilpasning.dk/media/600858/130206_mapping_climate_change_final.pdf

⁴²⁵ URL: <http://www.dmi.dk/nyheder/arkiv/nyheder-2017/august/ny-klima-krystalkugle-fra-dmi-skal-ruste-danskerne-mod-klimaforandringer>

⁴²⁶ Danish Nature Agency, May 2012, Background report, mapping climate change, barriers and opportunities for action, Task Force on Climate Change Adaptation, ISBN 978-87-7279-609-3, URL: http://en.klimatilpasning.dk/media/600858/130206_mapping_climate_change_final.pdf

⁴²⁷ Danish Environment and Food Ministry, 2016, Kystanalyse, URL: <http://kysterne.kyst.dk/kystanalyse.html>

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / In progress / No

The Coordination Unit for Research in Climate Change Adaptation (in Danish: Koordineringsenhed for Forskning i klimatilpasning - KFT) was established under the NAS. KFT was mandated to strengthen the coordination of national research activities in the context of climate adaptation, to ensure that synergies across a broad range of different research areas were harvested. KFT was a joint endeavour of the National Environmental Research Institute at the Aarhus University, the Danish Meteorological Institute, the Geological Survey of Denmark and Greenland (GEUS), the University of Copenhagen and Denmark's Technical University. KFT reported to the inter-ministerial 'Coordination Forum on Adaptation' and provided science-based knowledge to a national web portal on climate adaptation, at that time hosted by the Danish Ministry of Climate and Energy.

KFT aimed to collate and transfer knowledge within all Danish (and international) research areas that worked on the issue of climate adaptation, and helped coordinate information access at the science-policy interface. This activity built on strong cooperation across a wide range of scientific disciplines as well as regular interaction with both the policy-makers and other stakeholders. In addition, KFT fostered national and international networks; identified and described knowledge gaps as input for future strategic research programmes.

In 2013 the activities of KFT were transferred to a network of research activities on climate adaptation. The network meets on a yearly basis and keeps up network activities. The website is no longer active.

The Ministry of Environment and Food (MEF) has regular meetings with universities in order to highlight needs for further research on climate adaptation. Recent work is being done on adaptation knowledge regarding local level planning and coastal impacts.

The Environmental Technology Development and Demonstration Programme (MUDP) is run by the MEF. The Programme supports development, testing and demonstration of environmentally efficient technology, including applications to adaptation. Its total budget for environmental technology efforts in 2018 is about DKK 85 million.⁴²⁸

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

⁴²⁸ Danish Ministry of Environment and Food, MUDP - Ansøgningsrunde 2018, URL: <http://ecoinnovation.dk/tilskud/soeger-du-tilskud-under-mudp/aktuelle-opslag/mudp-opslag-2018/> Date accessed: 10/05/2018

Yes / In progress / No

The Danish web-portal⁴²⁹ for climate adaptation, established after the NAS in 2008, contains news, cases about climate adaptation and interactive tools. It is managed by the Ministry of Environment and Food and EPA in cooperation with a number of other governmental bodies. Different online tools are targeted at municipalities, enterprises and individuals. These tools can be used to assess risks from rising sea levels and to climate-proof buildings, among other things. Other available information includes: updated data and maps of temperatures, precipitation, sea and groundwater; articles and guidance about various sectors affected by climate changes; practical advice on climate adaptation; examples of calculations of how climate change may be included as a basis for important decisions; analysis and assessment tools for the public and decision-makers; information on financing adaptation projects; maps; an overview of municipal climate action plans; and information about the latest research and development into climate adaptation. An English version is available with an English newsletter.

DMI has a web page aimed at the general public with climate change related information, including information on adaptation and climate data.⁴³⁰ A dedicated page for research is available.⁴³¹

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / In progress / No

At an earlier stage of implementation, the Danish Adaptation Strategy and Action Plan provided for capacity building at central, municipal, and citizen levels. A mobile team (2012-2013) was established as part of the Task Force on Climate Change Adaptation. This team offered guidance and facilitated collaboration between municipal authorities and other stakeholders in the field, for example, with regard to preparing the municipal climate adaptation plans.

A new mobile team of subject specialists on adaptation, flooding, and erosion has been established by the Environmental Protection Agency and Coastal Authority⁴³². Its purpose is to advise, guide, support, and help coordinate municipalities in implementing adaptation solutions. The team is at the disposal of municipalities and offers training, workshops, seminars, and customised advice throughout the country at the request of municipalities.

⁴²⁹ Danish portal for Climate Change Adaptation, URL: <http://en.klimatilpasning.dk/> Date accessed: 09/05/2018

⁴³⁰ DMI, Klima, URL: <http://www.dmi.dk/klima/> Date accessed: 09/05/2018

⁴³¹ DMI, Research at the Danish Meteorological Institute, URL: <http://research.dmi.dk/home/> Date accessed: 09/05/2018

⁴³² Danish Ministry of Environment and Food, Rejseholdet, URL: <http://www.klimatilpasning.dk/rejseholdet.aspx> Date Accessed: 10/05/2018

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

The Danish adaptation policy addressed a risk assessment of 14 sectors⁴³³. A detailed risk and adaptation analysis was made by the Coastal Authority focusing on the effects of a future changing climate on the Danish coasts⁴³⁴. These documents have been used to develop detailed plans in conjunction with local authorities.

The Mobile Team, established in 2017, helps to ensure coherence and use of best practices in all contexts. The Team consists of experts from the Danish Coastal Authority and the Danish Environmental Protection Agency. The Team provides information on legal issues as well as solutions that include synergies in terms of nitrogen reduction in combination with recreational benefits. The Team also encourages cooperation across municipalities and brings knowledge from other ministries.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

The studies and projections referred to in relation to Indicators 3b and 3c form the basis for prioritising adaptation options. Stakeholder consultations form a central part of the policy formulation process as outlined in Section 2a.

At local level, a new tool, PLASK, that calculates the socioeconomic benefits from climate adaptation, has been developed and can be found on the Government web portal⁴³⁵. The tool is now being tested in municipalities. The tool calculates the costs of damage in the project area. It is calculated for different land use types in the case of flooding. Historical values of insurance payments are combined with standard values. The tool also incorporates the long-term and short-term investment and maintenance costs of the different flooding prevention structures or solutions. Using this data, the tool executes a cost-benefit analysis to calculate the level of climate adaptation that is optimal to protect the area and discounts the values over the lifespan of the project to provide a net present value of the different solutions/projects.

⁴³³ Danish Nature Agency, May 2012, Background report, mapping climate change, barriers and opportunities for action, Task Force on Climate Change Adaptation, ISBN 978-87-7279-609-3, URL: http://en.klimatilpasning.dk/media/600858/130206_mapping_climate_change_final.pdf

⁴³⁴ Danish Environment and Food Ministry, 2016, Kystanalyse, URL: <http://kysterne.kyst.dk/kystanalyse.html>

⁴³⁵ Danish Portal on Climate Change Adaptation. Beregningsværktøj, URL: <http://www.klimatilpasning.dk/viden-om/%C3%B8konomi/beregningsvaerktoej.aspx> Date accessed: 10/05/2018

The tool helps users to compare climate adaptation projects better and faster. The distribution of benefits and effects, in addition to economic value, is also shown by the tool. The tool shows different options for achieving the same level of protection against flooding and what the effects are in terms of, for example, biodiversity, energy-efficiency and public health. A new version of the tool will be available in September 2018.

In line with Directive 2007/60/EC on the assessment and management of flood risks, 22 at risk municipalities had to prepare flood risk management plans in order to reduce the flood risk through mitigation and adaptation measures, with the assistance of mapping and data tools from the Government.

The Copenhagen Cloudburst Management Plan is also, for example, based on a rigorous analysis of flood risks and priorities, as well as socio-economic economic assessment and cost-benefit analysis.⁴³⁶

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / **In progress** /No

There is some evidence that climate impacts and projections are taken into consideration in disaster risk reduction planning. The Danish Emergency Management Agency (DEMA) assists in ensuring knowledge about climate change and extreme weather events is considered in the risk-based design of local Fire and Rescue Service, as well as planning on a local level.

The Danish web portal⁴³⁷ on adaptation includes information on the link to disaster risk management⁴³⁸. The web portal provides information regarding preparedness⁴³⁹.

The National Risk Profile for Denmark provides a common ground for further coordination of both risk management and climate adaptation considerations. The most recent version of the National Risk Profile was published in January 2017 and explicitly discusses the risks posed by climate change with regard to changing wind patterns, increased sea level, and more frequent extreme weather events among other risks⁴⁴⁰.

7. Funding resources identified and allocated

⁴³⁶ City of Copenhagen, 2015, Climate Change Adaptation and Investment Statement. URL:

http://kk.sites.itera.dk/apps/kk_pub2/pdf/1499_bUxCjgovgE.pdf

⁴³⁷ Danish Portal on Climate Change Adaptation, URL: www.klimatilpasning.dk Date accessed: 10/05/2018

⁴³⁸ Danish Portal on Climate Change Adaptation , Ready and fully prepared - emergency preparedness, Danish Portal on Climate Change Adaptation, Preparedness, <http://en.klimatilpasning.dk/technologies/ready-and-fully-prepared-emergency-preparedness.aspx> Date accessed: 10/05/2018

⁴³⁹ Danish Portal on Climate Change Adaptation, Preparedness, URL:

<http://en.klimatilpasning.dk/sectors/preparedness.aspx> Date accessed: 10/05/2018

⁴⁴⁰ Danish Emergency Management Agency, 2017, Nationalt Risikobillede, URL:

<http://brs.dk/viden/publikationer/Documents/Nationalt-Risikobillede-2017-LowRes.pdf>

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / In progress /No

The NAS outlined funding for the development of socio-economic modelling tools for adaptation in 2008. The NAP outlined a number of funding initiatives, among others: an agreement between the Government and municipalities to increase investment in the wastewater area by DKK 2.5 billion in 2013; DKK 2.7 million for eight projects in which local collaboration partners created solutions for climate adaptation; DKK 60 million set aside for the Environmental Technology Development and Demonstration programme (MUDP) for projects in 2012, where climate adaptation and water was one of five main themes; DKK 30 million set aside by the innovation fund for development and market preparation of new generic climate adaptation solutions for export; DKK 122.6 million for green technology in 2013, including adaptation.

Funding is available for financing cross-cutting adaptation action (e.g. national scenarios and climate services, capacity building, website). Information on the various sources (including domestic public finance, private finance, and EU-level funds and grants) is provided on the Government's adaptation web portal⁴⁴¹. Various funding sources are available to finance adaptation projects, including a number of private funding sources, such as: the MUDP, a subsidy for home owners to conduct renovations; Denmark's Green Investment Fund to co-finance green solutions; the Market Maturation Fund to help develop and market green solutions; and the Innovation Fund that provides grants for the development of knowledge and technology, that leads to the strengthening of research and innovative solutions for the benefit of growth and employment.

In the 2018 budget, money is specifically set aside to support municipalities and property owners to develop coastal protection in connection with climate adaptation between 2018-21.⁴⁴² This follows an agreement on the management of coastal adaptation between the sectoral organisation for municipalities and a detailed sectoral analysis by the Coastal Protection Directorate.⁴⁴³ Some additional funding for related support activities has also been made available following the work of the inter-ministerial committee established to study the issue. Total funding will be approximately DKK 68 million⁴⁴⁴.

⁴⁴¹ Danish Portal on Climate Change Adaptation, Tilskud til klimatilpasning URL:

<http://www.klimatilpasning.dk/teknologi/tilskud-til-klimatilpasning.aspx> Date accessed: 10/05/2018

⁴⁴² Ministry of Finance, Aftale om finansloven for 2018, URL: <https://www.regeringen.dk/media/4500/aftale-om-finansloven-for-2018.pdf>

⁴⁴³ Local Government Denmark, 1 June 2017, Aftale om kommunernes økonomi for 2018, URL: https://www.kl.dk/ImageVaultFiles/id_85280/cf_202/-konomiaftale_2018.PDF

⁴⁴⁴ Ministry of Environment & Food, Ministry of Industry, Business & Financial Affairs, Danish Ministry of Energy, Utilities, and Climate, Faktaark – Oversigt over initiativer vedr. kystbeskyttelse og klimatilpasning, URL: <http://efkm.dk/media/11405/faktaark-initiativer-vedr-kystbeskyttelse-og-klimatilpasning.pdf>

The Danish Ministry for Environment and Food granted DKK 34.4 million in 2016 to 15 blue-green projects in which municipalities will take care of climate proofing, establish new recreational facilities and ensure better environmental conditions and less nitrogen in the aquatic environment.⁴⁴⁵

Local adaptation projects dealing with watercourses in cities and by roads are most often financed directly by the water utilities and municipalities. Until March 2016, water utilities could cover 100% of the cost of jointly managed projects, but new rules set a maximum of 75% financing by the utility. A governmental assessment shows that this has somewhat slowed investment in these projects⁴⁴⁶. The Danish Coastal Authority participates in the EU Interreg co-financed project on adaptation in the North Sea, 'Building with Nature'⁴⁴⁷ with funds from the ERDF. Furthermore, a number of Danish municipalities and stakeholders are participating Interreg adaptation projects,⁴⁴⁸ including in (FRAMES)⁴⁴⁹ dealing with flood resilience, and TOPSOIL⁴⁵⁰ dealing with soil and water resilience.

Finally, several recent LIFE projects in Denmark have adaptation dimensions⁴⁵¹, particularly the Inter-municipal cooperation on 'Water Management and Climate Change Adaptation for The Stream of Usseørd'⁴⁵² and the Central Denmark Region leads the EU-funded project 'Coast to Coast Climate Challenge', which has a goal of formulating and implementing a coordinated adaptation strategy for the region between 2017 and 2022⁴⁵³.

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

Recent transposition of the revised Environmental Impact Assessment (EIA) Directive (Law number 448/2017) includes a provision that EIA should assess whether projects impact

⁴⁴⁵ Danish Ministry of Environment and Food, 21 December 2016, New Nature Solutions Prevent Cities from Flooding, State of Green, URL: <https://stateofgreen.com/en/profiles/mim/news/newnature-solutions-prevent-cities-from-flooding>

⁴⁴⁶ Danish Ministry of Environment and Food, 2017, Evaluering af kommunal klimatilpasning. URL : <http://www.klimatilpasning.dk/media/1174683/evalueringsrapport.pdf>

⁴⁴⁷ Building with Nature, URL: <http://www.northsearegion.eu/building-with-nature> Date accessed: 10/05/2018

⁴⁴⁸ Cooperating on climate adaptation in the North Sea region, URL: <http://www.northsearegion.eu/fair/news/cooperating-on-climate-adaptation-in-the-north-sea-region/> Date accessed: 10/05/2018

⁴⁴⁹ FRAMES project, URL: <http://www.northsearegion.eu/frames/> Date accessed: 10/05/2018

⁴⁵⁰ TOPSOIL project, URL: <http://www.northsearegion.eu/topsoil/> Date accessed: 10/05/2018

⁴⁵¹ LIFE Programme, Denmark Overview, 2016, URL: http://ec.europa.eu/environment/life/countries/documents/denmark_en_nov16.pdf Date accessed: 10/05/2018

⁴⁵² Usseørd Å, URL: <http://www.usseeroed-aa.dk/> Date accessed: 10/05/2018

⁴⁵³ Coast to Coast Challenge, URL: <http://www.c2ccc.eu/om-c2c-cc/>. Date accessed: 8 May 2018.

significantly on climate, and consider climate adaptation. It is unclear what consideration of adaptation is taken in Strategic Environmental Assessment (SEA). The Ministry of Environment and Food is currently developing a guidance document.⁴⁵⁴

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / **No**

According to Section 24 of the Danish Emergency Management Act, ministries and underlying authorities are to plan the retention and continuation of vital societal functions within their sector in the event of accidents and disasters. This obligation includes the timely development of preparedness plans⁴⁵⁵. The plans have to be revised to the extent made necessary by development, and at least once every four years. The municipal and regional councils adhere to the same planning obligation in accordance with Section 25 of the Danish Emergency Management Act.

The Danish Emergency Management Agency (DEMA) coordinates the overall national disaster risk management planning and is responsible for the inspection and counselling of state authorities, municipalities, and regions regarding their general disaster risk management planning and preparedness plans. Plans have to be inspected by the DEMA at least once every four years or once during each municipal and regional parliamentary term.

The DEMA's counselling is based, among other things, on the 'National Risk Profile'⁴⁵⁶, which identifies hurricanes, strong storms, coastal flooding, and extreme rainfall as the climate-related risks that pose the greatest threat to Danish society and that need to be paid the closest attention by all authorities with disaster risk management responsibilities.

In addition to the 'National Risk Profile', the DEMA has produced other key guidance documents to support the agency's advisory and regulatory functions. In the guide 'Comprehensive Preparedness Planning'⁴⁵⁷, it is recommended that authorities and organisations include all of their critical functions in their disaster risk management planning, and build general capabilities to protect their critical functions and values in the event of any type of accident or disaster, including those that are climate-related.

The guidance also recommends that authorities and organisations keep up-to-date with the current threats to Danish society, as described in the 'National Risk Profile'. In addition, critical functions should be mapped, continual identification and monitoring of threats should be established, and risk and vulnerability analyses should be conducted regularly to create an

⁴⁵⁴ Danish Ministry of Environment and Food, Miljøvurdering af planer og programmer, URL: <http://mst.dk/natur-vand/planlaegning/miljoevurdering-og-vvm/miljoevurdering-af-planer-og-programmer/> Date accessed: 10/05/2018

⁴⁵⁵ URL: http://brs.dk/eng/legislation/act/Pages/the_emergency_management_act.aspx

⁴⁵⁶ URL: <https://brs.dk/viden/publikationer/Documents/National%20Risk%20Profile%20for%20Denmark.pdf>

⁴⁵⁷ URL: http://brs.dk/eng/Documents/Comprehensive_Preparedness_Planning.pdf

overview of the threats that constitute the biggest risks to the organisation, as well as the vulnerabilities that the organisation experiences in relation to these threats. Risk and vulnerability analyses can hereby form the basis for implementing counter measures against the identified threats.

The ‘National Accident and Disaster Prevention Strategy’⁴⁵⁸ emphasises the growing risk of extreme weather phenomena and the ever more complex climate-related challenges facing Danish society. The Strategy also underlines the need to initiate preventive measures and develop resilience amongst the general population, as well as among authorities with disaster risk management responsibilities. The Strategy contains a number of examples of prevention projects, for instance, concerning municipal climate plans.

In Denmark, the primary focus is on building general disaster risk management capabilities and preparedness plans that can be used in connection with a wide range of incidents; this is reflected in the National Preparedness Plan. The DEMA has noted that several government authorities, municipalities and regions are inspired by the ‘National Risk Profile’ in their disaster risk management planning and have developed preparedness plans that specifically focus on climate-related accidents and disasters.

The DEMA is currently working on operationalizing the climate-related challenges in the ‘National Risk Profile’ through the development of climate-related scenarios that are meant to form a basis for climate-related disaster risk management planning and exercises. Another purpose of the climate-related scenarios is facilitating the DEMA’s supervision and counselling activities in relation to the size, scope and development of the municipal fire and rescue services. The overall purpose of the project and the operationalisation of the ‘National Risk Profile’ is to increase the resilience of the municipal fire and rescue services by strengthening cohesion and the utilisation of capabilities more optimally in dealing with complex climate-related accidents and disasters. This requires cooperation between the national and the municipal fire and rescue services.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / No

The Planning Act and associated guidance was amended in June 2012, so that municipalities could address climate adaptation directly in local development/land-use plans. The ability of wastewater companies to invest in climate adaptation was clarified by an amendment to the Water Sector Act in Spring 2012. This is important because water management companies are separate entities from the municipalities. Since most adaptation policies in Denmark are associated with water management, it was important to clarify the institutional

⁴⁵⁸ URL: <http://brs.dk/viden/publikationer/Documents/National-forebyggelsesstrategi-2017.pdf>

responsibilities, capabilities and funding options of the water utilities and the municipal administrations with regard to adaptation⁴⁵⁹.

In response to the EU Floods Directive, Denmark implemented a flooding risk assessment. The 22 municipalities identified as being in the 10 areas at high risk of flooding were subsequently required to develop flood risk management plans to establish areas where new building should be avoided and plans for flood protection measures⁴⁶⁰. These flood risk management plans should be revised every six years.

Changes to the Planning Act were adopted in April 2018. With the changes in place, municipalities have to revise or develop local flood and erosion risk maps and adopt guidelines for flood response measures⁴⁶¹. The Coastal Authority will provide a national map of these risks in coastal areas to help in the planning process⁴⁶² and the DMI has provided a Climate Atlas and future climate scenarios based on IPCCs 5th Assessment Report.

Copenhagen, among other cities, has a detailed plan for the city's future urban planning with adaptation at its core⁴⁶³. Approximately 300 specific projects addressing adaptation are proposed, and a 'climate-resilient neighbourhood' is being developed as a demonstration project with adaptation built into every aspect of its design⁴⁶⁴.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / In progress / No

The primary implementation instruments have focused on coastal and flood protection at municipal level as outlined in relation to Indicator 8c. The sectoral organisation for municipalities negotiates a financial agreement with the Government every year. This agreement often outlines the specific details and requirements of climate adaptation policy for a given year. The most significant steps, such as the municipal plans, and changes to the planning laws were made in response to the NAP.

⁴⁵⁹ Krausing, Jarl., Madsen, Simone., Jørgensen, Sune., 2017, Robusthed i kommunale klimatilpasningsplaner, Concito. URL: <https://concito.dk/udgivelser/robusthed-kommunale-klimatilpasningsplaner>

⁴⁶⁰ Danish Coastal Protection Authority, Oversvømmelsesdirektivet, URL: <http://kysterne.kyst.dk/oversvoemmelsesdirektivet.html> Date accessed: 10/05/2018

⁴⁶¹ Personal communication with MS contact.

⁴⁶² Regeringen vil styrke kyst- og klimasikring af Danmark, 17/08/2017, Press Release: Ministry of Industry, Business & Financial Affairs, URL: <https://em.dk/nyheder/2017/08-17-kystbeskyttelse> Date accessed: 10/05/2018

⁴⁶³ City of Copenhagen, 2015, Climate Change Adaptation and Investment Statement. URL: http://kk.sites.itera.dk/apps/kk_pub2/pdf/1499_bUxCjgovgE.pdf

⁴⁶⁴ The Climate Resilient Neighbourhood Østerbro, URL: <http://klimakvarter.dk/en/om/> Date accessed: 30/05/2018

A wide number of laws now include consideration of adaptation, particularly:⁴⁶⁵

- Water Sector Law
- Act on Watercourses
- Flood Protection Act
- Coastal Protection Act
- Nature Protection Act
- Environmental Goals Act
- Act on payment rules for wastewater supply companies
- Roads Act
- Emergency Management Act
- Planning Act

The Ministry of Transport is working with the municipalities, in line with their climate action plans, to improve the design of roads where necessary.⁴⁶⁶ The Ministry undertakes regular risk analysis and includes adaptation in EIAs for all major infrastructure projects.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / No

There is clear awareness of the role to be played by insurance, which is mentioned in the NAS, and is well covered by the Danish adaptation portal.⁴⁶⁷

Many insurance companies offer a discount if policyholders make investments in risk prevention. If the damage occurs, policyholders can apply for compensation from the Danish Storm Council⁴⁶⁸. The Danish Storm Council handles cases concerning three types of natural catastrophes: storm surge, flooding from waterways and lakes and windfall.

The trade organisation for insurance has collected a variety of data and information on climate damage, which is presented on their homepage on climate adaptation.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

⁴⁶⁵ Krausing, Jarl., Madsen, Simone., Jørgensen, Sune., 2017, Robusthed i kommunale klimatilpasningsplaner, Concito. URL: <https://concito.dk/udgivelser/robusthed-kommunale-klimatilpasningsplaner>

⁴⁶⁶ Danish Government Adaptation Portal, Veje, <http://www.klimatilpasning.dk/sektorer/transport/veje.aspx> Date accessed: 10/05/2018

⁴⁶⁷ Danish Government Adaptation Portal, Insurance, URL: <http://www.klimatilpasning.dk/sektorer/forsikring.aspx>

⁴⁶⁸ The Danish Storm Council, URL: <https://www.danishstormcouncil.dk/artikler/danishstormcouncil/about-the-danish-storm-council/what-is-the-danish-storm-council/> Date accessed: 10/05/2018

Yes / **In progress** / No

The NAP presented 64 initiatives: 62 are either planned or implemented; two have been cancelled. An overview of implementation has not been published.

All 98 municipalities have adopted adaptation plans as required. Practical implementation has begun but it is uneven. For example, at the time of evaluation in 2016, many municipalities did not have a detailed implementation plans or financial analysis of planned measures. Some have not addressed guidelines for new buildings in at risk areas. Practical cross-boundary cooperation is still not in place in many municipalities and coordination is often lacking.⁴⁶⁹ Lack of financing and complex rules may hold back investments in some areas, as most investment in adaptation measures is still decided locally.⁴⁷⁰ Implementation of adaptation measures is also still hindered by a lack of coordination and certainty at municipal level,⁴⁷¹ and varying levels of political engagement with the issue.⁴⁷² Nonetheless, a large number of projects have been implemented across the country, and the situation has improved significantly since the introduction of the NAP.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / No

Central to climate adaptation efforts is a strong interaction between state and municipalities. A new national Mobile Team with a focus on flooding and erosion has been established by the MEF to help share knowledge, best practices and enhance cooperation, primarily with municipalities.⁴⁷³

A formal municipal climate adaptation network exists to help share knowledge and solutions between municipalities.⁴⁷⁴

‘Water in Urban Areas’ is an “innovation network” of knowledge institutions, government agencies, utilities and private companies. Its aim is to develop, document and present climate adaptation technologies and associated planning tools for transformation of existing urban

⁴⁶⁹ Danish Ministry of Environment and Food, 2017, Evaluering af kommunal klimatilpasning. URL : <http://www.klimatilpasning.dk/media/1174683/evalueringssrapport.pdf>

⁴⁷⁰ Krausing, Jarl., Madsen, Simone., Jørgensen, Sune., 2017, Robusthed i kommunale klimatilpasningsplaner, Concito, URL: <https://concito.dk/udgivelser/robusthed-kommunale-klimatilpasningsplaner>

⁴⁷¹ Krawack, Susanne, 2014., Evaluering af regelsættet for klimatilpasning, Concito, URL: https://concito.dk/files/dokumenter/artikler/klimatilpasning_lovgivning_-_m_rettelser_28.08.14.pdf

⁴⁷² Jensen, A., Nielsen, H.Ø. & Nielsen, M.L., 2016, Climate adaption in local governance: Institutional barriers in Danish municipalities, Aarhus University, DCE – Danish Centre for Environment and Energy, 102 pp. Scientific Report from DCE – Danish Centre for Environment and Energy No. 104 URL: <http://dce2.au.dk/pub/SR104.pdf>

⁴⁷³ Danish Government Adaptation Portal, Rejseholdet, URL: <http://www.klimatilpasning.dk/rejseholdet.aspx>
Date accessed: 10/05/2018

⁴⁷⁴ Kommunernes Klimatilpasningsnetværk. URL: <http://www.kl.dk/Kommunale-opgaver/Teknik-og-miljo/Vand/Kommunernes-Klimatilpasningsnetvaerk/> Accessed 08/05/2018

areas in Denmark.⁴⁷⁵ At the same time, Water in Urban Areas supports network members in developing their export potential to climate adaptation for the rest of Europe and the world. The network is funded by the Danish Agency for Science, Technology, and Innovation.

See Section A2 and B2, for details of regional cooperation. Nonetheless, several studies (see Indicator 9a) have pointed to the need for enhanced cooperation at local and regional level, as practical cooperation between municipalities is still not as widespread as it should be, given the stated aims of the NAP. One study for example found that 42% of municipalities were still not cooperating, or considering cooperation with other municipalities regarding their adaptation plans and challenges.⁴⁷⁶

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / **No**

Procedures and guidelines to assess the potential impact of climate change on major projects or programmes are mentioned in the NAS. Guidelines are continuously being developed by the Mobile Team to help municipalities to start the implementation of initiatives identified in the climate adaptation plans.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / No

A number of networks exist to involve stakeholders (municipalities, regions, universities, companies, NGOs & other civil society organisations) in the implementation of adaptation policies and measures. These include: Water in Urban Areas (see Indicator 9b); the regional cooperation projects (see Sections A2 and B2); CLEAN, a cluster for green technology enterprises to share knowledge, work together and find “green” solutions including to adaptation challenges⁴⁷⁷; the Danish Water Forum⁴⁷⁸; Danish Industry’s Adaptation

⁴⁷⁵ Water in Urban Areas: Innovation network for Climate Adaptation, URL: <http://vandibyer.dk/english/> Date accessed: 10/05/2018

⁴⁷⁶ Krausing, Jarl., Madsen, Simone., Jørgensen, Sune., 2017, Robusthed i kommunale klimatilpasningsplaner, Concito, URL: <https://concito.dk/udgivelser/robusthed-kommunale-klimatilpasningsplaner>

⁴⁷⁷ CLEAN, URL: <https://www.cleancluster.dk/hvem-er-clean/> Date accessed; 10/05/2018

⁴⁷⁸ Danish Water Forum, <http://www.danishwaterforum.dk/> Date accessed; 10/05/2018

Network⁴⁷⁹; Innovation Network for Environmental Technologies (Inno-MT)⁴⁸⁰; and the now concluded partnership, ‘Water from the Country’⁴⁸¹.

One clear example of stakeholder engagement in the implementation of adaptation-related policy is in the creation of river basin management plans (RBMP). In 2014, the Government created 23 water councils, involving a number of stakeholders (agricultural, industrial organisations, NGOs, water companies, hunters and anglers’ associations) to advise local authorities on these plans.⁴⁸²

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / **No**

No monitoring is ongoing with regard to the 62 of the 64 initiatives in the NAP that have been implemented (two were cancelled). The results of initial monitoring were disseminated to the participating ministries. Nevertheless, no overview of implementation has been published.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / **No**

No systematic monitoring of results of sectoral policies is conducted or disseminated.

10c. Regional-, subnational or local action is monitored and the results of the monitoring are disseminated

Yes / No

Subnational adaptation actions are monitored centrally rather than by the subnational administrations themselves.

In the period February to August 2016, a cross-ministerial working group carried out an evaluation of the municipal climate adaptation efforts. The evaluation (which was published

⁴⁷⁹ DI's Netværk om klimatilpasning, URL:

<http://di.dk/Shop/Netvaerk/Produktside/Pages/Produktside.aspx?productId=9319> Date accessed; 10/05/2018

⁴⁸⁰ Innovation Network for Environmental Technologies (Inno-MT), <https://inno-mt.dk/english/>

Date accessed; 10/05/2018

⁴⁸¹ Vandet fra Landet, URL : <http://www.klimatilpasning.dk/vandet-fra-landet.aspx> Date accessed; 10/05/2018

⁴⁸² Graversgaard, M., Jacobsen, B., Kjelsen, C., Dalgaard, T., 2017, Stakeholder Engagement and Knowledge Co-Creation in Water Planning: Can Public Participation Increase Cost-Effectiveness?, Water 9(3):191, URL: http://static-curis.ku.dk/portal/files/192036307/water_09_00191.pdf

in 2017)⁴⁸³ of all 98 municipalities' climate adaptation plans showed that all municipalities had adopted adaptation plans but that the level of detail and themes covered were uneven.

The Danish adaptation web portal compiles a wide range of adaptation information at central and municipal levels⁴⁸⁴. Many municipal websites contain information about the local climate adaptation measures.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

Currently there is no systematic evaluation and review framework in place but there are *ad hoc* reviews based on findings of evaluations. The Government is expected to continuously take stock of the progress of the initiatives in the action plan and is expected to assess whether or not a review is needed.

A review of the NAP took place in 2013 and 2015 in an inter-ministerial process.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / **No**

There is no systematic involvement of stakeholders in the monitoring, evaluation and review of NAP actions.

⁴⁸³ Danish Ministry of Environment and Food, 2017, Evaluering af kommunal klimatilpasning, URL: <http://www.klimatilpasning.dk/media/1174683/evalueringsrapport.pdf>

⁴⁸⁴ Danish Government Adaptation Portal, Kommunekort, URL: <http://www.klimatilpasning.dk/kort/kommunekort.aspx> Date accessed: 10/05/2018

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 Coordination structure		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	Yes / <u>In progress</u> / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	Yes / <u>In progress</u> / No
2 Stakeholders' involvement in policy development		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 Current and projected climate change		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	Yes / <u>In progress</u> / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	Yes / <u>In progress</u> / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No
4 Knowledge gaps		

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	<u>Yes</u> / In progress / No
5 Knowledge transfer		
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	<u>Yes</u> / In progress / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	<u>Yes</u> / In progress / No
Step C: Identifying adaptation options		
6 Identification of adaptation options		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	Yes / <u>In progress</u> / No
7 Funding resources identified and allocated		
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	<u>Yes</u> / In progress / No
Step D: Implementing adaptation action		
8 Mainstreaming adaptation in planning processes		
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account	Yes / <u>No</u>

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	climate change impacts and projections	
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	<u>Yes</u> / No
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	Yes / <u>In progress</u> / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	<u>Yes</u> / No
9 <i>Implementing adaptation</i>		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	<u>Yes</u> / No
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	Yes / <u>No</u>
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	<u>Yes</u> / No
Step E: Monitoring and evaluation of adaptation activities		
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10c	Regional-, subnational or local action is monitored and the results of the monitoring are disseminated	<u>Yes</u> / <u>No</u>

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
11 <i>Evaluation</i>		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	Yes / <u>No</u>

Adaptation preparedness scoreboard for Estonia

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List of abbreviations

AECM	Association of Estonian Cities and Rural Municipalities
CoM	Covenant of Mayors for Climate and Energy
EEA	European Economic Area
EIA	Environmental Impact Assessment
EUAS	EU Adaptation Strategy
IPCC	Intergovernmental Climate Change Panel
NAS	National adaptation strategy
NAP	National adaptation plan
NUTS	Nomenclature of Territorial Units
MoE	The Estonian Ministry of Environment
MS	Member State
SEA	Strategic Environmental Assessment
UNFCCC	United Nations Framework Convention on Climate Change

POLICY FRAMEWORK

A1. National adaptation strategy

The national adaptation strategy (NAS) – “Development Plan for Climate Change Adaptation until 2030”^{485 486} – was adopted by the Government on 2nd March 2017.

The NAS was developed under a project "Elaboration of Estonia's Draft National Climate Change Adaptation Strategy and Action Plan" agreed between the Ministry of Environment and the Estonian Environmental Research Centre, with support from the European Economic Area (EEA) Financial Mechanism. Contributions were received from the representatives of relevant ministries, local government, non-governmental organisations and research institutions.

The NAS presents a framework for action, which serves as a basis for reducing the vulnerability of Estonia to climate change⁴⁸⁷. The goal of the NAS is to increase readiness and the ability to adapt to climate impacts at national, regional and local levels. The overall target is that by 2030 at least 35% of people should acknowledge the risks of climate change and take appropriate measures. The NAS calls for eight sub-goals for the following priority areas, which align with the country's economic and administrative structure:

1. Human health and rescue preparedness
2. Land use and spatial planning, including coastal areas, other flood-risk areas, landslide risk areas, land reclamation, and planning of cities
3. Natural environment, including biodiversity, terrestrial ecosystems, freshwater ecosystems and environment, marine ecosystems and environment, and ecosystem services
4. Bio-economy, including agriculture, forestry, fishing, hunting, tourism, and peat production
5. The economy, including insurance, banking, employment, businesses and industry
6. Societal awareness and cooperation, including education and science, and international relations and cooperation
7. Infrastructure and buildings, including transport and transport infrastructure, technical support systems, and buildings
8. Energy and energy supply systems, including energy independence, energy security, energy resources, energy efficiency, heat production and electricity generation.

A2. Adaptation strategies adopted at subnational levels

⁴⁸⁵ Climate Change Adaptation, URL: <http://www.envir.ee/en/news-goals-activities/climate/climate-change-adaptation>, Date accessed: 04/05/2018

⁴⁸⁶ Kliimamuutustega kohanemise arengukava, URL: <http://www.envir.ee/et/eesmargid-tegevused/kliima/kliimamuutustega-kohanemise-arengukava>, Date accessed: 04/05/2018

⁴⁸⁷ Summary of Climate Change Adaptation Development Plan, URL: http://www.envir.ee/sites/default/files/climate_change_adaptation_development_plan_until_2030_summary_0.pdf Date accessed: 04/05/2018

There is no information or evidence about adaptation strategies existing at relevant subnational levels. Climate adaptation is, however, considered in the county and local municipal level risk assessments and crisis management plans. In addition, the capital city, Tallinn, and the municipalities of the cities of Rakvere, Jõgeva, Tartu, Viimsi and Rõuge have established processes for developing strategies and action plans for climate adaptation, and are signatories to the Covenant of Mayors (CoM). Action plan development has only started in Tallinn (approximately 34% of the population) and the plan is expected to be adopted by the end of 2018, with implementation not expected to be completed before 2019. In other cities, the development of adaptation plans has not yet been actively started.⁴⁸⁸

So far, the majority of climate adaptation activities at the subnational level have occurred through EU funded projects, such as ASTRA⁴⁸⁹, BaltCICA⁴⁹⁰, BalticClimate⁴⁹¹ and BaltAdapt⁴⁹² (see Indicator 9a below). Implementation is carried out through devolved government offices in the 15 counties, which are a subdivision of the Nomenclature of Territorial Units (NUTS) level III, and at the municipal level.

Traditionally, the regional level has not been very relevant in Estonia. Regions currently have no defined role in climate adaptation but local authorities (municipalities) may play an important role, particularly in implementation.

B. Adaptation action plans

B1. National adaptation plan

The detailed national adaptation plan (NAP) to implement the NAS was developed in parallel by the EEA project mentioned above. The NAP was adopted by the Government in March 2017⁴⁹³. The NAP includes specific costed activities and measures in the eight sectors identified in the NAS. Costs are identified for four years, distributed by year and by responsible authority.

B2. Adaptation plans adopted at subnational level

Some activities related to climate adaptation have taken place at the local level in several municipalities, but not as part of a systematic process. The capital city, Tallinn, and the municipalities of the cities of Rakvere, Jõgeva, Tartu, Viimsi and Rõuge have started the process of elaborating adaptation strategies and action plans. Some cities, such as Pärnu,

⁴⁸⁸ Information provided by Member State representatives

⁴⁸⁹ ASTRA: aims of the project, URL: http://www.astra-project.org/01_aims_astra.html, Accessed 04/05/2018

⁴⁹⁰ BaltCICA: Estonia, URL: <http://www.baltcica.org/casestudies/estonia.html>, Accessed 04/05/2018

⁴⁹¹ BalticClimate: Estonia, URL: <http://www.balticclimate.org/en/project/target-ares/estonia>, Accessed 04/05/2018

⁴⁹² BaltAdapt, URL: <http://www.baltadapt.eu/>, Accessed 04/05/2018

⁴⁹³ Kliimamuutustega kohanemise arengukava rakendusplaan 2017-2020, URL: http://www.envir.ee/sites/default/files/kliimamuutustega_kohanemise_arengukava_aastani_2030_rakendusplaan_aastateks_2017-2020.xlsx, Access date: 14/05/2018

Tartu, Tallinn that have been influenced by extreme weather conditions (e.g. a particularly strong storm in 2005), have been implementing adaptation measures. These include establishment of a flood warning system⁴⁹⁴ for Pärnu City within the ASTRA project, which sought to develop a Baltic Adaptation Strategy. The aim of the flood warning system is to notify citizens about potential hazards and what actions to take in case of significant sea-level rise. Since 2008, a 24-hour weather monitoring system has been used in Tallinn to inform citizens of extreme weather conditions, especially those that could cause floods.

At the moment no subnational or regional adaptation strategy has been adopted, but Tallinn has started the process of elaborating an adaptation strategy and action plan. In county-regions, risk assessments and crisis management plans have to be in place and be up-dated regularly. Cities also participate in regional crisis committees. They have performed risk analyses, which include extreme weather events, such as storms, floods and heavy rain. Local action plans have been developed to minimise the risks (flood boundaries, flood construction level, etc.).

B3. Sectoral adaptation plans

Some adaptation measures have been included in sectoral development plans, action plans and laws (e.g. “The Estonian Forestry Development Plan until 2020”, “The Nature Conservation Development Plan until 2020”, the Water Act, the Emergency Act and risk analyses for emergencies, “The Action Plan for Mitigation and Adaptation to the Impact of Climate Changes in the Agricultural Sector”, “The Public Health Development Plan for 2009–2020”, “The Estonian Rural Development Plan for 2014–2020”, “The National Security Concept of Estonia until 2020”).

The Estonian low-carbon strategy named ”General principles of Climate Policy until 2050“⁴⁹⁵, which was approved by the Parliament on 5th April 2017, set sectoral guidelines for adapting to the effects of climate change. The strategy considers: energy, infrastructure and buildings, health, economy, bio-economy, society, awareness and cooperation, land use and planning, and natural environment sectors

The entry into force of the NAS was originally planned to take place at the end of 2016, with implementation of the adaptation measures listed in the NAP beginning in 2017. However, due to a slight delay in adoption of the NAS, implementation is expected to begin in 2018 instead.⁴⁹⁶

SCOREBOARD

⁴⁹⁴ Electronic landscape maps of the flood exposure areas in Tallinn, Kuressaare, Haapsalu, Pärnu and Tartu are available on the website of the Land Board at <http://geoportaal.maaamet.ee>, Accessed 04/05/2018

⁴⁹⁵ Kliimapolitiika põhialused aastani 2050, URL: <https://www.riigiteataja.ee/akt/307042017001>, Date accessed: 04/05/2018

⁴⁹⁶ Personal communication with MS representative

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

The Estonian Ministry of Environment (MoE) is the institution responsible for all climate mitigation and adaptation-related activities in Estonia, including developing national policies, implementing measures, transposing EU legislation and integrating climate policy objectives and concerns into sectors that are not the MoE's responsibility.

Within the MoE, the Climate and Radiation Department is responsible for coordinating reporting activities under the United Nations Framework Convention on Climate Change (UNFCCC), its Kyoto Protocol and EU legislation, as well as for the development and implementation of climate mitigation and adaptation policies.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

A Steering Committee was formed for the development and general management of the NAS⁴⁹⁷. The Steering Committee was led by the Estonian Environmental Research Centre, and included representatives of concerned government authorities, associations and organizations, including: Ministry of Environment, Ministry of Rural Affairs, Ministry of Social Affairs, Ministry of Finance, Ministry of the Interior, Ministry of Economic Affairs and Communications, Ministry of Education and Science, Government Office, Rescue Authority, Estonian Association of Municipalities, Association of Estonian Cities, Estonian Science Agency, Estonian Academy of Sciences, and Estonian Fund for Nature.

All ministries are responsible for coordinating the implementation of activities that fall under their responsibility in the NAP. The MoE is responsible for annual reporting to the Government on the implementation of the NAP and for the coordination of adaptation-related ministerial communication.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / In progress / No

⁴⁹⁷ Climate change adaptation: Draft process, URL: <http://www.klab.ee/kohanemine/en/strategy/draft-process/>, Date accessed: 04/05/2018

The Estonian Association of Municipalities and the Association of Estonian Cities were part of the Steering Committee that led development of the NAS. Local governments have co-responsibility for implementation of relevant actions in the NAP, coordinated by the relevant ministries responsible.

The Association of Estonian Cities and Rural Municipalities (AECM) is the voluntary union established for representing the common interests and arranging co-operation of cities and rural municipalities. This association disseminates information about the CoM to the local municipalities.

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

In the process of developing the adaptation policy in Estonia, stakeholders from national governmental bodies as well as the scientific research communities were consulted. Some information was collected from regional-level governmental stakeholders.

The development of the NAS was promoted and followed up by a Steering Committee (see Indicator 1b). Several science and research institutions were included in the Steering Committee, including the Estonian Science Agency and the Estonian Academy of Sciences.

There was a 3-week period for public review of the NAS draft (in parallel with the public review of the strategic environmental assessment, SEA, report) with a public hearing at the end of the period. The draft NAS was published for public consultation through an online portal, and several public information seminars were held.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

The need for transboundary cooperation is acknowledged in the NAS, especially regarding the fishing sector in the Baltic Sea and Lake Peipus context⁴⁹⁸. However, no specific measures have been implemented yet. Nevertheless, Estonia participates in various transboundary initiatives and programmes.

Under the EEA Financial Mechanism project "Elaboration of Estonia's Draft National Climate Change Adaptation Strategy and Action Plan", bilateral cooperation contracts were signed

⁴⁹⁸ Republic of Estonia, Ministry of Environment, Climate Change Adaptation Development Plan until 2030, URL: http://www.envir.ee/sites/default/files/national_adaptation_strategy.pdf.

between the Estonian Environmental Research Centre and the Norwegian Directorate for Civil Protection and Emergency Planning (donor country). The aim of the bilateral contract was to transfer Norwegian know-how on climate adaptation to Estonia and to provide consultation. The aforementioned research groups that developed adaptation research studies also had partners from EEA Financial Mechanism donor countries: Agricultural University of Iceland, Norwegian Fridtjof Nansen Institute, Norwegian Institute for Urban and Regional Research, NIBR.

The Ministry of Environment participates in the Baltic Sea Region working group on climate adaptation⁴⁹⁹. Furthermore, Estonia takes active part in the implementation of the EU Strategy for the Baltic Sea Region (EUSBSR, 2009)⁵⁰⁰ and is a member of the Baltic Sea Region Climate Dialogue Platform⁵⁰¹.

Several projects on climate adaptation in the Baltic Sea region have been implemented. Estonia has taken part in several transboundary projects, including Astra⁵⁰², Baltadapt⁵⁰³, BaltCICA⁵⁰⁴, BalticClimate⁵⁰⁵, Baltclim⁵⁰⁶, RADOST⁵⁰⁷, iWater⁵⁰⁸.

Under the Joint Operational Programme of Estonia-Russia Cross-Border Cooperation 2014-2020⁵⁰⁹, a provision on transboundary cooperation concerning climate adaptation in the Baltic Sea and Lake Peipus is contained. The aims of the provision include preserving biodiversity on joint natural assets and fostering shared actions in risk management and a readiness to cope with environmental disasters.

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

⁴⁹⁹ Baltic Sea Commission: members, URL: <http://cpmr-baltic.org/who-we-are/member-directory-map/>, Access date 15/05/2018

⁵⁰⁰ EU Strategy for the Baltic Sea Region, URL: <http://www.balticsea-region-strategy.eu/>, Access date 15/05/2018

⁵⁰¹ EUSBSR Horizontal Action Climate, URL: <http://www.cbss.org/strategies/horizontal-action-climate>, Access date 15/05/2018

⁵⁰² ASTRA project case studies: Cities of Tallinn and Pärnu, URL: http://www.astra-project.org/02_estonia_tallin_paernu.html, Access date 15/05/2018

⁵⁰³ Baltadapt, URL: <http://www.baltadapt.eu/>, Access date 15/05/2018

⁵⁰⁴ BaltCICA, URL: <http://www.baltcica.org/>, Access date 15/05/2018

⁵⁰⁵ BalticClimate, URL: <http://www.balticclimate.org/>, Access date 15/05/2018

⁵⁰⁶ URL: <http://www.bef-de.org/index.php?id=52>, Access date 15/05/2018

⁵⁰⁷ RADOST, URL: <http://www.klimzug-radost.de/en>, Access date 15/05/2018

⁵⁰⁸ iWater, URL: <https://www.integratedstormwater.eu/content/integrated-storm-water-management>, Access date 15/05/2018

⁵⁰⁹ Joint Operational Programme of Estonia-Russia Cross-Border Cooperation 2014-2020, URL: http://www.estoniarussia.eu/wp-content/uploads/2016/03/Estonia_Russia_CBC_JOP_FINAL_16012017.pdf, Access date 15/05/2018

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / **In progress** / No

Climate observations of the Estonian Environment Agency weather service comprise systematic meteorological, atmospheric, oceanographic and terrestrial monitoring. Ensuring operative and continuous provision of meteorological and hydrological forecasts, warnings and monitoring of data for the public and for authorities is the strategic objective of the Estonian Environment Agency weather service.

Other institutions involved in climate observations include Tartu Observatory⁵¹⁰, the Estonian Marine Institute of the University of Tartu⁵¹¹ and the Marine Systems Institute of Tallinn University of Technology⁵¹².

The Estonian Environmental Agency Weather Service publishes data and climatological information on weather observations and scenarios, weather events and climate science. The Estonian Weather Service publishes the climate averages, weather warnings, weather events, anomalies and weather records data⁵¹³. The Weather Service also alerts the public to the possible occurrence of severe weather, such as heavy rain with risk of flooding, severe thunderstorms, gale-force winds, heat waves, forest fires, fog, snow or extreme cold with blizzards, avalanches or severe coastal tides (this information is also published on the European extreme weather alert portal⁵¹⁴ and is based on country awareness reports).

The on-line Sea Level Information System run by the Marine Systems Institute at Tallinn University of Technology provides information about the sea level status, trends, projections and water temperatures in different coastal regions of Estonia.

The Estonian Rescue Board website⁵¹⁵ publishes practical emergency instructions, also for extreme weather conditions (like storms, thunderstorms, extremely cold weather conditions, and floods).

There is no evidence of monitoring of climate impacts on Estonian society.

⁵¹⁰ Tartu Observatory, URL: <https://www.to.ee/>, Access date 15/05/2018

⁵¹¹ Estonian Marine Institute of the University of Tartu, URL: <http://www.sea.ee/en>, Access date 15/05/2018

⁵¹² Marine Systems Institute of Tallinn University of Technology, URL: <https://www.ttu.ee/en/?id=147569>, Access date 15/05/2018

⁵¹³ Estonian Weather Service, URL:

<https://www.ilmateenistus.ee/kliima/kliimanormid/ohutemperatuur/?lang=en>, Access date 15/05/2018

⁵¹⁴ European extreme weather alert portal www.meteoalarm.eu, Access date 15/05/2018

⁵¹⁵ The Estonian Rescue Board, URL: <https://www.rescue.ee/et/kodanikule/elanikkonnakaitse/>, Access date 15/05/2018

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

Alongside development of the NAS and NAP, the Estonian Environment Agency developed a report of short-term and long-term climate scenarios for Estonia and described past trends⁵¹⁶. The Estonian-specific future climate scenarios provide an overview of the projections and assessments up to 2100. They use calculations of 28 global climatic models according to the Intergovernmental Climate Change Panel (IPCC) Fifth Assessment Report, the Second Assessment of Climate Change for the Baltic Sea Basin, results of the Baltadapt project, and IPCC special report SREX (Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation), which are downscaled to the Baltic region. This report presents an overview of observed climate changes during the 19th and 20th centuries in Estonia, as well as assessments and projections of future climate until the year 2100. The report gathers existing scientific knowledge concerning the surface and atmospheric climate changes in Estonia and the Baltic Sea region. The report focuses on two greenhouse gas emission scenarios, which are recommended as a basis for development of the Estonian NAS and NAP:

- RCP4.5 – recommended as a main scenario; moderate, significant mitigation measures are expected from the countries
- RCP8.5 – recommended as an additional scenario; pessimistic, weak international cooperation and mainly carbon-based economy.

The future climate scenarios are used as a basis for developing the NAS and NAP for Estonia.

While the available climate projections and socio-economic scenarios were used in the development of the NAS, it cannot be verified if they were consistently used for assessing the economic, social and environmental impacts of climate change.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

The NAS was prepared based on comprehensive studies and analyses, which were carried out by experts and scientists from different institutions. These studies and analyses determined the potential climate impacts on priority areas and the adaptation measures that need to be taken in the short term until 2030, as well as in relation to a long-term vision until 2100.

⁵¹⁶ Eesti tuleviku kliimastenaariumid aastani 2100, URL: http://www.envir.ee/sites/default/files/kliimastenaariumid_kaur_aruanne_ver190815.pdf, Access date 15/05/2018

To date, there have been few risk analyses concerning climate vulnerability at national level in Estonia, however, the NAS/NAP is an independent policy document (development plan) with a comprehensive analysis of sectoral climate impacts, including a risk and vulnerability assessment.

The NAS was drawn up based on four in-depth scientific studies^{517,518,519,520}, which identified the sectoral climate impacts and vulnerabilities and determined the measures for climate adaptation in a short-term perspective (up to 2030) and long-term perspective (up to 2050 and 2100). The analysed sectors in these scientific studies, and also in the NAS, were as follows:

1. Health and rescue capability
2. Land use and planning, including coastal areas, other areas with a risk of flooding, areas with a risk of landslides, land improvement, and towns
3. Natural environment, including biodiversity, land ecosystems, freshwater ecosystems and environment, marine ecosystems and environment, and ecosystem services
4. Bioeconomy, including agriculture, forestry, fishing industry, hunting, tourism, and peat production
5. Economy, including insurance, banking, employment, entrepreneurship and industry
6. Society, awareness and cooperation, including awareness, education and science, international relations and cooperation
7. Infrastructure and buildings, including transport and infrastructure of transport, technical support systems, and buildings
8. Energy and security of supply, including energy independence, security, resources, efficiency, and heat and electricity production.

⁵¹⁷ Climate change adaptation strategy and measures for thematic fields of natural environment and bioeconomy (BIOCLIM), URL: <http://pk.emu.ee/struktuur/maastikukorralduse-ja-loodushoiu-osakond/projektid/bioclim/projekt/>, Accessed 09/05/2018

⁵¹⁸ Estonian Climate Adaptation Strategy for Infrastructure and Energy (ENFRA), URL: <http://kliima.seit.ee/>, Accessed 09/05/2018

⁵¹⁹ Assessment of climate change impacts elaboration of adaptations measures: planning, land use, health and rescue management (KATI), link: <http://www.geograafia.ut.ee/et/teadus/kati-kliimakohanemine> Climate change impact assessment and elaboration of suitable adaptation measures in the fields of the economy and society (RAKE), URL: https://www.envir.ee/sites/default/files/rake_lopparuanne.pdf, Accessed 09/05/2018

⁵²⁰ Climate change impact assessment and elaboration of suitable adaptation measures in the fields of the economy and society URL: https://www.envir.ee/sites/default/files/rake_lopparuanne.pdf, Accessed 09/05/2018

A thorough overview of the expected effects of climate change in Estonia is also given in the document “Estonia’s Sixth National Communication Under the United Nations Framework Convention on Climate Change”.⁵²¹

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

Climate risk/vulnerability assessments take transboundary risk into account in some sectors, such as fishing, especially in the Baltic Sea and Lake Peipus context. However, it is not clear whether transboundary risks are taken into account by the risk and vulnerability assessments for other relevant sectors.

The NAS identifies international relations and development cooperation as essential areas to promote adaptation to the effects of climate change, but it is not clear whether transboundary risks are enshrined in the NAS.

Estonia has engaged in a number of transboundary initiatives relating to climate impacts, as described in Indicator 2b. Climate risks/vulnerability assessments take transboundary risks into account, within the framework of the Baltic Sea Region Climate Change Adaptation Strategy, which focuses on such sectors as food supply (including fishery and agriculture), coastal infrastructure and coastal tourism.⁵²²

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / **In progress** / No

The NAS and four in-depth scientific studies aimed to contribute to a more climate-resilient Estonia. This was the first time that Estonia developed a coherent approach to adaptation and assembled all the available knowledge about different climate impacts in the region. Previously, information on climate impacts in different sectors was fragmented and scattered between different authorities and institutes, but since NAS adoption, Estonia can plan and implement its climate adaptation policy comprehensively through one development plan.

⁵²¹ Estonia’s Sixth National Communication Under the United Nations Framework Convention on Climate Change, URL: https://unfccc.int/files/national_reports/non-annex_i_natcom/application/pdf/est_nc6.pdf, Accessed 09/05/2018

⁵²² Climate Adapt, Assessments - Impacts & Vulnerability assessments: Estonia, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/estonia>, Access date: 14/05/2018

The MoE has conducted the four in-depth sectorial adaptation studies. This sector-specific research also contains an approach for addressing the knowledge gaps and dealing with uncertainties.

The adaptation measures in the NAS and NAP aim to increase the awareness and resilience, as well as to implement the precautionary principle. An important principle of the NAS/NAP is to increase the awareness of the general public and to reduce the knowledge gaps and the uncertainty related to climate change.

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / In progress / No

The national climate adaptation web portal is part of the MoE's website. This website (in Estonian) is regularly updated with new information regarding the NAS, with relevant adaptation procedures and NAS/NAP materials and guidelines. There is also adaptation information on the Estonian Environmental Research Centre homepage⁵²³. Additionally, all of the NAS baseline studies have their own websites, which contain more detailed information on sectoral climate adaptation^{524 525 526 527}.

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / In progress / No

The capacity-building activities were implemented in the development of the NAS and NAP, as one of the priority sections is "society, awareness and co-operation".

The EEA Financial Mechanism project "Elaboration of Estonia's Draft National Climate Change Adaptation Strategy and Action Plan" organised several public awareness and

⁵²³ Climate Change Adaptation, URL: <http://www.klab.ee/kohanemine/en/>, Access date: 14/05/2018

⁵²⁴ Climate change adaptation strategy and measures for thematic fields of natural environment and bioeconomy (BIOCLIM), URL: <http://pk.emu.ee/struktuur/maastikukorralduse-ja-loodushoiu-osakond/projektid/bioclim/projekt/>, Accessed 09/05/2018

⁵²⁵ Estonian Climate Adaptation Strategy for Infrastructure and Energy (ENFRA), URL: <http://kliima.seit.ee/>, Accessed 09/05/2018

⁵²⁶ Assessment of climate change impacts elaboration of adaptations measures: planning, land use, health and rescue management (KATI), link: <http://www.geograafia.ut.ee/et/teadus/kati-kliimakohanemineClimate> change impact assessment and elaboration of suitable adaptation measures in the fields of the economy and society (RAKE), URL: https://www.envir.ee/sites/default/files/rake_lopparuanne.pdf, Accessed 09/05/2018

⁵²⁷ Climate change impact assessment and elaboration of suitable adaptation measures in the fields of the economy and society URL: https://www.envir.ee/sites/default/files/rake_lopparuanne.pdf, Accessed 09/05/2018

knowledge transfer events, the most recent of which was in 2016⁵²⁸. The seminars aimed to raise awareness with regard to climate impacts in Estonia, and the importance of adaptation measures and ways to adapt. Some of the sectors addressed were health, rescue preparedness, spatial planning and land use, economy, natural environment, Buildings, infrastructure and energy supply systems.

The NAS Sub-objective 6 is to increase the awareness of the risks and opportunities presented by climate change. It elaborates on measures to achieve this sub-objective, such as disseminating updated adaptation knowledge to schools, education institutes and public bodies.

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

The NAS/NAP is an independent policy document (development plan) including: identification and description of adaptation options, assessments of adaptation options and forecasting costs, and development of actions for the adaptation options.

The NAS identifies the domains that are most climate vulnerable and specifies the actions that improve Estonia's readiness and capability to cope with climate change. In each scientific baseline study, the scientists and experts mapped the current situation, i.e. described problems, opportunities, and threats in thematic areas/sectors, set the objectives and listed the most crucial measures for adaptation, as well as impacts of past weather events. Existing adaptation measures were also analysed. Risks, vulnerabilities and climate impacts on the topical areas and their sub-themes were assessed. Recommendations for future research were also given. The baseline studies created a set of scientifically-based suggestions for developing the national climate adaptation policies. The baseline studies also created a network of scientists and stakeholders who have the potential for knowledge co-generation in this field.

Before the elaboration of the NAS and its baseline studies, knowledge on climate change in Estonia concerned mainly water-related issues. The NAS and Estonian future climate scenarios 2100 provide more knowledge about sea-level rise, coastal erosion, floods and increased precipitation.

⁵²⁸ Climate-adapting Estonia 2030: Why and how?, URL: <http://www.klab.ee/kohanemine/en/climate-adapting-estonia-2030-why-and-how/>, Access date: 14/05/2018

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

The adaptation options and measures in NAS are based on the analysis of existing scientific literature, (national) policies and legislation and information from different databases, as well as expert knowledge also gathered in the expert groups for the baseline studies. The selection of priority adaptation options is based on multi-criteria analyses, stakeholder consultations, and the opinion of the inter-ministerial committee.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / In progress / No

Measure 1.2. of the NAP provides for an increase in rescue capacity. This measure will underline coordination between disaster risk management and climate adaptation, and its implementation will begin in 2019. The implementation of this measure would include improvement of risk management, risk communication, institutional capacity and the acquisition of equipment to address climate change-related emergencies.⁵²⁹ Crisis management in Estonia is regulated by the Emergency Act, which entered into force in 2009. It provides the legal basis for crisis management, including ensuring the continuous operation of vital services, preparing for and resolving emergencies. Each ministry is responsible for implementation of the activities related to crisis management in their field of governance, coordinated by the Ministry of the Interior. Under the Emergency Act, emergency risk assessment and response plans must be prepared.

Estonia is planning work for further coordination between climate adaptation and disaster risk reduction. In the NAS, Objective 5.1 deals with "health and rescue capability," and has as a sub-goal to improve rescue capacity and the ability of people to protect their health and property, as well as reduce the negative effects of climate change on health and the quality of life. An identified measure is to improve risk management, for example, in relation to climate change. This entails, amongst others, early warning to the public, increasing hazard awareness, and cooperation between the civil and military institutions, as well as between public authorities and the private sector.

The Ministry of the Environment has initiated the formation of a working group and the main body responsible for conducting meetings is the Ministry of the Environment and the following members are appointed from the Commission: Ministry of Social Affairs, Ministry of Finance, Ministry of the Interior, Ministry of Economic Affairs and Communications,

⁵²⁹ Information provided by MS representatives

Ministry of Rural Affairs, Ministry of Education and Research, State Chancellery, Rescue Board, Association of Estonian Rural Municipalities, Estonian Research Agency, Association of Estonian Non-profit Organizations and Foundations and Estonian Village Movement Kodukant. The task of the working group is to coordinate the implementation and changes of the NAP. The working group will monitor the implementation of the development plan and make recommendations, if necessary. In addition, it will resolve open issues related to the development plan and discuss the implementation plan of the development plan before it is submitted for approval to the Government⁵³⁰.

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / In progress /No

The cost estimation for the implementation of the NAS for the period 2017–2030 is EUR 43,745,000. The implementation of measures and activities takes into consideration the objectives and development plans from other fields, including the Estonian Rural Development Plan for 2014–2020, Operational Programme for the European Maritime and Fisheries Fund for 2014–2020, and Operational Programme for Cohesion Policy Funds 2014–2020. Many activities related to adaptation together with their budget are also reflected in the implementation plans of the development plans of many other fields, such as the Nature Conservation Development Plan Until 2020, Estonian Forestry Development Plan Until 2020, Internal Security Strategy 2015–2020, National Transport Development Plan 2014–2020, and Development Plan for the Energy Sector Until 2030. Awareness raising is one of the objectives of the NAS and, as such, cross-cutting adaptation actions also have funding allocations.

The NAP determines the implementation of the objectives set in the NAS through specific activities. The NAP also includes financial forecast on the cost of these measures, as well as information on who are the responsible authorities for the incurred costs. The total cost of the NAP activities is expected to be EUR 6,700,000, of which the state contribution is planned to be EUR 3,310,000 and the support from the environmental programme of the Environmental Investment Centre and foreign sources is planned as EUR 3,390,000. Financing of the activities from the state budget is ensured within the cost limits of the implementing agencies.

The Estonian NAS and NAP has been developed in the framework of the EEA Financial Mechanism 2009-2014 program's "Integrated Marine and Inland Water Management" project

⁵³⁰ Information provided by MS representative

“Elaboration of Estonia’s Draft National Climate Change Adaptation Strategy and Action Plan” with a total budget of EUR 1.3 million (10% nationally co-financed)⁵³¹.

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

Consideration of climate adaptation in Environmental Impact Assessment (EIA) and SEA is addressed by the Environmental Impact Assessment and Environmental Management System Act⁵³².

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / **No**

The Estonian Rescue Board has prepared risk analyses for emergency events that may occur as a result of extreme climate events and circumstances: “Floods on Densely Populated Areas”, “Extremely Cold Weather”, “Extremely Hot Weather” and “Extensive Forest or Landscape Fires”. An “Epidemic Emergency Risk Assessment” has been prepared under the guidance of the Health Board. It is, however, unclear how future climate projections are factored into disaster risk management plans.

The “Internal Security Strategy 2015–2020“ notes the increased risk of extreme weather conditions caused by climate change. The Water Act⁵³³ establishes the obligation to prepare maps of flood risk areas, give an assessment of flood risks and prepare risk management plans for flood risks. Early warning systems are operating, and risk-prone communities receive timely, understandable warnings of impending hazard events. Some websites provide information to stakeholders:

- The Estonian Rescue Board website is used by government agencies and authorities to publish notices about their response to emergencies and provide guidance on how to cope with various emergencies, including extreme weather conditions

⁵³¹ Euroopa Majanduspiirkonna toetused 2009-2014, URL: <http://www.envir.ee/et/euroopa-majanduspiirkonna-toetused-2009-2014>, Accessed 15/05/2018

⁵³² Environmental Impact Assessment and Environmental Management System Act, URL: <https://www.riigiteataja.ee/en/eli/ee/Riigikogu/act/507072017002/consolide>, Access date: 15/05/2018

⁵³³ Water Act 1994, URL: <https://www.riigiteataja.ee/en/eli/512012017001/consolide>, Access date: 15/05/2014

- The real-time sea-level information system⁵³⁴ provides information for various parts of Estonia.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / **No**

The NAS includes "spatial planning and land use" as a priority area with sub-sectors including:

- Coastal areas
- Other areas with risk of flooding or soil instability
- Landscape planning, irrigation and drainage
- Planning of cities

The NAS does not include specific mainstreaming measures with regard to spatial planning and land use, rather it identifies the need for further research and development of guidance materials, including climate-proofing design criteria to be used by policy makers, land owners, and planners and developers. Nevertheless, climate adaptation is mainstreamed through Article 11 of the Planning Act⁵³⁵. It states that planners should consider relevant information that has an influence on spatial development, including emergency risk analyses (e.g. in relation to flood risks in densely populated areas). No measures relating to maritime planning have been included in the NAS.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / **In progress** / No

The NAS outlines eight sectors where measures should be implemented, and adaptation should be considered in policy development. However, no specific policy instruments have taken adaptation into account as a result of the NAS at this stage.

The list of strategic documents below includes indirect adaptation measures, mostly related to disaster risk reduction (based on the Emergency Act and the Water Act). The Estonian Environmental Strategy Until 2030 also focuses on the health of people and the development of knowledge. The Nature Conservation Development Plan Until 2020 and the MoE's development plan for 2017–2020 address awareness, as well as the development of environmental education and climate research.

⁵³⁴ Meretaseme Infosüsteem, URL: <http://on-line.msi.ttu.ee/kaart.php?en>, Access date: 15/05/2018

⁵³⁵ Planning Act 2018, URL: <https://www.riigiteataja.ee/en/eli/ee/503112017001/consolide#>, Access date: 15/05/2018

As regards Estonian legislation, climate adaptation is addressed primarily in the Emergency Act, which is the basis for the Rescue Board having prepared risk analyses for emergency events, including extreme weather. The effects of climate change are also addressed by the Water Act, which establishes an obligation to assess flood risks and prepare risk management plans and maps of flood risk areas.

Climate adaptation is included, to varying degrees, in the following national development plans, vision documents and strategies:

- Estonian low-carbon strategy “General Principles of Climate Policy until 2050”
- Estonian Forestry Development Plan until 2020 and its action plan
- Strategy for Estonian Development Cooperation and Humanitarian Aid 2016–2020
- Estonian Lifelong Learning Strategy 2020
- Estonian National Strategy on Sustainable Development "Sustainable Estonia 21
- Estonian National Development Plan for the Energy Sector Until 2020 and Development Plan for the Energy Sector 2030+
- Estonian Environmental Strategy Until 2030
- Estonian Rural Development Plan for 2014–2020
- Action plan 2012–2020 for mitigation of and adaptation to climate change for agricultural sector 2012–2020
- Programme of Measures of the Estonian Marine Strategy
- National Renewable Energy Action Plan Until 2020
- Estonian Research and Development and Innovation Strategy “Knowledge Based Estonia 2014–2020
- Development plan for the Ministry of the Environment for 2017–2020
- Nature Conservation Development Plan Until 2020
- Internal Security Strategy 2015–2020
- Estonian Regional Development Strategy 2014–2020
- Action programme of the Government of the Republic 2015–2019
- Estonian National Health plan 2009-2020
- Aquaculture Sector Development Strategy for 2014–2020
- National plan 'Estonia 2030+'
- Water Act and River Basin Management plans 2015-2021
- Emergency Act and national risk analysis.

The agricultural sector has been relatively active in raising awareness of climate impacts. In accordance with the Ministry of Agriculture’s Directive 24 (2011), a working group was established to draw up an action plan for climate mitigation and adaptation in agriculture, including by mapping and analysing the possibilities of revising existing measures, and making proposals for their improvement.

Under the steer of the Ministry of Finance and the Government Office, a guidance document for drafting development plans entitled ‘Mandatory topics of all area-based development plans’ is being updated to include climate adaptation.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

In the NAS, one of the priority sectors is economy, which also includes insurance. Although the insurance sector has evolved into one of the most important economic sectors relevant to adaptation, the volume of the Estonian insurance market is small, and the population is rather poor, which is why the compulsory and semi-compulsory types of insurance are prevalent in the country (e.g. motor third party liability insurance, home insurance). So far, the Estonian insurers have not dealt with spreading the climate risk.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In Progress** / No

The implementation of Estonia's adaptation policies has begun. For instance, in the spring of 2018, the MoE submitted an application for financial implementation of the EEA 2014-2021 programme for financing some parts of the implementation plan for 2018. In addition, MoE are also reviewing and updating nationally other sectoral development plans and their implementation plans for adaptation.⁵³⁶

Some autonomous adaptation actions are being undertaken and measures have been developed in the areas of agriculture, forestry, floods and human health, but their efficiency and sustainability has not yet been analysed.⁵³⁷

Some activities related to climate adaptation have taken place in several municipalities or at county level, but not as part of a systematic process. Some major cities, such as Pärnu, Tartu, and Tallinn that have been influenced by extreme weather conditions (a particularly strong storm in 2005) have been most active in implementing adaptation measures. These measures include the flood warning system that was established in Pärnu City within the Astra project. The aim of the system is to notify the citizens about potential hazards and what actions to take in case of significant sea-level rise. Since 2008, there has been a 24-hour weather monitoring system used in Tallinn to inform citizens of extreme weather conditions, especially those that could cause floods.

⁵³⁶ Information provided by MS representative

⁵³⁷ Project proposal for the EEA Grants project "Elaboration of Estonia's Draft National Climate Change Adaptation strategy (NAS) and Action Plan"

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / **No**

The MoE has initiated the development of a working group to implement the NAS and the NAP, which is expected to foster and support adaptation at the subnational level. The working group of the NAS will be formed by representatives from the following different institutions: the MoE, the Ministry of Social Affairs, the Ministry of Finance, the Ministry of the Interior, the Ministry of Economic Affairs and Communications, the Ministry of Rural Affairs, the Ministry of Education and Research, the Republic of Estonia Government Office, the Rescue Board, the Association of Municipalities of Estonia, the Association of Estonian Cities, the Estonian Research Council, the Network of Estonian Non-profit Organisations, and Kodukant (the Estonian Village Movement). It is expected that the first meeting of the working group will take place in June 2018⁵³⁸.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / **No**

In addition to the various guidelines issued by the European Commission, the MoE is planning to issue guidelines for assessing climate impacts on spatial planning, including recommendations for climate-proofing implementation of design criteria.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / **No**

The involvement of stakeholders in implementation of adaptation policies and measures is expected through the working group described in Indicator 9b.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / **No**

⁵³⁸ Personal correspondence with a MS representative

Annual reporting of NAS and NAP implementation was planned to begin on 1st March 2018. However, as the NAS entered into force in March 2017 rather than in November 2016 (the expected date), reporting has been postponed by a year and will begin on March 1, 2019 instead.⁵³⁹

The MoE will organise annual reporting on the NAS and will coordinate the exchange of adaptation-related information between the ministries. The working group of the NAS, with the chair of the MoE, will discuss the NAP once a year before presenting it to the Government for approval, monitor the implementation of the NAS, give recommendations for changing the NAS and, if necessary, solve open issues related to the NAS.

As of 2019, the MoE is expected to report annually to the Government an overview about the execution of the development plan and the achievement of its objectives by 1 March, also making proposals about amending or changing the development plan, if necessary.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

As of May 2018, no sectoral reporting has taken place. The sectoral mainstreaming is expected to be monitored and reported annually with the centralised single NAS/NAP report (see Indicator 10a), which is organised by the MoE and presented to the Government for approval. The first report is expected to be published by March 2019.

10c. Regional, subnational or local action is monitored and the results of the monitoring are disseminated

Yes / No

There is no formal regional/local level-specific reporting commitment, but the feedback from the subnational to national level will be collected via the working group of the NAS, in which members from the Association of Municipalities of Estonia, the Association of Estonian Cities and Kodukant (the Estonian Village Movement) are involved. This information will also be published in the annual NAS/NAP report from March 2019.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

As explained in 10a, from 2019 the NAS and NAP will be reviewed annually following the presentation of a report on execution and implementation presented by the MoE to the Government.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / No

It is planned that the stakeholders in the NAS working group (see Indicator 9b) will be involved in the assessment, evaluation and review of national adaptation policy. Nevertheless, as indicated in Indicators 10a and 11a, monitoring and evaluation has not started yet.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 <i>Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	<u>Yes</u> / In progress / No
2 <i>Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 <i>Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	Yes / <u>In progress</u> / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	<u>Yes</u> / In progress / No
4 <i>Knowledge gaps</i>		
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	Yes / <u>In progress</u> / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
5 <i>Knowledge transfer</i>		
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	<u>Yes</u> / In progress / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	<u>Yes</u> / In progress / No
Step C: Identifying adaptation options		
6 <i>Identification of adaptation options</i>		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	Yes / <u>In progress</u> / No
7 <i>Funding resources identified and allocated</i>		
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	<u>Yes</u> / In progress / No
Step D: Implementing adaptation action		
8 <i>Mainstreaming adaptation in planning processes</i>		
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	Yes / <u>No</u>
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	Yes / <u>No</u>

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	Yes / <u>In progress</u> / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 <i>Implementing adaptation</i>		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In Progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	Yes / <u>No</u>
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	Yes / <u>No</u>
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	Yes / <u>No</u>
Step E: Monitoring and evaluation of adaptation activities		
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10c	Regional-, subnational or local action is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
11 <i>Evaluation</i>		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	Yes / <u>No</u>

Adaptation preparedness scoreboard for Finland

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List of abbreviations

AMAP	Arctic Monitoring and Assessment Programme
CBSS	Council of the Baltic Sea States
EIA	Environmental Impact Assessment
ELASTINEN	Proactive management of weather and climate related risks project
EU	European Union
FinLTSER	Finnish Long-Term Socio-Ecological network
FICCA	Finnish Research Programme of Climate Change
FMI	Finnish Meteorological Institute
GCM	General Circulation Model
ISTO	Climate Change Adaptation Research Programme
LUKE	Natural Resources Institute Finland
NAP	National Climate Change Adaptation Plan 2022
NAS	National Adaptation Strategy
NESA	Finnish National Emergency Supply Agency
RCM	Regional Climate Model
SEA	Strategic Environmental Assessment
SYKE	Finnish Environment Institute

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

In Finland, a national adaptation strategy (NAS) was adopted in 2005⁵⁴⁰, as an independent element of the wider National Energy and Climate Strategy⁵⁴¹. The evaluation process resulted in a government resolution and publication of a new national climate adaptation framework in November 2014, known as the National Climate Change Adaptation Plan 2022⁵⁴² (NAP). This NAP replaced the 2005 NAS. Finland's Climate Act⁵⁴³ (approved on 6 March 2015) stipulates that the Government approves long-term and medium-term strategic mitigation plans and that it will approve a national plan on adaptation at least every ten years.

The NAP focuses on the horizontal aim that the Finnish society should have the capacity to manage the risks associated with climate change and adapt to changes in the climate. Based on this aim, the following objectives are set for the period to 2022:

- Adaptation should have been integrated into the planning and activities of both the various sectors and their actors
- The actors should have access to the necessary climate change assessment and management methods; and
- Research and development work, communication, and education and training should have enhanced the adaptive capacity of society, developed innovative solutions and improved citizens' awareness on climate adaptation.

The Ministry of Agriculture and Forestry was responsible for the preparation of the NAP (the updated NAS), with the practical work steered by a broadly-based coordination group appointed by the Ministry.

A2. Adaptation strategies adopted at subnational levels

Already 125 municipalities (approximately 40% of all municipalities) have a climate strategy⁵⁴⁴ and 60% of those reported that both climate mitigation and adaptation are part of their climate measures. By the end of 2012, 16 out of 18 regions had published a climate strategy that includes some recognition of adaptation⁵⁴⁵.

The Helsinki Metropolitan Area (Helsinki, Espoo, Vantaa and Kauniainen) has a dedicated adaptation strategy for the period 2012-2020⁵⁴⁶, which includes measures for land use, traffic

⁵⁴⁰http://mmm.fi/documents/1410837/1721050/MMMjulkaisu2005_1a.pdf/63f5d78d-8492-4621-b019-fe38d7aeb709

⁵⁴¹<http://tem.fi/en/energy-and-climate-strategy>

⁵⁴²<http://mmm.fi/en/nature-and-climate/climate-change-adaptation>

⁵⁴³ In Finnish: <https://www.finlex.fi/fi/esitykset/he/2014/20140082.pdf>

⁵⁴⁴ In Finnish: http://shop.kunnat.net/product_details.php?p=3159

⁵⁴⁵ <https://julkaisut.valtioneuvosto.fi/handle/10138/41419> (In Finnish, Documentation Page in English)

⁵⁴⁶http://ilmastotyokalut.fi/files/2014/10/11_2012_Helsinki_Metropolitan_Area_Climate_Change_Adaptation_Strategy.pdf

and technical networks, buildings and construction, water and waste management, rescue services and safety, health care and social services and research and information. Some other bigger cities have also focused on climate adaptation and vulnerability to extreme weather events (Pori, Turku) or by planning green infrastructure (Lahti, Jyväskylä). Other Finnish municipalities have climate change strategies which mostly focus on mitigation. Three Finnish cities are signatories to the Covenant of Mayors for Climate & Energy in relation to adaptation⁵⁴⁷.

Adaptation action plans

B1. National adaptation plan

The NAP aims to identify the most important tasks to promote adaptation nationally and in each sector in the next few years, and to ensure that Finnish society has the capacity to manage the risks relating to climate change and adapt to the changes.

B2. Adaptation plans adopted at sub-national level

The NAP calls for municipalities to integrate climate proofing reviews into emergency preparedness and security of supplies planning. The Plan tasks the joint regional offices (ELY-keskus) of the Ministry of Employment and Economy, the Ministry of Environment, the Ministry of Transport and Communications and the Ministry of Agriculture and Forestry to develop climate resilience guidance for municipalities.

In 2017, most of the municipalities implemented systematic climate actions and, although predominantly focused on climate mitigation, climate adaptation was also promoted. By the end of 2015, regional flood risk management plans were published for every significant flood risk areas (21 areas) and implementation of identified measures is ongoing. In addition, several bigger cities and municipalities are active in adaptation, e.g. the city of Helsinki (in vulnerability assessment) and the city of Vantaa (nature-based solutions in runoff water management).

B3. Sectoral adaptation plans

The NAP aims to incorporate adaptation into regular planning and activities of all sectors and actors. Adaptation is included in the Climate Act (approved on 6 March 2015). According to this Act, the State authorities must, as far as possible, promote the implementation of the NAP in their actions.

The Action Plan for the Adaptation to Climate Change of the Environmental Administration (2016)⁵⁴⁸ covers the period up to 2022. It replaces the Ministry of the Environment's Action Plan in 2008, which was later supplemented by an update in 2011, following an assessment undertaken in 2013 (Assessment of the Environmental Administration's Action Plan for Adaptation to Climate Change). The action plan sets measures concerning biodiversity, land

⁵⁴⁷ As of 15th June 2017: Jyväskylä, Lappeenranta and Oulu. See:

http://www.covenantofmayors.eu/about/about/signatories_en.html?q=Search+for+a+Signatory...&country_search=fi&population=&date_of_adhesion=&status=&commitments1=1&commitments2=1&commitments3=1

⁵⁴⁸ <http://julkaisut.valtioneuvosto.fi/handle/10024/79789>

use, buildings and construction, environmental protection and the use and management of water resources. The plan also sets targets for research activities and communications.

The action plan for the Adaptation to Climate Change of the Ministry of Agriculture and Forestry 2011 to 2015 will be revised in 2017 to 2018, building on a comprehensive study⁵⁴⁹ of vulnerability and adaptation in agriculture, forestry, fisheries, game and reindeer husbandry sectors that was completed in 2017 by Natural Resources Institute Finland (Luke).

The Climate Programme for Finnish Agriculture – Steps towards Climate Friendly Food (2014)⁵⁵⁰ presents climate adaptation and mitigation measures relating to the food system. The objectives of the National Forest Strategy 2025⁵⁵¹ (replacing the National Forest Programme) include “increasingly diverse sustainable forest management supports climate mitigation and adaptation’.

The Climate Policy Programme for the Ministry of Transport and Communications’ administrative sector for 2009–2020 aims to adapt to climate change without lowering the current service level in transport and communications. To attain this goal, the Ministry’s together with the Transport Agency will update its instructions about transport infrastructure construction, maintenance and management, outline an action plan for exceptional circumstances and invest in research.

In addition, there is the Energy and Climate Programme of the Finnish Defence Forces (2014), updated in 2018.

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

In Finland, the Ministry of Agriculture and Forestry is responsible for adaptation policy-making and coordination at the central government level. This includes, for instance, appointing and chairing the monitoring group for climate adaptation.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

The NAP was prepared by a coordination group appointed by the Ministry of Agriculture and Forestry, with representatives from the Prime Minister’s Office and the relevant ministries

⁵⁴⁹ In Finnish: <http://jukuri.luke.fi/handle/10024/538722>

⁵⁵⁰ http://mmm.fi/documents/1410837/1890227/Climate_programme_agriculture_WEB_03072015.pdf/

⁵⁵¹ <http://mmm.fi/documents/1410837/1504826/National+Forest+Strategy+2025/197e0aa4-2b6c-426c-b0d0-f8b0f277f332>

(Ministry of Environment, Ministry of the Interior, Ministry of Education and Culture, Ministry of Economy and Employment, Ministry of Social Affairs and Health), research institutes (Finnish Meteorological Institute; Finnish Environment Institute and the Natural Resources Institute) and regional actors (ELY, Municipalities).⁵⁵² In 2017, the group was updated with new expert organisations in fire and rescue services, and financial services. In addition, experts from the Ministry of Foreign Affairs, Ministry of Defence and from other organisations participate in the meetings, if needed.

The various ministries are responsible for the implementation, monitoring and evaluation of the plan within their respective administrative branches. A national monitoring group is appointed to follow and evaluate the implementation of the adaptation plan, with representatives from the relevant ministries, research institutions, regional and local bodies and other actors. The group is responsible for the implementation, follow-up and communication relating to the adaptation plan.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / In progress / No

The vertical coordination mechanisms within the governance system are in place and regional actors participated in the drafting of the NAP⁵⁵³ (see Indicator 1b). Representatives of municipalities (the Association of Finnish Local and Regional Authorities) and the Helsinki Metropolitan Region are also included in the coordination group. In addition, a significant share of the practical adaptation measures is taking place in the regions or at local level. The NAP also includes a key measure of promoting local and regional adaptation studies.

In Finland, the Covenant of Mayors initiative does not have dedicated coordination at national or regional level. However, the Association of Finnish Local and Regional Authorities (Kuntaliitto) is an advocate for all Finnish municipalities and regions. In addition, the Association of Finnish Local and Regional Authorities and Ecofellows Ltd./City of Tampere are supporting partners in the Covenant of Mayors. In 2017, 12 Finnish municipalities were part of the Covenant of Mayors but only three had signed up to the adaptation commitment, available since 2015.

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

The Ministry of Agriculture and Forestry was responsible for the preparation of the NAP, with the practical work steered by a broadly-based coordination group appointed by the Ministry.

⁵⁵² Membership of the coordination group is not static but evolves in time, usually with the addition of new members.

⁵⁵³ <http://mmm.fi/en/national-climate-change-adaptation-plan>

The preparation of the NAP involved a wide range of stakeholder consultations, including⁵⁵⁴:

- A “stock taking” questionnaire in Spring 2013, sent to a wide group of stakeholders on climate impacts and risks, recognised sectoral or regional vulnerabilities and views about the strategic goals and other relevant aspects to be taken into consideration in the revision process
- An open “mid-process” seminar (29 October 2013) on the draft strategic goals
- The draft NAP (7 March 2014) was sent for comments; 63 organisations representing administration (national, regional), research institutes and universities, NGOs and interest groups sent comments. At least 57 organisations commented on the draft NAP
- Presentation and discussions on the draft NAP in different fora
- An open seminar (“public hearing”) 10 April 2014 of the NAP.
- The draft NAP was in the “*Have your say*” –eParticipation forum for public (April-May 2014).

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

Transnational cooperation is one of the actions of the NAP. The action focuses on the development of the Finnish, Norwegian and Russian nature conservation cooperation in the Fennoscandia Green Belt, and on threats to the ecosystem services from climate change. There is also an intention to step up cooperation with Russia on climate adaptation, especially focusing on transboundary water use and management, and on invasive species. An Action Programme of the Joint Finnish-Russian Commission on the Utilisation of Frontier Waters on Risk Management in Case of Adverse Hydrological Conditions in the Vuoksi River Basin District was accepted in Commission’s meeting on 20 October 2017. Climate change was one of the key drivers for the establishment of this action programme. Invasion of Finnish inland waters by an alien moss animal was discussed in a Commission’s working group meeting in April 2018.

Adaptation is also part of transnational cooperation (e.g. Arctic Council⁵⁵⁵, Barents Euro-Arctic Council⁵⁵⁶, cooperation in the Baltic Sea region⁵⁵⁷). Finland has supported the development of the Arctic Resilience Action Framework⁵⁵⁸ during 2015-2017 with the Arctic Council and the implementation of this framework has started during Finland’s chair period

⁵⁵⁴ <http://www.cbss.org/wp-content/uploads/2014/04/Finland-CCA-Strategy-Presentation.pdf>

⁵⁵⁵ <http://www.arctic-council.org/index.php/en/>

⁵⁵⁶ <http://www.barentscooperation.org/en>

⁵⁵⁷ <https://www.interreg-baltic.eu/home.html>

⁵⁵⁸ <https://oaarchive.arctic-council.org/handle/11374/1790>

2017-2019. The first Arctic Resilience Forum will take place in Rovaniemi, Finland in September 2018.⁵⁵⁹

Finland has also participated in the cooperation with the Baltic2030 expert group of Council of the Baltic Sea States (CBSS)⁵⁶⁰ related to sustainable development, climate adaptation and resilience. The transboundary river agreements between Finland and its neighbouring countries include prevention of flood damages.

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / In progress / No

Observation systems are in place to monitor climate change, extreme weather events and their impacts and are conducted by:

- The Finnish Meteorological Institute (FMI): Weather observations. FMI established a Climate Service Centre unit in 2014⁵⁶¹. The Centre offers operational climate services and studies weather and climate, and their socio-economic aspects. FMI also monitors extreme weather events and their impacts.
- The Flood Centre of the Finnish Environment Institute and Finnish Meteorological Institute⁵⁶² was established on 1 January 2014 and is responsible for flood forecasts and warnings and maintaining a national situation awareness on floods.
- Finnish Environment Institute (SYKE)⁵⁶³: Monitoring for physical, chemical and biological state of inland waters and marine waters.
- Finnish Museum of Natural History⁵⁶⁴, Natural Resources Institute Finland (Luke)⁵⁶⁵, state enterprise Metsähallitus⁵⁶⁶, and SYKE: Collecting information on the changes taking place in ecosystems and habitats, species and species communities, and genes and genotype.

FMI produces a monthly climate monitoring bulletin and web material with information on extreme weather events. FMI is also collecting information on impacts of weather events, especially high-impact events, which cause negative impacts on health, property or critical functions of the society. Information is based on data gathered by authorities, research

⁵⁵⁹ <https://www.arcticfinland.fi/events/Arctic-Resilience-Forum-/39334/41fdbf10-4f1d-4ef4-a14c-ef4876f4a10e>

⁵⁶⁰ <http://www.cbss.org/cbss-baltic-2030-expert-group-sustainable-development-16th-meeting/>

⁵⁶¹ <http://en.ilmatieteenlaitos.fi/climate-service-centre>

⁵⁶² <http://en.ilmatieteenlaitos.fi/press-release/340236095>

⁵⁶³ <http://www.syke.fi/en-US>

⁵⁶⁴ <https://www.luomus.fi/en>

⁵⁶⁵ <https://www.luke.fi/en/>

⁵⁶⁶ Metsähallitus is a state enterprise that administers the state-owned land and water areas.

<http://www.metsa.fi/web/en>

institutes and/or private sector. Information on impacts of weather are produced sector-wise, e.g. rescue operations, electricity distribution network failures, railway passage delays and cancellations. This data is located within operators but FMI has been developing its own weather impacts data base.

Information on floods and their impacts is mainly collected by SYKE. SYKE acts as a coordinating body for the Finnish Long-Term Socio-Ecological network (FinLTSER). The Network brings together the Finnish research sites and scientists that conduct research on long-term socio-ecological processes and issues. FinLTSER currently consists of nine research platforms, representing the main ecosystems (marine, terrestrial, lake, sub-arctic, urban) in Finland, which provide a national infrastructure for long-term site-based ecosystem and biodiversity research in Finland, including climate impacts.

The Forest Centre collects data on damage to forests including weather related damages. The forest damage advisory service at Luke is responsible for monitoring forest pests and diseases and their damage, some of which may be related or initiated by weather events, especially storms.

THL is a Finnish expert agency that provides reliable information on health and welfare for decision-making and activities in the field. THL monitors the incidence of infectious diseases through use of several surveillance systems. THL is also collecting information on impacts of weather events and climate change on drinking water security and human health, heatwave-associated health impacts and other climate-related health effects.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

Climate projections based on the most recent (RCP-based/AR5) GCM and RCM simulations have been analysed for Finland and are explained in Ruosteenoja et al. (2016)⁵⁶⁷. Various datasets have been developed to fulfil the needs of different user groups, such as impact and vulnerability studies. Some of the climate scenarios have been developed on a 10x10 km grid. Ensemble-based climate scenario analysis has been common in most studies in Finland. Work is currently being undertaken to develop national SSP-based socioeconomic scenarios, e.g. in the Academy of Finland funded project PLUMES⁵⁶⁸.

Various climate impact and vulnerability studies are using these projections. Some of these results (e.g. from hydrological models) are also being portrayed in the national climate change portal, Climate Guide⁵⁶⁹.

⁵⁶⁷ http://www.geophysica.fi/pdf/geophysica_2016_51_1-2_017_ruosteenoja.pdf

⁵⁶⁸ <http://en.ilmatieteenlaitos.fi/plumes>

⁵⁶⁹ <https://ilmasto-opas.fi/en/datat/vaikutukset#SykeDataPlace:vaikutukset>

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

A general assessment of vulnerability across sectors was the basis for the NAS in 2005. For the publication of the NAP, a comprehensive study of the impacts of climate change and vulnerability of sectors was conducted in 2013⁵⁷⁰. After the publication of the NAP, more detailed and systematic vulnerability assessments⁵⁷¹ have been done in specific sectors or specific environments and include water, indirect economic effects owing to floods, forestry, biodiversity, agriculture, transport, health, and for the Arctic Region. Most of these were coordinated by the Ministry of Agriculture and Forestry; sector ministries are responsible for their administrative branches.

There are various studies on climate impacts and vulnerability assessments in different sectors. For example, the Academy of Finland funded the Finnish Research Programme of Climate Change (FICCA 2011-2014)⁵⁷². This programme produced several research projects, which covered flooding, urban water management, energy, forest, biodiversity, marine ecosystem and spatial planning, agriculture, transport, health, the Arctic region and urban planning.

The vulnerability of natural resources sectors (agriculture, forestry, game and fisheries and reindeer management) was thoroughly analysed as a part of the State of adaptation assessment project (Sopeutumisen tila 2017 by Luke).

In central level active management of weather-related and climate-related risks, project ELASTINEN (2015–2016)⁵⁷³ provided information and sought solutions for strengthening the capabilities of different sectors to assess and manage risks related to weather, climate, and the economy. The assessment and development project SIETO⁵⁷⁴ (2017–2018) funded by the Government's analysis, assessment and research activities has prepared a national weather and climate risk assessment as well as a plan on how to develop the production and collection of information and data for future vulnerability and risk assessments.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / In progress / No

⁵⁷⁰ Sorvali, J. 2013: Ilmastonmuutoksen haitalliset vaikutukset ja toimialojen haavoittuvuus (only available in Finnish).

⁵⁷¹ See more here: Vulnerability Assessment of ecosystem services for Climate Change Impacts and Adaptation (VACCIA): <http://www.syke.fi/projects/vaccia>; Climate change: a regional assessment of vulnerability and adaptive capacity for the Nordic countries (CARAVAN): <http://www.iav-mapping.net/CARAVAN/CARAVAN.html>; Assessing the adaptive capacity of the Finnish environment and society under a changing climate (FINADAPT): <http://www.syke.fi/projects/finadapt>; Map-based assessment of vulnerability to climate change employing regional indicators (MAVERIC): <http://www.syke.fi/projects/maveric>.

⁵⁷² <http://www.aka.fi/en/research-and-science-policy/academy-programmes/completed-programmes/ficca/>

⁵⁷³ <http://en.ilmatieteenlaitos.fi/elastinen>

⁵⁷⁴ <http://en.ilmatieteenlaitos.fi/climate-service-centre-projects>

Vulnerability assessments have been conducted as parts of regional cooperation, i.e. for the Barents Region, the Arctic or the Baltic Sea (BACC II)⁵⁷⁵. Finland is a participant in the Arctic Monitoring and Assessment Programme (AMAP), which is an intergovernmental monitoring and research programme under the Arctic Council. The main goal of AMAP is to provide reliable and sufficient information on the status of, and threats to, the Arctic Environment. Assessing climate impacts on the Arctic environment is one of the priority areas.⁵⁷⁶ Transboundary risks and transnational cooperation are also considered in the NAP.

Vulnerability studies consider transboundary effects where relevant, for example, trade flows in a project conducting a study on adaptation of the food sector and socio-economic impacts of climate change in North-East Europe⁵⁷⁷.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / In progress / No

The NAP calls for practical research on implementation of adaptation measures. The knowledge gaps identified throughout the policy process have triggered periodic research, programmes and projects. They have produced comprehensive knowledge on, e.g., climate impacts and vulnerabilities in different sectors for planning of the adaptation measures. Examples include the Climate Change Adaptation Research Programme ISTO (2006–2010) with about 16 research projects, and the Proactive management of weather and climate related risks project ELASTINEN (2015–2016), which provided information and solutions for strengthening the capabilities of different sectors to assess and manage risks related to weather, climate, and the economy.

The Academy of Finland (i.e. the national research council) has a climate change research portfolio of tens of millions of Euros as part of its annual grants and other annual funding. The national climate change research programme (FICCA) 2011–2014, funded by the Academy of Finland, responded to a broad range of scientific knowledge gaps posed by climate change including adaptation research.

The main examples of the current projects on adaptation include the assessment and development project SIETO (2017–2018) funded by the Government's analysis, assessment and research activities. The project has prepared a plan to develop the production and collection of information and data for future vulnerability and risk assessments.

The TASAPELI-project (2018-2019), which is funded by the Government, develops nature-based solutions for regional adaptation. The national Strategic Research Council (SRC) has large programmes that identify and include adaptation and resilience for sustainable growth.

⁵⁷⁵ <http://www.baltic-earth.eu/BACC2/>

⁵⁷⁶

Finland's Seventh National Communication under the United Nations Framework Convention on Climate Change. 2017. Ministry of the Environment and Statistics Finland, Helsinki. 314 p.

⁵⁷⁷ http://www.aka.fi/Tiedostot/Tiedostot/FICCA/FICCA%20tutkijaseminaari%202.-3.12.2014/ADIOSO_presentation_FICCA%2003122014.pdf

A large consortium project funded in an SRC programme is Sustainable, climate-neutral and resource-efficient forest-based bioeconomy FORBIO⁵⁷⁸ (2015–2020). It will provide smart means, solutions and tools needed to sustainably improve resource-efficiency and climate-neutrality of Finnish forests and to adapt to the changing environment. Another large research project is From Failand to Winland⁵⁷⁹ (2016–2019) which provides insight into possible futures with the help of scenarios, decision analysis and co-creation methods. The project studies how water, food and energy related pressures, shocks and policy responses affect Finland's overall security.

The Ministry of Agriculture and Forestry is funding projects to fill knowledge gaps regarding climate adaptation. The analysis of knowledge gaps and research needs was funded in 2017⁵⁸⁰. Other current research initiatives include the ones by the Climate Research Centre at the Finnish Meteorological Institute and the Flood Centre of the Finnish Environment Institute and the Finnish Meteorological Institute.

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / In progress / No

Adaptation relevant data and information is available to all stakeholders on a web portal⁵⁸¹. The Climate Guide portal, available in Finnish, Swedish and English, offers research information including mapping tools, data and infographics and also case studies, observational data, climate scenarios, impacts and step-by-step guidance to support both mitigation and adaptation actions.

A website (www.climateguide.fi), co-ordinated by the FMI and SYKE, provides an overview of observed and projected climate (temperature and precipitation) and the impacts of climate change on water resources, potential energy demand and natural decomposition rate of dead plant material. The maps show impacts for the present-day as well as future climate. Other knowledge transfer services are flood maps co-ordinated by SYKE and the wind atlas co-ordinated by FMI.

The Finnish Climate Change Panel was established in December 2011 to enhance science-policy interaction for the climate and energy sectors as well as public discussion⁵⁸². The Government nominated the third Climate Panel in January 2016 for the period of 2016-2019⁵⁸³.

⁵⁷⁸ <http://www.uef.fi/en/web/forbio>

⁵⁷⁹ <http://winlandtutkimus.fi/english/>

⁵⁸⁰ Arnkil, N. & Lahti, E. 2018. Ilmastonmuutokseen sopeutumisen tieto- ja osaamistarpeet Suomessa. Kohti tutkimusohjelmaa. Tapion raportteja nro 24.

⁵⁸¹ www.Climateguide.fi

⁵⁸² Finland's Seventh National Communication under the United Nations Framework Convention on Climate Change. 2017. Ministry of the Environment and Statistics Finland, Helsinki. 314 p.

⁵⁸³ <http://www.ilmastopaneeli.fi/fi/in-english/>

The Panel's members come from universities and research organisations and represent different branches of science from educational sciences to atmospheric sciences. It produces reports to support the preparation and implementation of climate policy and legislation in Finland. The Panel can receive assignments from different Ministries and Ministerial working groups or it can launch its own projects. The status and the general assignment of the Finnish Climate Panel is determined in the Climate Change Act (2015).

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / In progress / No

Capacity building activities take place in Finland. An example is a workshop for NGOs on how they can influence the preparedness of citizens for climate impacts. In addition, the Climateguide website lists upcoming climate change related events.

Education and training materials are available and disseminated. A Teachers' Climate Guide for primary and secondary school teachers was published in 2016. The material is available in Finnish and can be downloaded as a pdf⁵⁸⁴, with an overview published in English⁵⁸⁵. For University students a interdisciplinary elementary course in climate change is available that is also publicly accessible⁵⁸⁶. The NAP contains actions to develop and implement a communication plan on adaptation issues and educational material on adaptation for all levels of education. Therefore, it is expected that the examples presented above on climate change will be accompanied with further training materials focusing on climate adaptation.

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

The NAP identifies horizontal measures for the objectives mentioned in Section A1 and preliminary timing for implementation. The objectives have twelve separate fields of actions and measures in the NAP. The adaptation objective has been integrated into the planning and activities of the various sectors and their actors focus on the sectoral adaptation options.

According to the evaluation of the NAS in 2013, many sectors, such as water resources, agriculture, land use, energy, health and tourism received a score of three or higher implying that climate impacts are relatively well known including quantitative information and adaptation measures are identified and their implementation has already started. However, there are sectors where more work is required (e.g. insurance, biodiversity, fisheries).

⁵⁸⁴ In Finnish: <http://openilmasto-opas.fi/wp/wp-content/uploads/2016/09/open-ilmasto-opas-2016.pdf>

⁵⁸⁵ <http://openilmasto-opas.fi/english/>

⁵⁸⁶ <http://www.ilmastonyt.fi/studies.html>

The ELASTINEN (2015–2016) project provided information and suggested solutions for strengthening the capabilities of different sectors to assess and manage weather, climate and economic risks.

Climate risk assessment and management are improved in natural resource sectors: thorough analysis of vulnerability of natural resources sectors (agriculture, forestry, game and fisheries and reindeer management) was carried out as a part of the State of adaptation assessment project (Sopeutumisen tila 2017). This analysis also takes into account geographical specificities. These specificities are also addressed in other research, such as the Academy of Finland funded research programme Pathways linking uncertainties in model projections of climate and its effects, PLUMES.⁵⁸⁷

The SIETO (2017–2018) project prepared a plan on how to develop the production and collection of information and data for future vulnerability and risk assessments, as well as how the assessment could be arranged.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

Finland has selected adaptation options based on expert judgement and participatory processes⁵⁸⁸. However, the adopted mainstreaming approach implies that sectors have adopted different procedures and some are more advanced than others in their adaptation work and the level of detail of the processes preceding the selection of the adaptation measures vary.

There are some studies identifying the costs and benefits of climate change and adaptation actions for certain sectors, however, Finland reports considerable uncertainties and information gaps in estimating the potential costs and benefits of impacts and measures.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / In progress /No

The NAP contains measures on disaster risk reduction, as part of international cooperation. The NAP recognises the important link between climate adaptation and the National Platform for Disaster Risk Reduction. The national progress report on the implementation of the Hyogo Framework for Action (2013-2015) includes a core indicator stating that “Disaster Risk Reduction is an integral objective of environmental-related policies and plans, including for land use, natural resource management and adaptation to climate change”; the level of progress achieved on this indicator is 4 out of 5⁵⁸⁹.

⁵⁸⁷ <http://www.syke.fi/projects/plumes>

⁵⁸⁸ Self-assessment survey findings (EEA): <http://www.eea.europa.eu/publications/national-adaptation-policy-processes>

⁵⁸⁹ http://www.preventionweb.net/files/40147_FIN_NationalHFAProgress_2013-15.pdf

There are procedures in place for coordination. The National Risk Assessment (Kansallinen Riskiarvio⁵⁹⁰) recognises climate change as an important source of risk. The national monitoring group for adaptation also acts as a coordination mechanism with the authorities responsible for disaster risk reduction at national and sub-national levels.

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / **In progress** / No

Although no detailed budget could be found for cross-cutting/coordinated adaptation action, the Ministry of Agriculture and Forestry carries out these duties as part of its regular work or through projects. Climate adaptation is integrated into the key sector activities (e.g. to dam and flood safety or the monitoring and prevention of damages in forests) and ministries are responsible for providing funding to increase climate resilience in their administrative branches. All the research and development projects have been financed by project funding. Therefore, it is challenging to monitor the funding level for climate adaptation.

The state budget has an allocated budget for communications, guidance and studies for climate and energy policies (no information on adaptation)⁵⁹¹. Some key funding sources for adaptation work includes the Government's analysis, assessment and research activities for the ELASTINEN project (assessment of the management of weather and climate risks and evaluated ways to promote management of these risks in various sectors) and SIETO project (preparing a national weather and climate vulnerability and change assessment). National scenarios and climate services are funded through the budget of FMI or other institutions, or through research programmes.

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

The new Environmental Impact Assessment (EIA) legislation came into force on 16 May 2017 and includes an assessment of climate change risks for projects.⁵⁹² The legislation includes assessing direct and indirect impacts of the project on, for example, climate, including the vulnerability of the project to climate change. The legislation covers impacts on soil, waters, air, climate, flora, fauna, and biodiversity.

⁵⁹⁰ In Finnish: <http://urn.fi/URN:ISBN978-952-324-059-9>

⁵⁹¹ Finland's Seventh National Communication under the United Nations Framework Convention on Climate Change. 2017. Ministry of the Environment and Statistics Finland, Helsinki. 314 pp.

⁵⁹² In Finnish: <https://www.edilex.fi/lainsaadanto/20170252>

The Act on the Assessment of the Effects of Certain Plans and Programmes on the Environment (200/2005) and the Government Decree on the Assessment of the Effects of Certain Plans and Programmes on the Environment (347/2005), known as the Strategic Environmental Assessment (SEA) Decree, are the major pieces of legislation transposing the SEA Directive in Finland. In addition, the provisions for SEAs of land-use plans are included in the Land Use and Building Act (Act 132/1999) and Decree (895/1999). The SEA legislation includes assessment of direct and indirect impacts of plans or programmes on climate among a range of other issues, including soil, water, air, and biodiversity.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / **No**

Finland's first National Risk Assessment, published in December 2015, is based on the EU Civil Protection Mechanism, which binds all EU Member States. Protection under the EU Mechanism covers primarily people, but also the environment and property, against all kinds of natural and man-made disasters. These include the consequences of acts of terrorism, technological, radiological or environmental disasters, marine pollution and acute health emergencies. An update of the National Risk Assessment and 18 regional assessments is ongoing. The national assessment includes 19 scenarios that define issues that might endanger vital functions of society or cause serious problems for people, property or environment. Ten of these scenarios are related to extreme weather conditions. Assessments of climate adaptation and climate and weather-related risk management will be part of the process at the regional level.

Flood risk maps and flood risk management plans have been prepared according to EU Floods Directive (2007/60/EC), under the responsibility of the Ministry of Agriculture and Forestry. The future flood risks have been considered in the preliminary flood risk assessment, completed for all river basins, coastal areas and municipalities of Finland. Several climate scenarios were used in the preliminary flood risk assessment to model their impact on floods during the next 100 years and the impact was considered when the areas of potential significant flood risk were identified.

The LUOVA (multi-hazard) early warning system was initially developed for natural hazard warnings, it is now used for weather, marine, flood, earthquake, tsunami and space weather warning in close cooperation with other technical agencies.⁵⁹³ LUOVA provides an assessment of possible events during a restricted time of danger.

The policies on preparedness in municipalities and developing rescue activities adopted by the Board of the Association of Finnish Local and Regional Authorities state that municipalities should take the consequences of climate change into account in their own plans for preparedness. There is no evidence on how future climate risks have indeed been incorporated.

⁵⁹³ http://ec.europa.eu/echo/files/news/20140717_FinlandPeerReport.pdf

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / No

Promoting nature conservation and biodiversity is one of the statutory objectives of the Land Use and Building Act of 1999. The Act also requires the consideration of these aspects in regional and local land-use plans.⁵⁹⁴ The update of the national governmental land-use guidelines in 2008 mentions the need to consider storms, heavy rains and urban flooding and the risks of major accidents during land-use planning processes. The guidelines were revised so that they would better be able to meet the new challenges of land use, especially climate change⁵⁹⁵. The Guidelines implement the Land Use and Building Act and Decree and help to ensure that issues of national interest are taken into account in land use planning and in the activities of the government authorities in Finland. The Land Use and Building Act is currently under revision and the protection of biodiversity and cultural environment is specifically mentioned as an objective.⁵⁹⁶

In 2015 The Association of Finnish Local and Regional Authorities published a report on the climate work in the municipalities. The need for adaptation measures is increasingly recognised in municipalities although the need varies between the regions and municipalities. The most common measures are related to heavy rain and disruptions due to other extreme weather events. Work on adaptation is also closely related to preparedness and contingency planning in the municipalities.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / In progress / No

Sectoral adaptation is promoted by the NAP, and previously by the 2005 NAS.

The need for climate adaptation is relatively well-recognised in different sectors, which are in differing stages of mainstreaming. The most advanced sector is water management, where adaptation has already been integrated into decision making. For example, a digital monitoring and risk management process has been developed for dam safety regulation, flood risk management legislation and the Water Services Act.

The key policy instruments to promote climate adaptation are sectoral plans that detail the specific measures for mainstreaming adaptation into sectoral activities and planning processes, see Section B3. For example, the Action Plan for Adaptation to Climate Change of the Environmental Administration (2016)⁵⁹⁷ details how adaptation has been integrated into land use planning and the building sector, along with additional measures still to be taken to

⁵⁹⁴ Biodiversity Information for Europe, <https://biodiversity.europa.eu/countries/gi/finland>, accessed 16th of May 2018

⁵⁹⁵ Ministry of Environment, 2009. The Future of land use is being decided now. The revised land use guidelines of Finland. <http://www.ym.fi/download/noname/%7B331CBF76-8C6B-4AAF-93E6-95DCCF1E2AC2%7D/58466>

⁵⁹⁶ [http://www.ym.fi/enUS/Latest_news/Press_releases/Revised_national_land_use_guidelines_tow\(45417\)](http://www.ym.fi/enUS/Latest_news/Press_releases/Revised_national_land_use_guidelines_tow(45417))

⁵⁹⁷ <http://julkaisut.valtioneuvosto.fi/handle/10024/79789>

strengthen mainstreaming. Likewise, measures are included for mainstreaming adaptation into nature conservation, water management and environmental protection.

Regarding water management, long-term changes in the climate have been considered in the revised legislation on water resources and other relevant steering of the water sector. The key instruments steering the water sector are the Water Act (2011), Act on Flood Risk Management (2010) implementing the Floods Directive, Dam Safety Act (2009), Water Services Act (2014). Additionally, a handbook on preparing for floods in the construction sector was completed in 2014, suggesting minimum elevations for buildings.

Statutes aimed to improve the security of electricity supply were included in amendments to the electricity market legislation in Spring 2013.

Recent modifications to forest legislation in 2014, i.e. to the Forest Act 5 and the Forest Damages Prevention Act 6, take into account climate adaptation by allowing more diverse forest management and reduced length of timber harvesting cycles in response to pests. In addition, Finland's National Forest Strategy 2025 (2015) contains adaptation-related measures. The Forest Tree Breeding Programme 2050 (2008) includes a target for selection of suitable stock for reforestation that takes account of climate change. The use of high quality seed, suitable for different climatic conditions, is promoted by establishment of new seed orchards. New maps that take into account climate projections were released in 2017 for deployment of improved seeds and seedlings of pine and are under preparation for spruce. In addition, there is a programme for establishing a network of genetic forest reserves. The Finnish Forest Centre's forest damage contingency plan uses appointed regional experts to assist with rapid harvesting of wind-damaged trees in order to prevent consequential damage. Planning of forest-road maintenance has been developed to take into account exceptional weather and soil conditions.

Invasive alien species are a threat to all natural resource sectors, e.g. agriculture, forestry, game and fisheries and reindeer management (SOPEUTUMISEN TILA⁵⁹⁸). The EU Regulation on invasive alien species entered into force in January 2015. The list of EU invasive alien species entered into force in August 2016, and was updated in August 2017. The Finnish National Act on Managing the Risks Caused by Alien Species, as well as the Government Decree on Invasive Alien Species of National Concern (national list of invasive alien species), entered into force on 1 January 2016. The national invasive alien species portal⁵⁹⁹ was published in 2014. It enables citizens to recognise and report alien species. The portal includes information on and pictures of alien species, maps of their ranges and instructions on combating them.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

Flood insurance is a key instrument in Finland. In 2014, compensation for flood damage through governmental funds was replaced with a private-insurance-based system. Under the

⁵⁹⁸ <http://jukuri.luke.fi/handle/10024/538722>

⁵⁹⁹ www.vieraslajit.fi

new scheme, private insurance companies will provide damage compensation for all types of floods, including urban pluvial floods. However, this will apply only to floods above a threshold, pre-defined in insurance policies. The National Flood Centre gives expert opinion on whether this threshold was exceeded or not. Flood insurance is included in a package with home insurance, with no increase to insurance premiums (at the start of policies). After a few years, it is expected that premiums will be recalculated to eventually reflect the risk level. Insurance companies may use the flood-risk maps prepared during implementation of the EU Floods Directive.⁶⁰⁰

In 2016, some private insurance companies introduced products which cover risks for extreme weather conditions. Private insurance companies offer home and property insurances that cover damage caused by exceptional floods, as well as severe weather events. A great majority of households and property owners have this insurance.

There is a state aid system for commercial fishing in case of a loss or damage of fishing equipment or vessel in Finnish marine waters. Eligible causes of loss or damage include storms and ice, with a maximum vessel length of 12 metres.

The Government compensation scheme for crop damages ended at the end of 2015, and the following year some private insurance products, which cover risks for extreme weather conditions were introduced on the market by private insurance companies. Approximately less than one per cent of the whole arable area has been insured in (the first year) 2016. At the moment, there is no state aid to make the insurance more attractive for farmers. New guidelines for the state aid by the European Union have restricted the possibility for governmental compensation of damage caused by plant pests in agricultural or horticultural production, thus, no compensation has been paid since 2014. Adjustment of the compensation scheme for forest pests to the new guidelines has not yet been carried out. Private insurance products covering losses caused by plant pest outbreaks have not been introduced on the market so far, although some private insurance companies have shown interest.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / In progress / No

Finland's Seventh National Communication (2018) under the United Nations Framework Convention on Climate Change provides an overview of progress in climate adaptation in different sectors.⁶⁰¹ The need for adaptation measures is recognised in most sectors, impacts of climate change are known reasonably well, and adaptation measures have been identified and their implementation has started. As discussed earlier, a significant share of adaptation actions are implemented at local or regional level, such as flood protection.

⁶⁰⁰ http://ec.europa.eu/echo/files/news/20140717_FinlandPeerReport.pdf

⁶⁰¹ Climate change impacts, adaptation measures and vulnerability assessment. Chapter 6 in Finland's Seventh National Communication under the United Nations Framework Convention on Climate Change. 2017. Ministry of the Environment and Statistics Finland, Helsinki. pp. 179-216.
https://www.stat.fi/static/media/uploads/tup/khkinv/fi_nc7_final.pdf

The most advanced sector is water management, where adaptation has been integrated into decision making, and digital monitoring and risk management processes have been developed. Agriculture and food production are also relatively advanced in implementation, while transport and communication, forestry, health, energy, tourism are just beginning. Fisheries, insurance, game management and biodiversity are the least advanced although there has been some progress in these sectors, too. An example is a study on insurance for crop flood damages by the Finnish Climate Change Panel⁶⁰². The action plan for adaptation to climate change of the Ministry of Agriculture and Forestry 2011 to 2015 will be revised in 2018, building on a comprehensive study on vulnerability and adaptation in agriculture, forestry, fisheries, game and reindeer husbandry sectors that was completed in 2017.

In summary the following action plans have been completed for the administrative sectors:

- Climate Programme for Finnish Agriculture – Steps towards Climate Friendly Food (2014) (will be updated in 2018)
- Ministry of Environment Action Plan (2016)
 - Built environment
 - Conservation
 - Biodiversity and ecosystems
 - Water management (including sea and fresh waters)
 - Cross-cutting measures (research, communications and international cooperation)
- The Energy and Climate Programme of The Finnish Defence Forces - objectives and measures (updated in 2018)

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / No

Implementation of the NAP is monitored and promoted by a National Monitoring Group for Adaptation to Climate Change, which is steered by the Ministry of Agriculture and Forestry. The municipal and regional perspective in the group is represented by the Association of Finnish Local and Regional Authorities. The National Monitoring Group is the main mechanism for horizontal and vertical coordination. The objective of the monitoring group is, among others, to promote cooperation on adaptation between the government authorities and sectors of business and society. The current term of the monitoring group runs from 2015 to 2018.

The Government has recently produced new research on managing the climate and weather risks, particularly in the municipalities, including a policy brief on how municipalities can increase climate resilience by assessing and managing risks. The brief is based on research carried out in the ELASTINEN-project that provides information and solutions for sectors and actors to manage weather and climate risks.

⁶⁰² In Finnish:

http://www.ilmastopaneeli.fi/uploads/selvitykset_lausunnot/ilmastopaneeli_ilmastomuutoksen%20riskit%202016.pdf

In 2017, the project KUJA2 (2017-2019) was developed. It builds on the results of the previous KUJA (2014-2016) project, and develops preparedness and continuity management in municipalities and in the new counties. KUJA2 aims to strengthen the interconnectedness of municipalities, regional authorities and their key stakeholders and to promote common understanding related to preparedness. Climate adaptation is part of the process. Both projects are implemented in cooperation between the Association of Finnish Local and Regional Authorities and the Finnish National Emergency Supply Agency (NESA).⁶⁰³

Regarding the cooperation fostering the preparation of the flood risk management plans the Ministry of Agriculture and Forestry has appointed flood groups for the inland water and coastal areas, where one or several significant flood risk areas are located, with representatives from the Centres for Economic Development, Transport and the Environment, Regional Councils, municipalities and rescue authorities. The planning involves collaboration with other parties as well as hearings of local residents and operators.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / **No**

We could not find any procedures or guidelines to assess potential climate impacts on major projects or programmes and facilitate the choice of alternative options. The NAP includes measures to include climate impacts in the draft proposal for impact assessment guidelines for legislation, plans and programmes. There are some informal guidelines on increasing climate resilience in the public sector and public procurement⁶⁰⁴.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / No

The coordination Group for Adaptation to Climate Change was formed in 2008 to monitor and promote the implementation of the adaptation strategy together with the network of the stakeholders. Its work is continued in a Monitoring Group on Climate Change Adaptation, which was appointed in 2015. The monitoring group has a broad representation with representatives from the Prime Minister's Office and the relevant ministries, agencies, regional and local actors, research institutes, fire and rescue services, and financial services. The group is responsible for implementation, follow-up and communication relating to the adaptation plan and also for enhancing the cooperation between administrations and actors.

There are also sectoral mechanisms for stakeholder engagement, including regular meetings and groups, the flood groups being one example.

⁶⁰³ In Finnish: www.kuntaliitto.fi/kuja

⁶⁰⁴ https://prezi.com/ydwrtD0fcb_y/julkinen-sektori-ilmastokestavyyden-tyokalut/

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / No

Monitoring of the implementation of the 2005 NAS was first published in a mid-term evaluation report in 2009. In 2013, a second evaluation report took stock of the progress on implementation.

In line with the new Climate Act, the implementation of the adaptation plan is monitored and reported to the Parliament once during the electoral term, as part as the annual climate report. The section on adaptation will include a review on the adequacy and effectiveness of the adaptation actions and, where appropriate, include a description of the implementation of the planned actions on a sector-by-sector basis. The monitoring report on climate adaptation has not yet been submitted during the current electoral term (2015-2019).

The monitoring and evaluation of adaptation to climate change has been promoted in 2015 to 2017 by building a national adaptation monitoring framework and its indicators in cross-sectoral work. In particular, climate change related risks to the society and its various functions have been emphasised. The indicators are divided into three categories: 1. indicators representing climate impacts (these indicators measure the impacts and changes in exposure, such as sea level rise), 2. indicators representing risks (these indicators measure changes in vulnerability such as through flood risk maps), and 3. implementation and decision making (indicators measuring the level of action and/or supportive decision making such as level of investment to renew sewage systems or emergency planning against heat waves in hospitals). Assembling of the indicators was completed, and the associated report has been released in May 2017.⁶⁰⁵ The report, however, recognises that further work is needed, for example, on harmonising and development sector-specific indicators and monitoring mechanisms.

There is also an on-going work lead by the Prime Minister's Office on the development of sustainable development indicators that has included adaptation relevant indicators, such as on flooding. The aim is also to link climate adaptation with the on-going regional reform and the resilience and preparedness of regions.⁶⁰⁶

Information on adaptation-related expenditures at national level has not yet been addressed.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

⁶⁰⁵ Arnkil, N., Lilja-Rothsten, S., Juntunen, R., Koistinen A. & Lahti, E. (2017). Ilmastomuutokseen sopeutumisen indikaattorit seurannan työkaluna [Indicators As a Tool For Monitoring Climate Change Adaptation]. (in Finnish) Tapion raportteja nro 17. <http://tapio.fi/wp-content/uploads/2017/05/Ilmastomuutokseen-sopeutumisen-indikaattorit.pdf>

⁶⁰⁶ Personal communication with MS contact.

A preliminary indicator of the level of adaptation in relevant sectors on a scale from one to five was developed in connection with the evaluation of the NAS implementation conducted in 2009. In addition to the adaptation measures launched in a specific sector, this indicator takes account of the adaptation research in the sector, cooperation between sectors and recognition of the need for adaptation. The exercise was repeated in the 2013 evaluation of the NAS and included in the NAP.

Information on the implementation of adaptation actions is also monitored and disseminated through sectoral actions plans, updates and evaluations (e.g. Ministry of Agriculture and Forestry, Ministry of Environment⁶⁰⁷).

10c. Regional, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / No

The suggested monitoring framework for the NAP recognises the importance of the adaptation action at local and regional level and discusses potential indicators⁶⁰⁸. In Finland, many adaptation actions are implemented regionally or locally, specifically in flood and water management. Therefore, monitoring data for actions implicitly also cover regional and local actions, even if not explicitly stated so. Local and regional authorities are also part of the Monitoring Group of the NAP (see indicator 11b).

The Helsinki Metropolitan Area is advanced in monitoring and its Adaptation Strategy (2012) has its own monitoring and reporting framework. This framework includes indicators for the seven areas of focus (land use; transport and technical networks; buildings and climate proof local environment; water and waste management; rescue services and safety; social and health services; cooperation to produce and disseminate information). Monitoring information is also disseminated, and three monitoring/progress reports have been published since 2012.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

The first evaluation report on the implementation of the 2005 NAS was published in 2009. A broader evaluation was conducted in 2013 to assess the progress in adaptation and to give feedback and recommendation for the revision of the strategy. These evaluations led to the NAP.

⁶⁰⁷ Ympäristöministeriö, 2013, Ympäristöministeriön hallinnonalan sopeutumisohjelman arviointi. Available at: http://julkaisut.valtioneuvosto.fi/bitstream/handle/10138/41467/YMra_3_2013_Ymparistoministerion.pdf?sequence=2 (In Finnish, Documentation Page in English)

⁶⁰⁸ Lilja-Rothsten et al., 2015, Ilmastomuutoksen sopeutumisen seurannan järjestäminen. Seurantakehikko. *Tapio*. In Finnish: http://mmm.fi/documents/1410837/1516663/MMM-%23220285-v1-sopeutumisen_seurannan_j%C3%A4rjest%C3%A4minen_loppuraportti_.pdf/0aebf686-d8e3-47a8-a213-ca3bb7e4cae8

The mid-term evaluation of the NAP is ongoing and the report will be published at the beginning of 2019.

The NAP is part of the planning system for climate change policy under the Climate Change Act. The act stipulates that the government approves a NAP at least every ten years. The NAS from 2005 had a mid-term and end-term evaluations. Therefore, it is expected that each adaptation plan will be evaluated twice through a mid-term and final evaluation.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / No

The Monitoring Group of the NAP is responsible for the implementation, follow-up, evaluation and communication relating to the NAP and promotes cooperation between sectors in adaptation actions and the overall awareness raising on adaptation. The Group is composed of the Ministry of Agriculture and Forestry, other ministries, research institutes, local, regional and other relevant actors and associations.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
<i>1 Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	<u>Yes</u> / In progress / No
<i>2 Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
<i>3 Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	<u>Yes</u> / In progress / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	<u>Yes</u> / In progress / No
<i>4 Knowledge gaps</i>		
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	<u>Yes</u> / In progress / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
5 Knowledge transfer		
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	<u>Yes</u> / In progress / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	<u>Yes</u> / In progress / No
Step C: Identifying adaptation options		
6 Identification of adaptation options		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	<u>Yes</u> / In progress / No
7 Funding resources identified and allocated		
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / <u>In progress</u> / No
Step D: Implementing adaptation action		
8 Mainstreaming adaptation in planning processes		
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	Yes / <u>No</u>
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	<u>Yes</u> / No
8d	National policy instruments promote adaptation at	<u>Yes</u> / In progress

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	/ No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 Implementing adaptation		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	<u>Yes</u> / In progress / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	<u>Yes</u> / No
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	Yes / <u>No</u>
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	<u>Yes</u> / No
Step E: Monitoring and evaluation of adaptation activities		
10 Monitoring and reporting		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
11 Evaluation		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	<u>Yes</u> / No

Adaptation preparedness scoreboard for France

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List of abbreviations

ADEME	L'Agence de l'environnement et de la maîtrise de l'énergie (Environment and Energy Management Agency)
EIA	Environmental Impact Assessment
EUSALP	EU Strategy for the Alpine Region
INTERREG	Inter-regional cooperation programmes under the European Structural and Investment Funds
IRD	Institut de recherche pour le développement (Institute for Development Research)
INRA	Institut national de la recherche agronomique (National Institute of Agronomic Research)
NAS	National adaptation strategy
NAP	National adaptation plan
ONERC	Observatoire national sur les effets du réchauffement climatique (national observatory on the effects of global warming)
PCAET	Plans Climat-Air-Energie Territoriaux (Territorial Climate-Air-Energy Plans)
PNACC	Plan National d'Adaptation au Changement (National climate adaptation plan, or NAP)
PPRI	Plan de prévention des risques d'inondation (flood risk management plan)
SDAGE	Schémas directeurs d'aménagement et de gestion des eaux (river basin management plans)
SRADDET	Schéma regional d'aménagement, de développement durable et d'égalité des territoires (Regional Plan for Sustainable Development and Territorial Equality)
SRCAE	Schéma régional du climat, de l'air et de l'énergie (Regional Framework on Climate, Air and Energy)

In addition, several abbreviations representing the French acronym for organisations whose titles are given in English are provided once (to provide clarity for French readers).

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

A National Adaptation Strategy, NAS (Stratégie nationale d'adaptation au changement climatique), was adopted in December 2006⁶⁰⁹. It was developed via a wide consultation with stakeholders by the national observatory on the effects of global warming (Observatoire national sur les effets du réchauffement climatique, ONERC), and presents key actors and principles for addressing climate adaptation. A process for revising the NAS was launched with the publication in November 2015 of an evaluation report⁶¹⁰, which was in turn incorporated by ONERC into a wider set of recommendations for action in 2016⁶¹¹, and with the announcement in 2016 of a process for the revision of the National Adaptation Plan (NAP), see below.

A2. Adaptation strategies adopted at subnational levels

At the regional level, all of the 26 (one per region) Regional Frameworks on Climate, Air and Energy (SRCAEs) have been approved, covering 100% of the French population. The SRCAE requirements include detailed information on planned mitigation, air quality and adaptation actions and measures. The section on adaptation measures in each Regional Framework is adapted to the regional context.

Adaptation action plans

B1. National adaptation plan

A National Adaptation Plan 2011-2015, NAP (Plan National d'Adaptation au Changement Climatique - PNACC), was adopted in 2011⁶¹². It sets out a range of proposed actions and implementation processes, covering a wide range of sectors. The NAP was developed in coordination with stakeholders. The development of a new NAP was announced in the national climate plan (Plan Climat), published in July 2017. The adoption of this new NAP is

⁶⁰⁹ See ONERC, 2006 *Stratégie nationale d'adaptation au changement climatique* : https://www.ecologique-solidaire.gouv.fr/sites/default/files/ONERC_Rapport_2006_Strategie_Nationale_WEB.pdf

⁶¹⁰ See Conseil général de l'Environnement et du Développement durable (CGEDD), 2015, *Evaluation du plan national d'adaptation au changement climatique*

http://cgedd.documentation.developpement-durable.gouv.fr/documents/cgedd\010178-01_rapport.pdf

⁶¹¹ See *Adaptation au changement climatique : Évaluation de la démarche nationale et recommandations*, ONERC report to the Prime Minister and to Parliament, 2016. <http://www.ladocumentationfrancaise.fr/rapports-publics/174000726/index.shtml>

⁶¹² Ministère de l'Écologie, du Développement durable, des Transports et du Logement, 2011 : *Plan national d'Adaptation au Changement Climatique*

http://www.ecologique-solidaire.gouv.fr/sites/default/files/ONERC_PNACC_1_complet.pdf

expected by the middle of 2018 but implementation of some actions and measures is already under way⁶¹³.

B2. Adaptation plans adopted at sub-national level

Territorial Climate-Air-Energy Plans (Plans Climat-Air-Energie Territoriaux, PCAET), which are compatible with the SRCAEs' strategic orientations and with urban planning documents, concern all levels, from the region to the municipality. Since 2010, they have been mandatory for local authorities with more than 50 000 inhabitants; and, since 2016, mandatory for local authorities with more than 20 000 inhabitants (2016 was also when air quality requirements were incorporated into the plans).

The process for the adoption of river basin management plans (Schémas directeurs d'aménagement et de gestion des eaux - SDAGE) and flood risk management plans ("plan de prévention des risques d'inondation", PPRI) is set out in detail in the national Environment Law (Code de l'Environnement⁶¹⁴ Livre II, titre 1er), and requires the close involvement of a river basin committee (Comité de Bassin), which includes representatives of local and regional levels of administration. The local and regional authorities are then consulted on the detailed proposals for the plans, with clear evidence of strong participation. A high level of engagement on climate adaptation issues can be observed in the river basin management plans, which are in most cases informed by a specific river basin plan for climate adaptation (plan de bassin d'adaptation au changement climatique).

B3. Sectoral adaptation plans

As established in the first NAP (2011-2015), SDAGEs (2016-2021) are required to include adaptation actions and measures. All SDAGEs had been approved by December 2015.

The National Sea and Coastline Strategy⁶¹⁵ (Stratégie Nationale pour la mer et le littoral) was published in July 2017. This strategy also refers to the national strategy on integrated coastline management (Stratégie intégrée de gestion du trait de côte)⁶¹⁶.

The National Research Strategy⁶¹⁷ includes a reference to climate adaptation, identifying the "responsible management of resources and climate adaptation" as one of 10 societal challenges that research efforts should address.

In the agriculture sector, the General Council for Food, Agriculture, and Rural Areas (Conseil général de l'alimentation, de l'agriculture et des espaces ruraux) was commissioned to

⁶¹³ Personal communication with MS contact.

⁶¹⁴ Code de l'environnement, version consolidée au 21 avril 2018, available at : <https://www.legifrance.gouv.fr/affichCode.do?cidTexte=LEGITEXT000006074220&dateTexte=29990101&categorieLien=cid>

⁶¹⁵ See : https://www.ecologique-solidaire.gouv.fr/sites/default/files/SNML_def.pdf

⁶¹⁶ See : https://www.ecologique-solidaire.gouv.fr/sites/default/files/12004-1_Strat%C3%A9gie%20gestion%20trait%20de%20c%C3%B4te%202017_light.pdf

⁶¹⁷ http://cache.media.enseignementsup-recherche.gouv.fr/file/Strategie_Recherche/26/9/strategie_nationale_recherche_397269.pdf

consider the impact of climate change on the agriculture sector. Its report⁶¹⁸ was published in June 2017 and provides detailed recommendations for a range of scenarios.

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

In France, the Ministry for Ecological and Inclusive Transition (or Ministère de la Transition écologique et solidaire) is responsible for climate adaptation. One of the directorates of the ministry is the General Directorate on Energy and Climate. The General Directorate designs and enforces policies on climate change mitigation and adaptation. Within the General Directorate, the ONERC) is responsible for adaptation policy-making.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

Until recently, there was no specific horizontal governance structure for adaptation in France, although a clear division of responsibilities was identified in the first NAP, and relevant sectoral ministries were involved in its development. Actions were listed in the first NAP according to different sectors, such as agriculture, the forestry sector, fishery, aquaculture, the energy sector, industry, the transport sector, infrastructure, buildings and tourism.

Sectoral departments were then in charge of implementing measures in their area of competence while ONERC ensured overall implementation monitoring; ONERC fulfilled this role, reviewing activity at sectoral level. Every action committed in the NAP identified the leading actors and partners to be considered for implementing each action. The NAP contained a set of identified cross-cutting actions, where many sectoral ministries were involved. More specific sectoral actions also involved several sectoral ministries, where relevant.

This governance system has been reinforced in the process of developing the revised NAP. A specialised Committee of the National Commission for Ecological Transition (CNTE) has been established to guide the actions of ONERC and will also be in charge of the regular monitoring (three times a year) of the future NAP.

⁶¹⁸ “Eau, agriculture et changement climatique: Statu quo ou anticipation? Synthèse et recommandations”, CGAER, 2017

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / In progress / No

Regional planning is led by the regional assemblies and local state representatives. Local adaptation planning is led by the local councils. There has been some vertical integration with regard to climate adaptation through the development of the SRCAE and the PCAET. The SRCAE was created in 2010 by the Grenelle II law ⁶¹⁹. These plans were drawn up in collaboration between the state and the region, and include climate and energy goals, with a requirement for a section on climate adaptation. Since 2016, the duty to develop an SRCAE was replaced by a new requirement for regions to adopt a Regional Plan for Sustainable Development and Territorial Equality, SRADDET (Schéma régional d'aménagement, de développement durable et d'égalité des territoires⁶²⁰).

To implement the SRCAE at a more local level, PCAET were developed. PCAET's were defined by the NAP and integrated into the Grenelle laws. They were required for territories of more than 50,000 inhabitants and could (at the choice of the region) be combined with the SRCAE. The territories are required to integrate adaptation measures in their territorial policies. Climate change mitigation and adaptation are also integrated in the Local Urbanisation Plans and the Territorial Coherence Schemes.

The process for local and regional governments to influence national policy-making is less detailed; however, the Grenelle consultation process, which prepared the first NAP, involved close engagement of local and regional authorities as one of five "colleges" (NGOs; state; employers; employees; territorial collectivities). The Ministry for the Ecological and Inclusive Transition has provided for the involvement of local and regional authorities in developing the revision process of the NAP, and in particular has called for the regional economic, social and environmental councils (Conseils économiques, sociaux et environnementaux régionaux) to be closely associated with the new NAP.

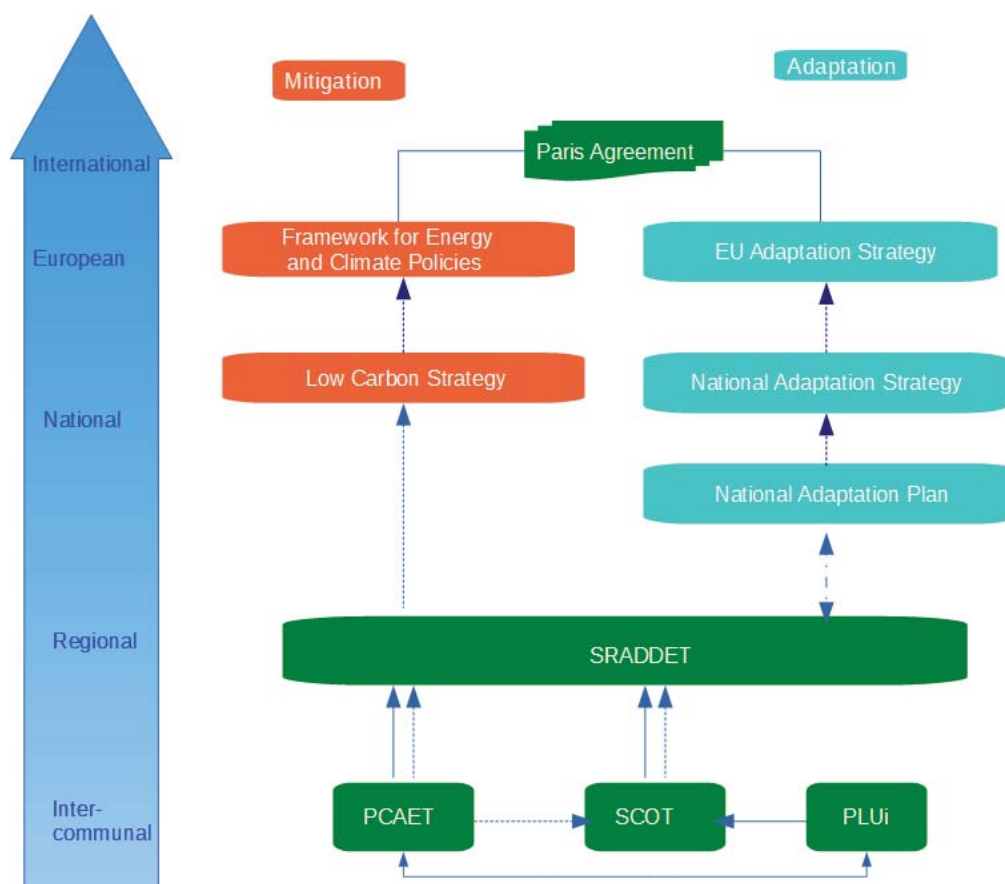
The coordination of cities is ensured by the regional level, because the PCAET should be in coherence with the SRADDET, but also with the sectoral plans, schemes and strategies, such as SDAGEs, PPRIs, Coastline Management Strategy or Mountain Area Strategy, when relevant.

The process for vertical and horizontal coordination is presented in the figure below.

⁶¹⁹ Loi no 2010-788 du 12 juillet 2010 portant engagement national pour l'environnement.

⁶²⁰ See : Décret n° 2016-1071 du 3 août 2016 relatif au schéma régional d'aménagement, de développement durable et d'égalité des territoires.

Figure 1: Stakeholder's involvement in policy development



2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

A range of different stakeholders were involved in the development of the first NAP. In advance of its development, there was a concertation in 2010 of elected representatives, communities, the state, employers, unions and associations. National groups, overseas regions, interregional groups submitted reports in 2010. Furthermore, a report of a public consultation was published online⁶²¹. An active process of stakeholder involvement is also in hand for the revision of the NAP.

Six working groups were engaged from June 2016 to July 2017. They proposed 33 recommendations⁶²², which are intended to form the basis of the new NAP. The process for the development of adaptation policy, including the development of the new NAP, relies

⁶²¹ See p.9 of the NAP, referred to in footnote 612

⁶²² See: <https://www.ecologique-solidaire.gouv.fr/adaptation-france-au-changement-climatique#e>

heavily on stakeholder engagement, and provides frequent opportunities for stakeholder input on specific issues.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

The current NAS contains some statements about transboundary coordination to ensure a sound territorial approach to the adaptation action, but there is no indication of action to prepare for transboundary cooperation on common challenges. While the current NAP includes a section on international and European cooperation, it focuses on development aid issues, and on EU-level policymaking, and does not address transboundary issues related to the French territory. However, there is some transboundary cooperation at national government level, and the revised NAP is expected to address transboundary issues more directly⁶²³.

Transboundary issues in France are mostly addressed via EU Interreg projects, or via transboundary SDAGEs (Meuse, Rhine) or transboundary observatories (Pyrenees) or international conventions (Alpine Convention, Mediterranean action plan, Indian Ocean Commission). It has not been possible to establish to what extent this is coordinated at national level, although there is active involvement of prefectural services, representing the national government. There is some collaboration on climate adaptation in these projects. For example, the Interreg project POCTEFA between France and Spain, the Interreg 2 MERS between France, England and the Netherlands and the Interreg ALCOTRA between France and Italy have climate adaptation cooperation among their goals. The AMICE project under the Interreg North West Europe programme specifically addressed climate adaptation in the Meuse river basin. Recently, a project on adaptation in the Alpine areas (ARTACLIM) has been launched in the frame of the Interreg Alcotra (Italy-France) project. France is also involved in the implementation of the EU Strategy for the Alpine Region (EUSALP).

In 2017, France involved one of its experts in the Alpine Climate Board, which was established under the Alpine Convention to bundle together climate change initiatives in the Alpine area and to elaborate proposals for a concrete set of objectives of the Alpine Convention towards the perspective of a “climate-neutral Alpine space”. In addition, close cooperation must be established with the various projects of the Alpine Space Program (the European transnational programme for the Alpine Region) and Action Groups under the EUSALP.

As of 1 January 2018, the L'ASADAC-MDP (Savoie Vivante et l'Agence touristique départementale de la Savoie) merged into AGATE (Agence alpine des territoires). The Observatoire Savoyard du Changement Climatique is part of AGATE.

⁶²³ Personal communication with MS contact.

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / In progress / No

The website of Météo-France (the French national weather service) contains information on the climate in the past, present and the future⁶²⁴. Yearly and seasonal assessments, public climatologic data and early warning system for extreme events including storm surges are available to the public⁶²⁵. Data include knowledge on temperatures, rainfall, humidity, atmospheric pressure, wind, sunshine, storms, snow, droughts, etc. (Météo-France, 2017a). In addition, climate change indicators for France are available online and regularly updated on the ONERC website. They include climate indicators regarding the atmosphere, temperature and precipitation. An ONERC indicator is dedicated to population exposure to climate events⁶²⁶, based on the climate events database (Gaspar⁶²⁷) crossed with the population database.

In addition to the monitoring of extreme weather events and impacts in France referred to above, France also contributes to global monitoring efforts. The Institut Pierre Simon Laplace contributes to climate studies on a global scale. The institute studies the atmosphere, the oceans, the ice, the continental surfaces, marine biogeochemistry, the radiative balance of the Earth, and the water and carbon cycles⁶²⁸. The National Observation Services are bodies tasked with documenting the formation, evolution and variability of the astronomical system and the terrestrial environment on the long term⁶²⁹.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

ONERC collects and disseminates information on the risks of climate change including climate projections. ONERC is in contact with scientific organisations, such as the National Centre for Scientific Research (CNRS), the national meteorological and climatological service (Météo-France), the Research Institute for Development (IRD) and the National Institute of Agronomic Research (INRA).

⁶²⁴ See Tout savoir sur la météo, le climat et Météo-France. Available online (accessed the 14th March 2017)

<http://www.meteofrance.fr/climat-passe-et-futur>

⁶²⁵ See: <http://pluiesextremes.meteo.fr/>

⁶²⁶ See: <https://www.ecologique-solidaire.gouv.fr/impacts-du-changement-climatique-sante-et-societe>

⁶²⁷ See: <https://www.data.gouv.fr/fr/datasets/gaspar/>

⁶²⁸ Institut Pierre Simon Laplace : *A propos de l'IPSL* : <https://www.ipsl.fr/Organisation/A-propos-de-l-IPSL>

⁶²⁹ Centre National de Recherche Scientifique (CNRS) *Services Nationaux d'Observation* :

<http://www.insu.cnrs.fr/node/1228>

Climate projections are available through an extensive scientific approach via a reference climate scenarios report, a sea-level rise report and a downscaled indices report.

A scientific report assessing future climate projections until 2100 in France, “The climate in France in the 21st century” was published in 2014⁶³⁰. The report was commissioned by the Ministry of Sustainable Development (the current Ministry for the Ecological and Inclusive Transition), and written by scientists from Météo-France in collaboration with scientists from IPSL (Institut Pierre Simon Laplace) and from Cerfacs (Centre européen de recherche et de formation avancée en calcul scientifique). The evolution of precipitations and temperatures were studied. The scenarios are based on three of the four scenarios of the Intergovernmental on Climate Change (IPCC) 5th Assessment Report (AR5).

From 2009 to 2013, the Datar (now CGET) entrusted the regional prefects with the steering of six studies addressing vulnerability and adaptation issues at the interregional level (with the exception of Île-de-France and Overseas territories). Whenever possible, this work was articulated in line with the preparation of the SRCAE in cooperation with the Regional Councils. These six studies have also contributed to the PCAET.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

In 2009⁶³¹, the Ministry of Ecology, Energy, Sustainable Development and the Sea (the current Ministry for the Ecological and Inclusive Transition) produced a report on the costs of the impact of climate change, which was the result of meetings between ministries to assess the sectoral costs of the impact and adaptation to climate change. These groups were centrally organised by the Ministry of Ecology, Energy, Sustainable Development and the Sea. The groups consisted of experts from research, administration and the private sector. The knowledge base was built around various research projects at national, regional and local level. The sectoral costs in the sectors of health, agriculture, forestry, water, transport infrastructure, building infrastructure, energy, tourism, natural risks and insurances, biodiversity and territories were presented.

In 1999, the Ministry of Ecology, Sustainable Development, Transports and Housing (the current Ministry for the Ecological and Inclusive Transition) launched the research programme ‘Management and Impacts of Climate Change’⁶³² (GICC). Different organisms

⁶³⁰ Jouzel J., G. Ouzeau, M. Déqué, M. Jouini, S. Planton, R. Vautard, M. Vrac Jouzel et al., 2014, [Le climat de la France au XXIe siècle Scénarios régionalisés – Édition 2014 pour la métropole et les régions d’outre-mer, Août 2014](#)p.3, <http://www.drias-climat.fr/>

⁶³¹ Ministère de l’Ecologie, de l’Energie, du Développement Durable et de la Mer (2009) : Changement climatique : Coûts des impacts et pistes d’adaptation.

http://www.ecologie-solidaire.gouv.fr/sites/default/files/ONERC_rapport_Climate%20change_Costs%20of%20impacts%20and%20li nes%20of%20adaptation_ENG.pdf

⁶³² See Gestion et Impacts du Changement Climatique : Presentation of the GICC programme.

contribute to the programme, such as the French Board for Economic Studies and Environmental Evaluation (D4E), the inter-ministry task-force on the greenhouse effect (MIES), the French Environment and Energy Management Agency (ADEME), ONERC, the French Biodiversity Institute, etc. They gather information on climate change impact, greenhouse gas limitation and adaptation measures to support public policies. Studies include research on impacts on health, agriculture, coastal impacts, forests, fisheries, etc. In 2012, impacts, vulnerability and adaptation options in French overseas regions were evaluated for various sectors⁶³³.

Nevertheless, the 2015 evaluation of the NAP mentions (p.43) that no study has yet been carried out to identify the industrial sectors or tourism sectors most vulnerable to climate change or to indicate opportunities, as it was foreseen in the NAP. To fill the gaps, sectoral vulnerability assessment is expected to be conducted as part of the second NAP.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

The assessment report (see Indicator 3c) does not consider impacts spreading across borders. The NAS contains some statements about consistency of adaptation action across boundaries, but this objective is not developed in the NAP into specific action. Nevertheless, some detailed and structured assessment of specific transboundary risks is included in material developed under transboundary structure and projects referred to at Indicator 2b above. As noted above, it is expected that the revised NAP will focus more explicitly on transboundary issues.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / In progress / No

The first NAP (2011) contained a high number of detailed and focused research actions across most thematic sections, plus an additional section on research. ONERC is charged with making recommendations about knowledge needs to inform the NAS, and works in coordination with the relevant national research institutions.

Although it is not fully clear what mechanisms exist for funding (e.g. there is not an explicit link of the needs identified in the NAP with the national research programme⁶³⁴, or the GICC), a 2013 mid-term evaluation of implementation of the NAP⁶³⁵ stated that, despite a

<http://www.gip-ecofor.org/gicc/?q=en/node/119>

⁶³³ See : [https://www.ecologique-](https://www.ecologique-solidaire.gouv.fr/sites/default/files/ONERC_Rapport_2012_OutreMer_WEB.pdf)

[solidaire.gouv.fr/sites/default/files/ONERC_Rapport_2012_OutreMer_WEB.pdf](https://www.ecologique-solidaire.gouv.fr/sites/default/files/ONERC_Rapport_2012_OutreMer_WEB.pdf)

⁶³⁴ Stratégie nationale pour la recherche et l'innovation

⁶³⁵ *Évaluation à mi-parcours du Plan national d'adaptation au changement climatique*, ONERC 2013

significant shortfall in the funding initially expected, 94% of the research actions identified in the 'research' section of the NAP had already been funded⁶³⁶. Similar figures were reported for other knowledge gathering actions identified as a priority in other NAP sections. This is evidence that knowledge gaps are identified and funding is mobilised to address them (also through the identification of new co-financing partners). The 2015 evaluation of the NAP identifies new knowledge gaps and makes recommendations, directed at specific government ministries, to address them.

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / In progress / No

Since July 2012, there is free access to the latest French high-resolution climate simulations and data (projections, parameters, indices) provided by the "Drias – les futurs du climat" website, which aims at providing climate services in France.

The ONERC collects and disseminates information on the risks of climate change. Reports are available on the site of the Ministry for Ecological and Inclusive Transition.

The NAP mentions (p.50) the goal to develop a website to spread recent scientific information on climate change. The Wiklimat platform was developed within the framework of the national adaptation plan to climate change. It was established in 2013. The website contains information on initiatives regarding climate adaptation. Different stakeholders can share their experiences and realisations. The information on the website is structured according to sectoral fields (agriculture, biodiversity, energy, forestry, etc.), environments (forests, sea, cities, etc.), on territories (international, Europe, outermost regions, French regions) and on stakeholders (state, communities, associations, private sector, etc.)⁶³⁷.

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / In progress / No

A partnership between the national education ministry and Météo-France led to the creation of a website about the atmosphere, the climate and its evolution, in support of education programs in primary school, middle school and high school⁶³⁸.

The French Environment and Energy Management Agency (ADEME) provides advice and expertise on climate change mitigation and adaptation to businesses, local authorities and

⁶³⁶ For instance, the National Forest Plan fosters research on adaptation solutions. Similar research is also conducted in fisheries and aquaculture.

⁶³⁷ See <http://wiklimat.developpement-durable.gouv.fr/index.php/Portail:Wiklimat>

⁶³⁸ See <http://education.meteofrance.fr/>, (MEDTL, 2011, p. 52) (Météo-France, 2017b)

communities, government bodies and the public at large. ADEME supports research and innovation and sets up communication campaigns to inform the public and raise awareness⁶³⁹.

In addition, the current NAP mentions that the strategy on jobs in the green economy has to take the impact of climate adaptation in different sectors into account. Detailed work on the development of the new plan included a focus on employment and training issues, and detailed recommendations on socio-economic impacts (as part of the recommendations of stakeholder working groups published in July 2017). It emphasised the need for a detailed analysis of training requirements.

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

Some progress under the current NAP has been made in all 17 of the sectors for which actions and measures were identified⁶⁴⁰. For example, the project “Climator” assessed the impacts of climate change on agriculture in France from 2007 until 2010 and was carried out by 7 institutes and organisations. The project was financed by the National Research Agency (ANR). Estimations were done at 13 sites representative for France. The work of Climator consists of analyses of possible impacts according to different hypotheses about the climate in the future. Prospective models were created on a biotechnological level⁶⁴¹. Local strategies for the management of the risk of flooding have been developed as well as coastal Risk Prevention Programs (PPR) that function as climate adaptation measures.

The evaluation of the NAP notes that an intended study to identify the industrial sectors or touristic sectors most vulnerable to climate change or to indicate opportunities, has not in fact been carried out. Sectoral vulnerability assessment is now a priority foreseen in the second NAP.

Work on the development of the new NAP has included a comprehensive cross-sectoral analysis of needs, culminating in the publication of recommendations from stakeholder groups in July 2017, referred to above.

⁶³⁹ See <http://www.ademe.fr/en/about-ademe>

⁶⁴⁰ Health; water resources; biodiversity; natural risks; agriculture; forestry; fisheries and aquaculture; energy and industry; infrastructure and transport; planning and the built environment; tourism; publicity; training and education; research; finance and insurance; coastal areas; mountain areas.

⁶⁴¹ See Institut National de la Recherche Agronomique : Projet Climator
http://w3.avignon.inra.fr/projet_climator/

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

Research was carried out in 2009 to identify sectoral costs and benefits of adaptation action⁶⁴². The 2015 evaluation of the NAP notes the need for further work to identify costs and benefits of adaptation measures in different sectors. However, a stakeholders' consultation, which took place from June 2016 to July 2017, prioritised 33 recommendations grouped in six major domains.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / In progress /No

Several adaptation measures related to disaster risk reduction are being implemented. More specifically, the French NAS mentions reducing risk inequalities among its four objectives and as one of the four transversal approaches. This notion was translated into the first NAP, which included a dedicated section on natural hazards (28 measures out of 240). These measures are structured around five main areas: i) developing knowledge in sensitive areas, ii) developing observations, iii) a flagship measure on sea level rise; generalising vigilance and alert mechanisms; iv) integrating climate change impacts on natural hazards in urban management; and v) reducing vulnerability and increasing resilience and adaptation to climate change. The second NAP will also contain a “resilience and prevention” domain.

The first NAP included 28 measures related to dealing with natural hazard. Information tools have been developed and practices by professionals on their assessment of natural hazard risks have been reviewed. An iterative process is intended to ensure tools are timely adapted.

Both climate adaptation and disaster risk management have clear structures at national and regional levels. Cooperation between the two is to some extent guaranteed by the role of Prefects in the hierarchy of both.

France has a detailed mechanism for disaster risk management, based on the publication of plans at the level of each département setting out how the response to a range of risks will be organised (“L’organisation de la réponse de sécurité civile”). These include the identification of key climate-related risks (heatwaves, floods, etc), and the impact of climate change is taken into account in their identification, and in the plans themselves. In addition, a specific plan for reducing flood risks (PPRI) is prepared in zones at risk of flooding, with a process for ensuring that it is informed by developments in climate modelling. A national strategy for

⁶⁴² Ministère de l’Ecologie, de l’Energie, du Développement Durable et de la Mer : *Changement climatique : Coûts des impacts et pistes d’adaptation*. http://www.ecologique-solidaire.gouv.fr/sites/default/files/ONERC_rapport_Climate%20change_Costs%20of%20impacts%20and%20li nes%20of%20adaptation_ENG.pdf

managing flood risks (“stratégie nationale de gestion des risques d’inondation”) was adopted in 2014⁶⁴³, with a focus on the need to identify increased risks as a result of the impacts of climate change.

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / In Progress / No

The cost of implementing the NAP has been estimated at EUR 171 million, excluding governmental staff costs. The budget of EUR 171 million aimed to finance all the activities in the NAP, including sectoral, transversal and territorial actions. A total of EUR 391 million for future investments has contributed partially to climate adaptation. The financing of the Plan against Drought and the Fast Submersion Plan contributed with another EUR 500 million for the period 2011-2016 to the adaptation needs. However, the final assessment was not able to conclude on the level of actual financial commitment, given the partial coverage of the financial monitoring.

The second NAP is still under consideration, but it is foreseen that the Specialised Commission of the National Committee for Ecological Transition (CNTE) will regularly monitor the budget allocation and execution.

In France, adaptation is also indirectly promoted via the State’s role on insurance markets. The State acts as reinsurer of last resort. Moreover, insurers are directly involved in funding risk prevention policies. Levies collected by private insurers contribute to financing state-sponsored preventive action (via the so-called Barnier Fund⁶⁴⁴), such as relocating high-risk assets, risk reduction investments by individuals, and risk assessment and risk management undertakings by local authorities.

France allocated the second-highest level of funding from EU Structural and Investment Funds to Thematic Objective 5 “Promoting climate change adaptation, risk prevention and management”, with a total of EUR4866m, the bulk of it from rural development funds.

⁶⁴³ “Stratégie nationale de gestion des risques d’inondation”, Ministère de l’Écologie, du Développement durable et de l’Énergie, 2014 ; https://www.ecologique-solidaire.gouv.fr/sites/default/files/2014_Strategie_nationale_gestion_risques_inondations.pdf

⁶⁴⁴ See : <http://www.doubs.gouv.fr/Politiques-publiques/Amenagement-du-territoire-Construction-Logement-et-Transports/Financement-des-projets-d-investissement/Fonds-de-prevention-des-riques-naturels-majeurs>

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

Directive 2014/52 on Environmental Impact Assessment (EIA) has been implemented in France by a regulation from 2016⁶⁴⁵. The national legislation requirements are expressed in terms of the need to assess the impact of projects and, in the case of the Strategic Environmental Assessment (SEA) Directive, plans and programmes on the climate. The requirement to address climate impacts is not, however, further specified in order to consider adaptation needs. A guide to climate vulnerability assessment in the national EIA framework is under consideration.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / No

Some future risks are being considered in current French disaster risk management plans. Risk is considered in coastal planning through the July 2011 guidelines for storm-surge risk zoning, including future sea-level rise. The projected increase in frequency and intensity of heat waves is included in the “Heatwave Plan” at national and local levels. Similarly, the national strategy for managing flood risks (see Indicator 6c above) identifies increased risk of extreme weather events and the impacts of sea-level rise as key drivers for increased preparedness.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / No

The first NAP covered urban planning, coasts and mountain areas. The 2013 mid-term evaluation suggested that the integration of adaptation considerations into key land use and urban planning as well as in coastal and mountain areas was progressing satisfactorily. At the regional and local level, the SRADDET (SRCAE) and the PCAET (PCET) continue to promote the inclusion of adaptation policy in local spatial/urban planning.

⁶⁴⁵ Ordonnance no 2016-1058 du 3 août 2016 relative à la modification des règles applicables à l'évaluation environnementale des projets, plans et programmes

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / In progress / No

The NAS mentions recommendations regarding agriculture, energy and industry, the transport sector, buildings and habitats, tourism, banks and insurance. The first NAP focused on ensuring that adaptation was mainstreamed in various sectoral policies, with actions and measures listed in 17 sectoral fiches. The sectoral coverage of the NAP was extensive. Adaptation actions were mentioned in relation to agriculture, forestry, fisheries, aquaculture, energy, industry, transport, infrastructure, buildings, and tourism. The 2015 evaluation suggested that the integration of adaptation considerations into resource management policies is progressing satisfactorily in biodiversity, forestry and agriculture. Some initial steps have also been taken to integrate adaptation into water management cycles, as SDAGEs are revised, including some achievements in specific river basins. As noted above, the recommendations published for the revised NAP in July 2017 include detailed assessment of a wide range of sectoral policy needs.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / No

The French system has a long history of investigating the role of insurance in risk management, and includes a public mechanism to avoid social exclusion and adverse-selection phenomena in the natural catastrophe insurance market: the Bureau Central de Tarification. It provides insurance to those that cannot obtain it through regular market venues, for either availability or affordability reasons. No indication of other types of public-private cooperation for the financing of adaptation action could be found.

The reinforcement of insurance as a tool to face climate change was one of the objectives of first the NAP, together with the provision of other incentives for investments. The mid-term evaluation of 2013, however, concluded that it was too early to consider that insurance objectives had been met, given the complexity of the issue, and noted that there were significant works still to be implemented to introduce the consideration of resilience to climate change into public investments, and to identify financial resources to finance adaptation. The 2015 evaluation addresses (p.83) the trade-off between solidarity and incentives to adaptation action, notes that new mechanisms have been introduced in the forestry sector to remove some climate risks from solidarity mechanisms and encourage private insurance, in order to improve incentives to action, and suggests that this should be adopted more widely.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / In Progress / No

The first NAP sets out lists of actions organised by 17 sectors⁶⁴⁶, together with lists of horizontal actions, European and international actions, and for governance actions. Specific sectoral strategies on adaptation were not envisaged, although in many cases, broader sectoral strategies have included a focus on climate adaptation. Most actions and measures have been implemented under the first NAP covering the period 2011-2015; fewer than 10% were abandoned, due to lack of budget or human resource, or because they were no longer relevant. A total of 24 actions were abandoned, relating mostly to biodiversity, forestry, research and, especially, financing and insurance (nine actions)⁶⁴⁷. The second NAP is being developed and is now expected to be published around the middle of 2018.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / No

Regional and local governments are not directly involved in implementing the NAP. One of the first NAP actions included reporting about the consistency of national and regional strategies (i.e. *a posteriori*), instead of identifying cooperation and coordination mechanisms to build adaptation strategies that are territorially consistent (*a priori*). Regional administrations were mentioned as partners of the NAP. For local administrations, the provision of guidance was mostly considered. A dedicated set of measures in the NAP focused on reinforcing the coherence of adaptation action at the subnational level. It mostly consisted of the provision of guidance and development of the framework for additional coordination. The second NAP is intended to reinforce the vertical integration mechanisms. However, it should be noted that climate adaptation mechanisms are built into a wide range of specific policy instruments relevant to adaptation, as detailed in Indicator 1c above.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / No

Ademe produced guidelines to support the assessment of climate impacts in major projects and programmes. Some measures are planned, and some have been progressed, but they cannot be considered as implemented.

⁶⁴⁶ See footnote 612

⁶⁴⁷ See footnote 610

Regarding infrastructure, France has reviewed design codes and infrastructure standards in the transport sector that are related to climate variables. France is also developing a methodology for assessing the vulnerability of French airports to climate change. A guide looking at transport networks in general is under development. A network of infrastructure managers has been established that meets regularly and exchanges experience.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / **No**

The 2015 evaluation document (p.43) mentions that there is a lack of involvement of territorial communities in NAP implementation and too little involvement of professional sectors. The evaluation indicated that the first NAP was mostly implemented by the state and its organisms and focused on national measures. However, preparation and revision of the NAP and the NAS are based on a fully participatory process, and the evaluation called for a deepening of the existing processes. A special body has been created as an Advisory Council and will monitor NAP implementation – see Indicator 1b above. France has a highly developed system of stakeholder engagement on environmental issues, based on Chapter 1 of the national Environment Law (Code de l'environnement), which sets out detailed requirements for public and stakeholder engagement in the development of plans, such as the NAP.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / No

An annual report on the achievements of the NAP was foreseen in the plan. This annual follow-up is coordinated by ONERC. At the end of 2011, there was a first meeting between the actors in charge of the different themes to discuss the implementation of the plan. A first synthesis of the implementation of the NAP was presented in 2012 at the National Committee of Sustainable Development and the Grenelle of the Environment (CNDDGE), followed by a dossier on progress published in 2013⁶⁴⁸. The progress statements did not provide detailed or aggregate information on the finance made available for implementation.

The General Council for the Environment and Sustainable Development (or Conseil général de l'environnement et du développement durable, CGEDD) evaluated implementation of the

⁶⁴⁸ ONERC, Dossier d'avancement du 1er Plan national d'adaptation au changement climatique après 2 années de mise en œuvre (2013) :

https://www.ecologique-solidaire.gouv.fr/sites/default/files/ONERC_PointAvancement_2ans_2013.pdf

NAP in 2015. The report includes quantitative and qualitative information. Around 80% of the actions and 75% of measures of the NAP were achieved according to the evaluation.⁶⁴⁹

As noted in relation to Indicator 1b above, improvements to the process of monitoring implementation are being put in place for the revised NAP.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

The implementation of the first NAP in different sectors is presented in the central evaluation report (see Indicator 10a). The report indicates the amount of actions per theme that were implemented, delayed or cancelled. In addition, the overall implementation per theme and sector is briefly discussed as poorly, partially or strongly implemented.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / No

Cooperation with local and regional administrations on monitoring adaptation action seems quite limited. In the absence of a multilevel governance system for adaptation, a procedure for collecting information on actions carried out below the national level does not exist. As part of the 'governance' actions in the development of the revised NAP, some studies, such as the 2015 evaluation report, have focused on assessing the coherence between national and territorial approaches to climate adaptation. This included the publication of a fiche elaborating the NAP to action at lower territorial levels, which also formed part of the stakeholder recommendations in 2017. This includes stakeholder recommendations for improved coherence, and the creation of regional adaptation committees. The second NAP is intended to address this weakness, but at this moment, the process is under construction.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

The first NAP, covering a four-year period from 2011 to 2015, was planned to be evaluated at the midway stage, in 2013, with a full evaluation carried out in 2015 with a view to its revision and updating. As noted above, the NAP was evaluated in 2015. As set out in Section B1 above, a process for revising the NAP, and producing a new NAP, is under way. The second NAP is planned to be validated during the first anniversary of the Climate Plan in July 2018.

⁶⁴⁹ See footnote 2

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / No

The different stakeholders were not involved systematically in the follow-up of the implementation or evaluation of the first NAP, but have been comprehensively involved in preparation of the new NAP (and hence the review of the first NAP). The first NAP defined that the General Director of Energy and Climate had to chair an evaluation committee together with stakeholders such as representatives of the administration in charge of the implementation of the NAP, national and local representatives and scientists. Annual meetings on the implementation and evaluation were foreseen. This committee was not, however, created, and instead the National Council on the Ecological Transition acted as the monitoring and evaluation committee.

Stakeholders have been actively participating in the preparatory work leading to the updated NAP. A special body has been created as an Advisory Council that will monitor the NAP implementation progress.

Based on the available information, it can be concluded that stakeholders are involved in the evaluation of the NAP.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 Coordination structure		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	<u>Yes</u> / In progress / No
2 Stakeholders' involvement in policy development		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 Current and projected climate change		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	<u>Yes</u> / In progress / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No
4 Knowledge gaps		

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	<u>Yes</u> / In progress / No
5 Knowledge transfer		
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	<u>Yes</u> / In progress / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	<u>Yes</u> / In progress / No
Step C: Identifying adaptation options		
6 Identification of adaptation options		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	<u>Yes</u> / In progress / No
7 Funding resources identified and allocated		
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	<u>Yes</u> / In Progress / No
Step D: Implementing adaptation action		
8 Mainstreaming adaptation in planning processes		
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	Yes / <u>No</u>
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	<u>Yes</u> / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	<u>Yes</u> / No
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	Yes / <u>In progress</u> / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 Implementing adaptation		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In Progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	Yes / <u>No</u>
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	<u>Yes</u> / No
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	Yes / <u>No</u>
Step E: Monitoring and evaluation of adaptation activities		
10 Monitoring and reporting		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
11 Evaluation		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	<u>Yes</u> / No

Adaptation preparedness scoreboard for Germany

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List of abbreviations

APA	National Adaptation Plan
BMBF	Federal Ministry of Education and Research
BMU	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
BMU/UBA	German Environmental Agency
BMVI	Federal Ministry of Transport and Digital Infrastructure
DAS	National Adaptation Strategy (Deutsche Anpassungsstrategie)
DFG	German Research Foundation
DWD	Germany's National Meteorological Service
EIA	Environmental Impact Assessment
GI	Green Infrastructure
ICLEI	Local Governments for Sustainability
IMA	Inter-ministerial Working Group
IPCC	Intergovernmental Panel on Climate Change
NGO	Non-Governmental Organisation
SEA	Strategic Environmental Assessment

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

Germany adopted its National Adaptation Strategy (DAS)⁶⁵⁰ on 17 December 2008. The Strategy's aim is to proactively reduce vulnerability to the consequences of climate change, to maintain or improve the adaptability of natural, social and economic systems, and to take advantage of opportunities that may rise from effects of climate change. The DAS presents an overview of the effects of climate change, respectively following a sectoral and a geographic approach. In short, the DAS takes into account existing global and national climate projections, as a basis for identification of knowledge gaps and the first steps towards an action plan. The DAS set the framework conditions for tackling climate adaptation in Germany. It was drafted in a manner that allows for continuous refinement, matching the rapid developments in this policy field. In this light, the federal government adopted a report⁶⁵¹ on progress up to the end of 2015 with concrete and updated steps to develop and implement the DAS.

A2. Adaptation strategies adopted at subnational levels

All 16 Bundesländer (federal states) have developed climate adaptation strategies and have developed measures, some as a part of an integral climate change strategy or programme⁶⁵² (i.e. 100% of territory covered).

Bundesländer, or regions at the NUTS I level, exercise legislative powers in all areas that are not the exclusive competence of the Federal level. Environmental policy (including climate adaptation) is a concurrent competence between the federal level and Bundesländer level. The Bundesländer also implement legislation at lower levels of governance.

At the time when the DAS was developed (before 2009), 13 Bundesländer had already carried out studies of climate impacts on various sectors. Sectors commonly covered include water management, forestry, agriculture and health. Studies of the climate impacts on biodiversity and soils are less common. The northern German Bundesländer have studies on coastal protection. Specific strategies and measures taken by the Länder administrations are drafted in

⁶⁵⁰ German Federal Government (2008). German Strategy for Adaptation to Climate Change. Available at: http://www.bmub.bund.de/fileadmin/bmu-import/files/english/pdf/application/pdf/das_gesamt_en_bf.pdf

⁶⁵¹ German Federal Government (2015). Adaptation to Climate Change: Initial Progress Report by the Federal Government on Germany's Adaptation Strategy. Available at: https://www.bmu.de/fileadmin/Daten_BMU/Pool/Broschueren/fortschrittsbericht_anpassung_klimawandel_en_bf.pdf

⁶⁵² See for example: Baden-Württemberg Ministry for Environment, Climate, and Energy (2015). Strategie zur Anpassung an den Klimawandel in Baden-Württemberg. Available at: https://um.baden-wuerttemberg.de/fileadmin/redaktion/m-um/intern/Dateien/Dokumente/4_Klima/Klimawandel/Anpassungsstrategie.pdf

a coordinated manner, by means of KomPass - Climate Impacts and Adaptation in Germany⁶⁵³.

Although both the DAS and the national action plan (APA) were drafted at Federal level, these documents build on the activities already undertaken by various Länder and the actions that were commonly defined and carried out at both governance levels. This shows the result of a continuous dialogue between the Länder and the Federal Government. The actual actions concerned vary from Land to Land. Some Länder focus on reducing greenhouse emissions – including by means of legislation – while others have adopted a fully-fledged adaptation strategy at Bundesländ level.

Adaptation action plans

B1. National adaptation plan

The APA⁶⁵⁴ (national adaptation plan) was adopted on 31 August 2011. Its main objectives are to implement the DAS and to take steps for the next revision of the DAS. The APA follows a sectoral approach. The sectors presented are human health, the building sector, water regime, water management, coastal and marine protection, soil, biological diversity, agriculture, forestry and forest management, fishery, the energy industry (conversion, transport and supply), the financial services industry, transport and transport infrastructure, trade and industry, tourism industry; and cross-sectional topics, such as spatial, regional and physical development planning and civil protection. The APA was updated as part of the progress report in 2015 (APA II)⁶⁵⁵. The main ‘clusters’ (i.e. aggregated sectors) that are covered are water, infrastructure, land, health, economy, spatial planning, and civil defence.

B2. Adaptation plans adopted at sub-national level

The APA II lays down a set of criteria for measures to be taken at the level of the Bundesländer, in addition to those to be addressed at the federal level. Examples of these criteria are the extent to which measures are ‘no-regret’, or of direct or indirect relevance to climate adaptation. The initial lack of a cost-benefit analysis was provisionally filled by means of expert judgment on the efficiency and effectiveness of measures. Furthermore, the

⁶⁵³ German Federal Government (2011). The Competence Center for Climate Impact and Adaptation (KomPass). Available at: <http://www.umweltbundesamt.de/themen/klima-energie/klimafolgen-anpassung/kompass>

⁶⁵⁴ German Federal Government (2011). Adaptation Action Plan of the German Strategy for Adaptation to Climate Change. Available at: http://www.bmub.bund.de/fileadmin/bmu-import/files/pdfs/allgemein/application/pdf/aktionsplan_anpassung_klimawandel_en_bf.pdf

⁶⁵⁵ German Federal Government (2015). Fortschrittsbericht zur Deutschen Anpassungsstrategie an den Klimawandel. Available at: http://www.bmu.de/fileadmin/Daten_BMU/Download_PDF/Klimaschutz/klimawandel_das_fortschrittsbericht_bf.pdf

states of Hamburg (2013) and Hessen (2017) have both complemented their adaptation strategies with comprehensive action plans.

B3. Sectoral adaptation plans

Neither the DAS nor the APA presented an analysis allowing sectors to prioritise measures, such as a cost-benefit study specifically addressing risks per sector, or a supporting vulnerability analysis. This was, however, well acknowledged and it prompted the Federal Government to make the closing of this significant knowledge gap a key area of the Action Plan from 2011 onwards⁶⁵⁶. Within the “Netzwerk Vulnerabilität”, also established in 2011, vulnerability assessments were carried out to support prioritisation of climate risks. These were published in 2015 in a dedicated report on Germany’s climate vulnerability⁶⁵⁷. The DAS monitoring and progress report (2015) also summarises the results.⁶⁵⁸

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

In Germany, the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety is the central administration body. Executive power for policy making (i.e. continued development of the DAS and horizontal/vertical coordination) lies with a designated inter-institutional working group – the IMA (Interministerielle Arbeitsgruppe Anpassungsstrategie). The IMA is supported by the StA AFK (Ständiger Ausschuss zur Anpassung an die Folgen des Klimawandels), a further committee whose task is the coordination of action between the federal and Bundesländer institutions for climate adaptation (see Indicator 1b and 1c).

⁶⁵⁶ German Federal Government (2011). Adaptation Action Plan of the German Strategy for Adaptation to Climate Change. Available at: http://www.bmub.bund.de/fileadmin/bmu-import/files/pdfs/allgemein/application/pdf/aktionsplan_anpassung_klimawandel_en_bf.pdf

⁶⁵⁷ German Federal Government (2015). Vulnerabilität Deutschlands gegenüber dem Klimawandel. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/climate_change_24_2015_vulnerabilitaet_deutschlands_gegenueber_dem_klimawandel_1.pdf

⁶⁵⁸ German Federal Government (2015). Monitoringsbericht 2015. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/monitoringbericht_2015_zur_deutschen_anpassungsstrategie_an_den_klimawandel.pdf

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities. At the federal level, there is an Inter-Ministerial Working Group (IMA Anpassung) mandated by the cabinet, which meets 3 to 6 times a year, involving all federal ministries. This IWG supervised the drafting of the APA and the progress report, among other activities. For the implementation of adaptation measures, coordination mechanisms tend to have an ad-hoc nature, fitting the specific needs and ministerial expertise required for the various projects. An example of such an initiative is KLIWAS⁶⁵⁹ (Auswirkungen des Klimawandels auf Wasserstraßen und Schifffahrt), where the Ministry of Transport and Digital Infrastructure is supported by a variety of government agencies.

Within the Vulnerability Network (*Netzwerk Vulnerabilität*), experts from relevant federal departments and agencies support the identification of the climate vulnerability of relevant sectors. Network partners include the Federal Office of Civil Protection and Disaster Assistance, the Federal Institute for Geosciences and Natural Resources, the German Meteorological Service, various research institutes and the KfW bank⁶⁶⁰.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / In progress / No

Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system. A working group on adaptation to climate impacts under the Conference of Environmental Ministers integrates the federal states in the process (Ständiger Ausschuss zur Anpassung an die Folgen des Klimawandels [StA AFK])⁶⁶¹. This group meets twice a year to provide input from the federal state level into the national process, to exchange experiences with the strategy processes in the various federal states and to coordinate joint activities. Their primary focus to date has been to develop 'Länder-specific' activities for the implementation of the APA, as part of the German DAS, as well as the development of systematic climate impact monitoring across states by testing and selecting the most meaningful set of indicators to monitor changes throughout nature and the wider environment.

⁶⁵⁹ KLIWAS. URL: http://www.kliwas.de/KLIWAS/DE/Home/homepage_node.html. Date accessed: 16/05/2018.

⁶⁶⁰ Netzwerk Vulnerabilität (n.d.). Netzwerkpartner. Available at: <http://netzwerk-vulnerabilitaet.de/tiki-index.php?page=Netzwerkpartner>

⁶⁶¹ Federal / State Working Group "Climate, energy, mobility - sustainability". Anpassung an die Folgen des Klimawandels. Available at: <https://www.blag-klina.de/Themenfelder-Anpassung-an-die-Folgen-des-Klimawandels.html>

More specifically, the APA also lays out those activities to be carried out jointly by the Federal and State Governments, namely expanding the knowledge base, intensifying the communication of knowledge, building networks, drawing up joint concepts and implementing measures, as well as joint Federal-Länder funding programmes for adaptation⁶⁶².

Action on adaptation at city level is also increasing. For this reason, the Federal Government, is expanding dialogue about adaptation with the local authority associations and other bodies, such as the Klimabündnis⁶⁶³ and ICLEI⁶⁶⁴, and providing funding support.

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

A dedicated process was in place to facilitate stakeholders' involvement in the preparation of both the DAS and the APA (and their progress report with the APA II), which were accompanied by a cross-sectoral, multi-stakeholder discussion and various formats for participation as part of the ongoing dialogue and participation process concerned with the DAS. The DAS preparation involved information gathering from administration, the private sector, interest groups, scientists and the general public.

For stakeholders from priority sectors, limited evidence could be collected concerning involvement, participation or public consultation in drafting the DAS and APA/APA II. The examples that could be gathered concern stakeholders from the financial and insurance sector who were identified in the DAS and practitioners who were consulted in drafting the climate projections.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

Transboundary cooperation is mentioned in the DAS in the context of river basin management, in which Germany and its Länder are very active. Germany participates in the international river basin committees for the Rhine, Danube, Meuse, Elbe, Saar-Mosel. The International Commission for the Protection of the Rhine published a climate adaptation

⁶⁶² German Federal Government (2011). Adaptation Action Plan of the German Strategy for Adaptation to Climate Change, Section D (p. 44-47). Available at: http://www.bmub.bund.de/fileadmin/bmu-import/files/pdfs/allgemein/application/pdf/aktionsplan_anpassung_klimawandel_en_bf.pdf

⁶⁶³ Climate Alliance. Available at: <http://klimabuendnis.org/>

⁶⁶⁴ Local Governments for Sustainability. Available at: www.iclei.org

strategy in 2014⁶⁶⁵. This is a good example of ongoing transboundary efforts. In addition, Germany has been a leader in BaltAdapt and the follow-up by the Council of the Baltic Sea States⁶⁶⁶, as well as participating actively in the Danube adaptation strategy⁶⁶⁷.

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / In progress / No

Observation systems are in place to monitor climate change, extreme climate events and their impacts.

The German Government carries out continuous long-term observation of processes in the atmosphere, the oceans and on land. Monitoring the atmosphere is part of the remit of Germany's National Meteorological Service, results of which are made visible through the Climate Atlas. The German Meteorological Service – as the successor of earlier meteorological services – has over 150 years of experience in observing the weather and the climate.

Extreme weather events are monitored and climate impacts on different sectors (fields of action from DAS) are monitored using indicators. This is reported in a monitoring report (2015) and is planned to be updated every four years⁶⁶⁸.

Germany also participates in, and funds, several international research programmes, and is one of the leaders in Europe on climate research and Earth observation from space.

Germany's National Meteorological Service (DWD)⁶⁶⁹ is responsible for meeting meteorological requirements from all areas of the German economy and society. DWD plays an important role in providing services to the Federal Government and the Länder in terms of climate monitoring. This includes the provision of climate projections for the planning and preparation of adaptation measures.

⁶⁶⁵ IKSR (2015). Strategy for the IRBD Rhine for adapting to climate change. Available at: http://www.iksr.org/fileadmin/user_upload/Dokumente_en/Reports/219_en.pdf

⁶⁶⁶ Council of the Baltic Sea States. Available at: <http://www.cbss.org/>

⁶⁶⁷ ICPDR (2012). ICPDR Strategy on Adaptation to Climate Change. Available at: http://www.icpdr.org/main/sites/default/files/nodes/documents/icpdr_climate-adaptation-strategy.pdf

⁶⁶⁸ German Federal Government (2015). Monitoringsbericht 2015. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/monitoringsbericht_2015_zur_deutschen_anpassungsstrategie_an_den_klimawandel.pdf

⁶⁶⁹ DWD. Available at: <http://www.dwd.de>

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

Projections are available at both the Federal level and at the level of the Länder.

Both statistical and dynamic regional climate models are used. Only studies that were developed after 2009 take ENSEMBLES into account when determining a climate signal. Most of them look at time frames up to 2100. A number of different Intergovernmental Panel on Climate Change (IPCC) scenarios are used, including the Representative Concentration Pathways (RCP) scenarios, although A1B is most frequently selected as the reference scenario (followed by A2 and B1). Both statistical and model-based approaches are used to determine the consequences of climate change, depending on the sector under consideration. Most calculations of the potential future consequences of climate change use only climate projections. Socioeconomic background conditions, such as demographics or land use, are seen as constants.

Excerpts of climate projections can be found in the Climate Atlas⁶⁷⁰. Regional climate projections are also carried out by the individual Länder.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

Climate risks and vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.

The first vulnerability assessment of climate impacts for selected fields of actions in Germany was conducted in 2005⁶⁷¹. In 2011, the Vulnerability Network was established: a network of 16 governmental departments and institutes, financed by the Federal Government (BMUB) and supported by the scientific project UBA. The aim was to conduct an up-to-date, standardised cross-sectoral vulnerability assessment, covering the whole of Germany. Two different scenarios were used (strong change and weaker change) and for the prioritisation, social, economic, ecological and cultural criteria were used. Furthermore, interactions

⁶⁷⁰ DWD. Climate Atlas. Available at:

http://www.dwd.de/EN/climate_environment/climateatlas/climateatlas_node.html

⁶⁷¹ German Federal Government (2005). Climate Change in Germany - Vulnerability and Adaptation Strategies of Climate-Sensitive Systems. Available at: <http://www.umweltbundesamt.de/en/publikationen/klimawandel-in-deutschland-vulnerabilitaet>

between different ‘action fields’ were analysed and cross-cutting vulnerabilities were identified. The results of the extensive vulnerability assessments were published in 2015, pointing out which sectors are most vulnerable and should be prioritised within the adaptation action plan⁶⁷². The 14 sectors analysed are: soil, biodiversity, agriculture, forestry, fishery, maritime and coastal protection, water management, transport, buildings, industry, energy, tourism, finance and human health.

In addition, various studies and activities have been carried out by individual Länder to assess the level of climate vulnerability. These have been reviewed in a meta-analysis and include 155 studies that had been published up to mid-2012 throughout different Länder. The meta-analysis has extracted the most relevant findings across Länder and impact sectors in order to feed these into the analysis of climate risk and vulnerability presented in Chapter 6 of Germany’s vulnerability to climate change report (2015)⁶⁷³.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / In progress / No

Sectoral vulnerability assessments take transboundary risks into account in a qualitative way. The 2015 vulnerability report recognises international risks mainly for the sectors industry and business, transportation and infrastructure, fishing, finance and in lesser degree biodiversity, human health and tourism. Within flood risk and water management, transboundary cooperation is already well established.

Germany recognises that climate impacts in other parts of the world will be large and those can in effect have impacts on Germany, for example, through trade and migration (progress report). The research regarding the quantification of these effects is, however, still premature.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / In progress / No

⁶⁷² German Federal Government (2015). Vulnerabilität Deutschlands gegenüber dem Klimawandel. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/climate_change_24_2015_vulnerabilitaet_deutschlands_gegenueber_dem_klimawandel_1.pdf

⁶⁷³ Meta-analysis findings of existing Länder studies are published in chapter 6 of German Federal Government (2015). Vulnerabilität Deutschlands gegenüber dem Klimawandel. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/climate_change_24_2015_vulnerabilitaet_deutschlands_gegenueber_dem_klimawandel_1.pdf

Work is being carried out to identify, prioritise and address the knowledge gaps, in collaboration with key stakeholders (from science, administration and the private sector). Research and development in the field of climate change and adaptation are supported and developed by a national centre of competence for consequences of climate change and adaptation (KomPass⁶⁷⁴). The KomPass centre derives from the DAS. Its core tasks are policy advice, environmental research, information distribution, networking and stakeholder involvement.

The Climate Service Centre was an initiative of the German Federal Government, that was kickstarted in 2009. In June 2014, the Centre was institutionalised in the Helmholtz Association and renamed Climate Service Center 2.0⁶⁷⁵. It offers decision support and decision support tools for administrations dealing with the effects of climate change. Global consequences of climate change are researched by a national climate research centre in Potsdam⁶⁷⁶.

Specific effects of climate change for the building sector have been researched in ExWoSt⁶⁷⁷. An additional overview of translation of projections to the regional level can be found in KlimZug⁶⁷⁸. The aim of KlimZug is to integrate expected changes to the climate and the associated extreme weather challenges in regional planning and development processes. Networks are to be formed, partly to increase the future competitiveness of regions, and partly to advance the development and use of new technologies, methods and strategies for adapting to climate change in regions⁶⁷⁹.

Identified knowledge gaps are used to prioritise public funding for research on climate impacts, vulnerabilities and adaptation.

Knowledge gaps are well defined by research institutes dealing with climate change. In some cases, designated research bodies within a sector exist, working on climate change challenges on both mitigation and adaptation sides.

The APA and APA II present efforts to be undertaken in scientific research, dealing with uncertainties, new observational methods and systems. Extensive studies on these topics are

⁶⁷⁴ German Federal Government (2011). The Competence Center for Climate Impact and Adaptation (KomPass). Available at: <http://www.umweltbundesamt.de/themen/klima-energie/klimafolgen-anpassung/kompass>

⁶⁷⁵ Climate Service Center Germany. Climate Services for Adaptation. Available at: <http://www.climate-service-center.de/>

⁶⁷⁶ Potsdam Institute for Climate Impact Research. Climate Impacts and Vulnerabilities. Available at: <https://www.pik-potsdam.de/forschung/klimawirkung-vulnerabilitat>

⁶⁷⁷ BMUB. ExWoSt. Available at: http://www.bbsr.bund.de/BBSR/DE/FP/ExWoSt/exwost_node.html_buildings

⁶⁷⁸ German Federal Ministry of Education and Research. KlimZug. Available at: <http://www.klimzug.de/en/160.php>

⁶⁷⁹ German Federal Government (2008). German Strategy for Adaptation to Climate Change. Available at: http://www.bmub.bund.de/fileadmin/bmu-import/files/english/pdf/application/pdf/das_gesamt_en_bf.pdf

funded by the Federal Ministry of Education and Research (BMBF) and the German Research Foundation (DFG).

The Federal Government defines priority research fields in its APA and APA II to strengthen the knowledge base and to develop climate models on different scales. The BMBF contributes through several research projects, e.g. ‘The economics of climate change’⁶⁸⁰ and a research programme related to ‘Climate services’ within the framework of “JPI Climate”⁶⁸¹. There is also collaboration between 14 European countries to coordinate their climate research jointly and fund new transnational research initiatives, for which BMBF is one of the key funders.

The Inter-Ministerial Working Group on climate has published guidelines for Climate Impact and Vulnerability Assessments, containing recommendations for applying regional and national assessment methods.

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / In progress / No

Adaptation relevant data and information is available to all stakeholders through a dedicated website. In the framework of the APA, KomPass transformed its webpage into a national Information, Communication and Cooperation Platform on Adaptation⁶⁸². The KomPass portal is intended to provide information on adaptation activities and policy interactively, and will be expanded further for this purpose in cooperation with other governmental agencies.

In addition to the website of DKD and KlimAdapts, Klimanavigator⁶⁸³ (Climate Navigator) is a national web portal that guides users to climate and environmental information. Other informative websites related to the current and future German climate are the German Climate Portal (Deutsches Klimaportal)⁶⁸⁴ and the Regional Climate Atlas⁶⁸⁵.

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / In progress / No

⁶⁸⁰ BMBF (2015). Economics of Climate Change Adaptation. Available at: <http://www.oekonomie-klimawandel.de/>

⁶⁸¹ JPI Climate. Available at: <http://www.jpi-climate.eu/home>

⁶⁸² German Federal Government (2011). The Competence Center for Climate Impact and Adaptation (KomPass). Available at: <http://www.umweltbundesamt.de/themen/klima-energie/klimafolgen-anpassung/kompass>

⁶⁸³ Klima Navigator. Available at: <http://www.klimanavigator.de/>

⁶⁸⁴ German Climate Portal. Climate Services for Germany. Available at: <http://www.deutschesklimaportal.de>

⁶⁸⁵ Germanys Regional Climate Atlas. Available at: <http://www.regionaler-klima-atlas.de/>

Capacity building activities take place; education and training materials on climate adaptation concepts and practices are available and disseminated.

Making knowledge available, providing information, and playing an enabling role is one of the key areas of the DAS. This comprises initiatives by the Federal Government to expand knowledge bases, provide and communicate information, expand the research and information infrastructure and support stakeholder dialogue, participation and networking. At the Bundesländer level, examples of interactive workshops can also be found⁶⁸⁶.

Science-policy interfaces, such as workshops, are in place to facilitate dialogue between researchers and decision and policy-makers. An example of exchanges between government, society and the scientific community is offered by the Helmholtz Centre for Environmental Research⁶⁸⁷.

Education and capacity building was an important part of the project KlimZug, part of the sustainable development project of the Federal Ministry of Education and Research⁶⁸⁸.

Many tools, guidelines and handbooks have been developed by the Federal Government within the research projects⁶⁸⁹. Between 2011 and 2014 five regional conferences were organised by BMUB, which discussed specific adaptation themes and aimed to support cooperation between stakeholders.

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

Adaptation options are based on sectoral risk assessments and good practices, defined in Indicator 3c, and taking into account geographic specificities, as defined under Indicator 3b. In the DAS, adaptation options are presented to a limited extent; nonetheless, opening up the possibilities for development of adaptation measures through the APA. For the further development of the DAS and the prioritisation of climate risks and needs for action, an up-to-

⁶⁸⁶ MKULNV. Klimashutz. Available at: <https://www.klima.nrw.de/mediathek/dokumentation/workshops-anpassung/>

⁶⁸⁷ UFZ. Available at: <http://www.ufz.de/>

⁶⁸⁸ German Federal Ministry of Education and Research. KlimZug. Available at: <http://www.klimzug.de/en/160.php>

⁶⁸⁹ BBSR. Available at: www.klimastadtraum.de

date, standardised cross-sectoral vulnerability assessment and progress report were published in 2015^{690,691,692}. The APA is updated according to these findings, for example, it includes more sector-specific measures and instruments⁶⁹³. The APA II identifies adaptation options for all clusters (i.e. grouped under 14 priority sectors, as mentioned above). Actions can be cross-cutting and specific to a multitude of priority sectors under one cluster. All priority sectors are mentioned in the APA II action list.

An additional overview of the actions taken and options identified, collected at the federal level, can be found in the KomPass project catalogue, providing an overview of programmes and projects related to climate adaptation⁶⁹⁴.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

The updated APA II, as initiated under the DAS progress report⁶⁹⁵, includes prioritisation of adaptation options based on the vulnerability assessments. It takes into account expected impact, urgency and the time that it takes to implement a measure. The qualification of options according to these measures was based on expert judgment by the authors of the vulnerability assessment. The expert judgment was mainly informed by an extensive literature review of 285 climate-relevant (impact) studies in Germany.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / In progress / No

⁶⁹⁰ German Federal Government (2015). Monitoringsbericht 2015. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/monitoringbericht_2015_zur_deutschen_anpassungsstrategie_an_den_klimawandel.pdf

⁶⁹¹ <http://www.umweltbundesamt.de/en/publikationen/klimawandel-in-deutschland-vulnerabilitaet>

⁶⁹² German Federal Government (2015). Vulnerabilität Deutschlands gegenüber dem Klimawandel. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/climate_change_24_2015_vulnerabilitaet_deutschlands_gegenueber_dem_klimawandel_1.pdf

⁶⁹³ German Federal Government (2015). Fortschrittbericht zur Deutschen Anpassungsstrategie an den Klimawandel. Available at: http://www.bmub.bund.de/fileadmin/Daten_BMU/Download_PDF/Klimaschutz/klimawandel_das_fortschrittsbericht_bf.pdf

⁶⁹⁴ German Federal Government (2011). The Competence Center for Climate Impact and Adaptation (KomPass). Available at: <http://www.umweltbundesamt.de/themen/klima-energie/klimafolgen-anpassung/kompass>

⁶⁹⁵ German Federal Government (2015). Fortschrittbericht zur Deutschen Anpassungsstrategie an den Klimawandel. Available at: http://www.bmub.bund.de/fileadmin/Daten_BMU/Download_PDF/Klimaschutz/klimawandel_das_fortschrittsbericht_bf.pdf

There is evidence of mechanisms in place to coordinate disaster risk management and climate adaptation. It is clear that there have been contacts and cooperation between the institutions responsible for both policies. A representative of the Federal Office for Civil Protection and Disaster is part of the inter-ministerial working group for climate adaptation. The office nominated a contact person for the topic civil protection and climate change. Members of the office are represented in the Strategic Governmental Agencies Alliance (see Indicator 8b) and in the Vulnerability Network⁶⁹⁶.

Since 2007, there has been a ‘Strategic Governmental Alliance Climate Adaptation’ between the Federal Office for Civil Protection and Disaster Assistance, the German Meteorological Service, the Federal Institute for Research on Building, Urban affairs and Spatial Development and other institutions.

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / In progress /No

For all measures described in the APA II, the amount and source of available funding is described, both for vulnerable sectors as well as for cross-cutting adaptation action.

The Federal Government is providing funding for developing the German Climate Projections, the national climate change risk assessment, the maintenance of the Adaptation Subcommittee, the climate services websites, and other research and cross-cutting actions needed to implement the APA and coordinate action nationally. The Federal Government is also funding exemplary model and demonstration schemes at local and regional level, that develop and test concepts and approaches for climate adaptation.

Since the beginning of 2011, the ongoing funding of local authority climate protection concepts under the National Climate Protection initiative⁶⁹⁷ has been supplemented with options to develop integrated adaptation and climate protection concepts, and sub-concepts for adaptation. Furthermore, the BMU is launching a new round of funding (in August 2018)⁶⁹⁸ promoting climate adaptation at the level of individual enterprises. This funding scheme also supports communal lighthouse projects, projects fostering local and regional

⁶⁹⁶ Netzwerk Vulnerabilität (n.d.). Netzwerkpartner. Available at: <http://netzwerk-vulnerabilitaet.de/tiki-index.php?page=Netzwerkpartner>

⁶⁹⁷ BMU. Climate Initiative. Available at: <http://www.bmub.bund.de/en/topics/climate-energy/climate-initiative/general-information/>

⁶⁹⁸ Förderung von Maßnahmen zur Anpassung an die Folgen des Klimawandels. Available at: <https://www.ptj.de/folgen-klimawandel>, Date accessed: 16/05/2018

adaptation cooperation, and the development of educational adaptation tools⁶⁹⁹. It has been in operation since October 2011.

Where relevant, funding is available to increase climate resilience in vulnerable sectors. All activities under the APA are funded from the budgets of the respective governments' departments within the current financial planning. Thereby all activities reside with the ministries responsible.

Local authorities' adaptation activities are supported by the expanded opportunities to obtain funding under the National Climate Protection Initiative. Further support is being provided by the Environment Ministry and the German Environmental Agency (BMU/UBA), the Federal Ministry of Transport and Digital Infrastructure (BMVI/BBSR) and the BMBF, in particular⁷⁰⁰.

Furthermore, the LIFE program of the European Union regularly co-funds climate-relevant projects in Germany. Since its inception, 197 of those projects implemented have focused on environmental innovation and 132 on nature conservation. Under the newest LIFE programme, four projects have specifically focused on climate adaptation (and mitigation). For more specific information consult the LIFE website's Germany profile⁷⁰¹.

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

The revised Environmental Impact Assessment (EIA) Directive was transposed into Germany's EIA legislation⁷⁰², as part of a wider reform of the country's urban planning

⁶⁹⁹ BMU (2017). Bekanntmachung des BMUB über die Förderung von Maßnahmen zur Anpassung an den Klimawandel. Available at:

https://www.ptj.de/lw_resource/datapool/systemfiles/cbox/715/live/lw_bekdoc/das_foerderbekanntmachung_klimawandel_bf.pdf

⁷⁰⁰ German Federal Government (2015). Progress Report on the German Adaptation Strategy on Climate Change. Available at:

http://www.bmub.bund.de/fileadmin/Daten_BMU/Download_PDF/Klimaschutz/klimawandel_das_fortschrittsbericht_bf.pdf

⁷⁰¹ LIFE – Germany. Available at: <http://ec.europa.eu/environment/life/countries/germany.html>, Date accessed: 16/05/2018

⁷⁰² Gesetz über die Umweltverträglichkeitsprüfung (UVPG). Available at: <http://www.gesetze-im-internet.de/uvpg/UVPG.pdf>

legislation in March 2017⁷⁰³. It now acknowledges the need to assess climate as one of seven subjects of protection from impacts of a specific plan or project. The specific focus hereby lies on general changes to the climate (e.g. via greenhouse gases) or a change to local climates arising from inside the parameters of influence of the planned project(s). At the same time the revised Directive also requires the project(s) to assess their vulnerability to potential impacts of climate-related extreme weather events and to outline the types of adaptation measures that are planned. Integration took place with the EIA and Strategic Environmental Assessment (SEA) document⁷⁰⁴. In a majority of the Bundesländer adaptation plans, EIA is mentioned as an existing tool to address the effects of climate change in local spatial planning. SEA is included in part of the same German EIA legislation as the EIA document and, hence, also considers climate change.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / **No**

Early warning systems for civil protection purposes at Bundesländ-level draw heavily on the information that is available for extreme weather events, for example, from the 24-hour inundation early warning system that was recently inaugurated by the Saxonian government (early 2018)⁷⁰⁵.

No evidence has been found of how disaster risk management plans and associated risk analyses take account of future climate projections. Climate change and adaptation is being included in educational activities for crisis management, emergency planning and civil protection⁷⁰⁶. This initiative is financed and carried out by the Federal Office of Civil Protection and Disaster Assistance (see Initiative 6.2 in the APA II).

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / No

⁷⁰³ <https://www.bundesregierung.de/Content/DE/Artikel/2016/11/2016-11-30-urbane-gebiete.html>

⁷⁰⁴ Gesetz über die Umweltverträglichkeitsprüfung (UVPG). Available at: <http://www.gesetze-im-internet.de/uvpg/UVPG.pdf>

⁷⁰⁵ Hochwasserfrühwarnung für Einzugsgebiete kleiner 200km². Available at: <https://www.umwelt.sachsen.de/umwelt/infosysteme/hwims/portal/web/fruehwarnung>, Date accessed: 16/05/2018

⁷⁰⁶ German Federal Government (2015). Fortschrittbericht zur Deutschen Anpassungsstrategie an den Klimawandel. Available at: http://www.bmub.bund.de/fileadmin/Daten_BMU/Download_PDF/Klimaschutz/klimawandel_das_fortschrittsbericht_bf.pdf

When the Federal Regional Planning Act was revised in 2008, climate adaptation was introduced as one of the principles of spatial planning (Paragraph 2, Section 2, No. 6). This Act put in place a framework that has allowed inclusion of adaptation-relevant considerations when the spatial plans of the Länder and regions are revised.

KLIMAPAKT is an example of a project integrating climate change into land use and land management. It has established best practices for spatial planning in Germany (2008-2010). The internet platform Klima und Raum is a result of this project and aims to promote long-term collaboration between research, institutions and practice⁷⁰⁷. A recent report (2016) of the Federal Environmental Office provides a practical guide for consideration of climate adaptation in spatial planning⁷⁰⁸. There are several more research projects related to climate change and spatial planning. Examples include: the Klimawandelgerechter Regional Plan⁷⁰⁹ and projects within the KlimaMORO framework, which aims to develop strategies for spatial development and climate change⁷¹⁰.

In addition to consideration of climate adaptation in spatial plans, the National Strategy for an Integrated Management of Coastal Zones (IKZM, 2006 – latest version)⁷¹¹ takes account of climate change as a crucial factor influencing decision making in maritime spatial planning.

The main legal document for urban planning in Germany, the Baugesetzbuch (BauGB)⁷¹², states that the protection of the climate should always be taken into account. It also states that urban planning measures that contribute to climate mitigation and adaptation are to be supported and fostered.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / In progress / No

National policy instruments promote adaptation at sectoral level, in line with national priorities. The APA and its successor, the APA II, adopt a sectoral approach (see above). Implementation of the actions identified in the APA and APA II is the responsibility of the Länder. The action programmes and model projects of the APA and APA II are adopted by

⁷⁰⁷ Klima und Raum. Available at: <http://www.klima-und-raum.org>

⁷⁰⁸ German Federal Government (2016). Klimaanpassung in der räumlichen Planung. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/1968/publikationen/fkz_3711_41_103_internet_hauptprodukt_praxishilfe_klimaanpassung_in_der_raumlichen_planung.pdf

⁷⁰⁹ BBSR (2016). KlimREG. Available at: http://www.bbsr.bund.de/BBSR/DE/FP/MORO/Forschungsfelder/2014/KlimREG/01_start.html?nn=406988

⁷¹⁰ KlimaMoro. Available at: <http://www.klimamoro.de>

⁷¹¹ BMU (2006). Integriertes Küstenyonenmanagement in Deutschland. Available at: http://www.ikzm-strategie.de/dokumente/endbericht_kabinettversion_30032006.pdf

⁷¹² German Federal Government (2017). Baugesetzbuch, Fassung 2017. Available at: <https://www.gesetze-im-internet.de/bbaug/BJNR003410960.html>

the relevant stakeholders. In practice, however, climate adaptation does not have the highest priority in most municipalities, except in those that are model projects⁷¹³.

The progress report (2015) identifies the following sectors as having incorporated climate adaptation in their legislation: the protection of critical infrastructure, spatial development, forest management, biodiversity, water and flood management.

Examples of the policy instruments applied to promote adaptation at sectoral level include:

- The building code, which was amended to ensure that climate adaptation is considered in urban planning by municipalities⁷¹⁴.
- Regulations that require that facility safety consider expected intensities of river high water, flood events and heavy rainfall.

Research projects are also important for the promotion of adaptation in different sectors. For example, KLIWAS (by BMVI) investigated climate impacts on waterways and shipping and developed adaptation options⁷¹⁵. It also developed new methods and tools by involving relevant stakeholders across 30 projects, which has increased systemic understanding of the sector and encouraged implementation of adaptation measures.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / No

Activities described in the APA and APA II discuss insurance options for physical damage. Other measures discuss the binding inclusion of climate factors in risk analysis by financial services companies.

According to the progress report (2015), the insurance sector has the capacity to react to climatic changes and can continue to provide insurance against natural disasters. The insurance sector in Germany is well aware of the risks of climate change, which are considered within risk management. Insurance products incentivising the development of climate-resilient buildings (e.g. natural hazard insurance) are identified as important elements for risk prevention in the APA II and supported by Action 5.5. (funding for increased campaigning).

⁷¹³ German Federal Government (2015). Fortschrittbericht zur Deutschen Anpassungsstrategie an den Klimawandel. Available at: http://www.bmub.bund.de/fileadmin/Daten_BMU/Download_PDF/Klimaschutz/klimawandel_das_fortschrittsbericht_bf.pdf

⁷¹⁴ German Federal Government (2015). Fortschrittbericht zur Deutschen Anpassungsstrategie an den Klimawandel. Available at: http://www.bmub.bund.de/fileadmin/Daten_BMU/Download_PDF/Klimaschutz/klimawandel_das_fortschrittsbericht_bf.pdf

⁷¹⁵ Kliwas. Available at: http://www.kliwas.de/KLIWAS/DE/Home/homepage_node.html

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In progress** / No

The progress report states that from the 150 measures identified in the APA, 43 have been implemented since 2011, 78 are in the process of being implemented, 13 measures are not yet being implemented, while 10 are in preparation (status of May 2015).

At a federal level, implementation has been focusing on four pillars:

- Pillar 1: Providing knowledge, informing, enabling and involving
- Pillar 2: Framework-setting by the Federal Government
- Pillar 3: Activities for which the Federal Government is directly responsible
- Pillar 4: International responsibilities.

A total of 60% of all APA I activities are assigned to Pillar 1. Extensive research and development activities have been implemented to deepen the understanding of changing, regional climate impacts and the areas affected. Two key examples include: ‘KLIMZUG – Making climate change sustainable in regions’ (completed), and ‘Local adaptation to climate change – Forums for the exchange of ideas and cooperation’ (ongoing).⁷¹⁶

Pillar 3 covers the Federal Government’s responsibilities for climate adaptation in its capacity as the owner of property, land and infrastructure, and also as a developer. For example, one of the completed projects was ‘KLIWAS – Impacts of climate change on waterways and navigation – Searching for options of adaptation’.

From a sectoral perspective, good progress in project implementation can be found mainly for coastal protection, flood protection and prevention, protection against heavy rains, heat waves and droughts⁷¹⁷.

In the plans drafted by the Länder, specific challenges to sectors are addressed when deemed relevant by the regional government. A complete overview can be found on the Kompass web

⁷¹⁶ <http://www.klimzug.de/de/1426.php>

⁷¹⁷ German Federal Government (2015). Fortschrittbericht zur Deutschen Anpassungsstrategie an den Klimawandel. Available at: http://www.bmub.bund.de/fileadmin/Daten_BMU/Download_PDF/Klimaschutz/klimawandel_das_fortschrittsbericht_bf.pdf

page⁷¹⁸. A short background of relevant mechanisms induced by climate change is described for each sector.

The progress report has particularly indicated an urgent need to further support small communities. Whereas large cities are capable of performing costly climate and vulnerability analyses, small communities often lack the resources to initiate an adaptation process.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / No

Cooperation mechanisms are in place to foster and support adaptation at relevant scales (e.g. local, subnational).

The Federal Government supports adaptation at the local level⁷¹⁹, including through funding schemes. Cooperation between the federal level and the Bundesländer is well coordinated. In order to support activities at the local level, the Federal Government has initiated projects on adaptation issues in various model regions, facilitated dialogues (with support of relevant ministries), grants and workshops. As a result, several reports with research results, guidance and implementation examples have been published^{720,721}. Within the project KlimZug, cooperation networks are built to integrate climate adaptation measures effectively into regional planning and development projects⁷²². IT-supported information services for climate impact assessment are available for local authorities, such as the UBA/KomPass Klimilotse, an adaptation decision-support tool and the BBSR's Stadtklimilotse⁷²³. The website Klimascout gives a wiki-like overview of climate for municipalities⁷²⁴.

⁷¹⁸ German Federal Government (2011). The Competence Center for Climate Impact and Adaptation (KomPass). Available at: <http://www.umweltbundesamt.de/themen/klima-energie/klimafolgen-anpassung/kompass>

⁷¹⁹ EU (2016). Regional and local adaptation in the EU since the adoption of the EU adaptation strategy in 2013. Available at:

<http://cor.europa.eu/en/documentation/studies/Documents/Local%20and%20regional%20adaptation.pdf>

⁷²⁰ BBSR (2016). Klimaresilienter Stadtumbau. Available at:

http://www.bbsr.bund.de/BBSR/DE/Veroeffentlichungen/Sonderveroeffentlichungen/2017/klimaresilienter-stadtumbau-dl.pdf?__blob=publicationFile&v=3

⁷²¹ BBSR (2016). Anpassung an den Klimawandel in Stadt und Region. Available at:

http://www.bbsr.bund.de/BBSR/DE/Veroeffentlichungen/Sonderveroeffentlichungen/2016/anpassung-klimawandel-dl.pdf?__blob=publicationFile&v=2
http://www.bbsr.bund.de/BBSR/DE/FP/MORO/Studien/2011/LeitfadenRegionaleKlimafolgenbewertung/Downloads/DL_Handbuch.pdf;jsessionid=9E901BD9056219A1DFBB0E103B660DB1.live!1294?__blob=publicationFile&v=3

⁷²² German Federal Ministry of Education and Research. KlimZug. Available at:

<http://www.klimzug.de/en/160.php>

⁷²³ German Federal Government. Klimilotse. Available at: www.klimilotse.anpassung.net/

⁷²⁴ KlimaScout. Available at: <http://www.klimascout.de/kommunen/index.php?title=Hauptseite>

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / No

Procedures or guidelines are available to assess the potential climate impacts on major projects or programmes, and facilitate the choice of alternative options. The most relevant guideline is Germany's Environmental Impact Assessment (EIA) legislation⁷²⁵ of March 2017, which transposes the EU's revised EIA Directive into national law. This new EIA legislation requires major projects to assess on the one hand their potential contribution to climate change, as well as their potential vulnerabilities to climate impacts. It includes a requirement to make an analysis of alternative options.

Additionally, from 2014-2017, the climate resilience of infrastructure was examined through a project which investigated the weak spots of current infrastructure and developed scenarios for future infrastructures. These scenarios considered climate and extreme weather events, societal and technological change as well as a vision of future climate resilient and sustainable infrastructures⁷²⁶.

Another project about climate-resilient regions studied the vulnerability of (critical) infrastructure in the context of climate change. Approaches to design climate-resilient infrastructures was developed. This included the consideration of social, organizational and institutional consequences that are associated with the adaptation of existing or alternative infrastructures. Based on this, policy recommendations will be developed for actors at the federal level and other adaptation stakeholders (e.g. municipalities) for developing climate-resilient infrastructures⁷²⁷.

It is not clear if green infrastructure (GI) is facilitated specifically as an alternative to major projects or programmes, but Germany is active in the field of GI, and GI is, at least, promoted as a climate adaptation measure for flood protection. In urban areas, green areas, water retention basins and reduction of sealed soil are seen as important measures for climate adaptation (as described in the National Urban Development Policy, Nationale Stadtentwicklungspolitik).

⁷²⁵ Gesetz über die Umweltverträglichkeitsprüfung (UVPG). Available at: <http://www.gesetze-im-internet.de/uvpg/UVPG.pdf>

⁷²⁶ German Federal Government (2017). Klaris. Available at: <https://www.umweltbundesamt.de/en/topics/climate-energy/climate-change-adaptation/adaptation-tools/project-catalog/klaris-needs-opportunities-for-climate-resilient>

⁷²⁷ German Federal Government (2016). Climate-resilient regions. Available at: <https://www.umweltbundesamt.de/en/topics/climate-energy/climate-change-adaptation/adaptation-tools/project-catalog/climate-resilient-regions>

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / No

Stakeholders are being actively involved in adaptation policy development and implementation. For the development of the DAS, the APA and the progress report. Academia, research, NGOs and the business sector have been particularly heavily involved⁷²⁸.

In order to showcase and bundle how non-state actors are involved in implementation, ongoing activities by stakeholders are captured in an ever-expanding information platform to share this knowledge and experience with other interested citizens, business, NGOs, etc. primarily at local and regional levels: 'Tatenbank Anpassung' (Actionbase Adaptation)⁷²⁹. However, the APA, expert opinion⁷³⁰, and the progress report emphasise that there is still a need to embed the necessity for climate adaptation more deeply in society. Awareness particularly needs to be increased among non-state actors and citizens in order to encourage more active involvement.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / No

Climate impacts on different sectors (fields of action from DAS) and the progress on adaptation are monitored using qualitative and quantitative indicators. Most recently, a monitoring report was published by the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety in 2015 and progress is planned to be reported every four years⁷³¹. The progress report includes information on allocated budgets.

⁷²⁸ For example, see p. 17 of APA. Available at: http://www.bmub.bund.de/fileadmin/bmu-import/files/pdfs/allgemein/application/pdf/aktionsplan_anpassung_klimawandel_en_bf.pdf

⁷²⁹ http://www.tatenbank.anpassung.net/cln_095/Tatenbank/DE/Home/home_node.html

⁷³⁰ <https://www.nachhaltigkeitsrat.de/aktuelles/nachhaltigkeitspolitik/detailansicht/artikel/tut-deutschland-genug-zur-anpassung-an-den-klimawandel/>

⁷³¹ Umweltbundesamt (2015). Monitoringsbericht zur Deutschen Anpassungsstrategie an den Klimawandel.

Available at:

https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/monitoringbericht_2015_zur_deutschen_anpassungsstrategie_an_den_klimawandel.pdf

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

As indicated in relation to Indicator 10a, the monitoring report is structured per vulnerable sector and, therefore, the integration of climate adaptation into the priority sectors is monitored. At the same time, the monitoring process does not include a method for specifically monitoring the integration of climate action in the priority sectors.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / No

No formal monitoring and reporting mechanism or legal requirement seems to be in place for adaptation at regional or local levels. However, guidance on establishing monitoring and evaluation systems at municipal level are provided (e.g. Anpassung an den Klimawandel in Stadt und Region⁷³²) and states engage in monitoring and reporting practices throughout the country. As an example, the Bundesländ of Baden-Württemberg recently published its first monitoring report for its regional Climate Protection Law (2017)⁷³³.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

A periodic review of the DAS and APA is undertaken through the monitoring report and the progress report (see Indicator 10a). These reports inform any revision needed. For instance, an update of the APA was published in 2015, containing among other things a detailed planning of activities and a funding plan aimed at reaching the DAS objectives. The monitoring report described under Indicator 10a is to be drawn up every four years.

⁷³² BBSR (2016). Anpassung an den Klimawandel in Stadt und Region. Available at: http://www.bbsr.bund.de/BBSR/DE/Veroeffentlichungen/Sonderveroeffentlichungen/2016/anpassung-klimawandel-dl.pdf?__blob=publicationFile&v=2
http://www.bbsr.bund.de/BBSR/DE/FP/MORO/Studien/2011/LeitfadenRegionaleKlimafolgenbewertung/Downloads/DL_Handbuch.pdf;jsessionid=9E901BD9056219A1DFBB0E103B660DB1.live11294?__blob=publicationFile&v=3

⁷³³ LUBW (2017). Monitoring-Bericht zum Klimaschutzgesetz Baden-Württemberg. Available at: https://www4.lubw.baden-wuerttemberg.de/servlet/is/269448/monitoring-bericht_zum_klimaschutzgesetz_baden-wuerttemberg.pdf?command=downloadContent&filename=monitoring-bericht_zum_klimaschutzgesetz_baden-wuerttemberg.pdf

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / No

Stakeholders are involved in the assessment, evaluation and review of national adaptation policy mostly through consultation, and as receivers of information. It would appear as though active stakeholder involvement has been limited to science and research stakeholders.

The indicators for the monitoring of climate impacts and adaptation have been developed over a 5-year long process in which governmental and non-governmental experts from national and Länder-level were involved, but no evidence can be found that stakeholders were involved in the evaluation of the indicators⁷³⁴.

⁷³⁴ Umweltbundesamt (2015). Monitoringsbericht zur Deutschen Anpassungsstrategie an den Klimawandel. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/monitoringbericht_2015_zur_deutschen_anpassungsstrategie_an_den_klimawandel.pdf

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 Coordination structure		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	<u>Yes</u> / In progress / No
2 Stakeholders' involvement in policy development		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 Current and projected climate change		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	<u>Yes</u> / In progress / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	<u>Yes</u> / In progress / No
4 Knowledge gaps		
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	<u>Yes</u> / In progress / No
5 Knowledge transfer		
5a	Adaptation relevant data and information is available to	<u>Yes</u> / In progress

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	/ No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	<u>Yes</u> / In progress / No
Step C: Identifying adaptation options		
6 Identification of adaptation options		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	<u>Yes</u> / In progress / No
7 Funding resources identified and allocated		
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	<u>Yes</u> / In progress / No
Step D: Implementing adaptation action		
8 Mainstreaming adaptation in planning processes		
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	Yes / <u>No</u>
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	<u>Yes</u> / No
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	<u>Yes</u> / In progress / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	<u>Yes</u> / No
9 Implementing adaptation		
9a	Adaptation policies and measures are implemented, e.g.	Yes / <u>In</u>

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	as defined in action plans or sectoral policy documents	<u>progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	<u>Yes</u> / No
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	<u>Yes</u> / No
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	<u>Yes</u> / No
Step E: Monitoring and evaluation of adaptation activities		
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
11 <i>Evaluation</i>		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	<u>Yes</u> / No

Adaptation preparedness scoreboard for Greece

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List of abbreviations

CCISC	Climate Change Impacts Study Committee
CoM	Covenant of Mayors
CUGM	Central Union of Greek Municipalities
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
FFWI	Forest Fire Weather Index
FRMPs	Flood Risk Management Plans
HNMS	Hellenic National Meteorological Service
LIFE IP AdaptInGR	LIFE Climate Action Integrated Projects Call.
MEEN	Ministry of Environment and Energy
MD	Ministerial Decision
MoU	Memorandum of Understanding
NAS	National Adaptation Strategy
NCCAC	National Climate Change Adaptation Committee
NSRF	National Strategic Reference Framework
RAAP	Regional Adaptation Action Plan
RBMP	River Basin Management Plan
SEA	Strategic Environmental Assessment
UGR	Union of Greek Regions

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

Following public consultation, the Greek National Adaptation Strategy (NAS) was finalised in April 2016, and formally endorsed by the Greek Parliament in August 2016, through Law 4414/2016 (Article 45)⁷³⁵. The Greek NAS has a 10-year implementation horizon (i.e. it should be reviewed and revised by 2026). Law 4414/2016 defined the Ministry of Environment and Energy (MEEN) as the national competent authority for national adaptation policy and to oversee the process for the revision of the NAS over a 10-year planning cycle.

The MEEN has signed a Memorandum of Understanding (MoU) with the Climate Change Impacts Study Committee of the Bank of Greece (CCISC) and the Biomedical Research Foundation of the Academy of Athens, which commits them to undertake climate adaptation actions. The drafting of the NAS was included in this MoU. The CCISC, in cooperation with the MEEN, prepared a draft NAS, building on its existing work and the extensive CCISC report⁷³⁶ on climate impacts and vulnerability assessment. The draft NAS underwent public consultation. The MEEN assessed the comments received during the public consultation, completed and finalised the draft NAS.

Law 4414/2016 also foresaw the establishment of a National Climate Change Adaptation Committee (NCCAC), to act as the formal advisory body of the MEEN at national level for adaptation policy design and implementation. The NCCAC comprises representatives from all Ministries that have a sectoral role in adaptation policy planning and in funding of adaptation actions, as well as representatives of other stakeholder bodies and governmental authorities with a role in adaptation policy support and knowledge enhancement.

A2. Adaptation strategies adopted at sub-national levels

Based on a careful assessment of needs, preparation of strategies at the regional (sub-national) level has been considered redundant and, thus, no adaptation regional (sub-national) strategies will be developed.

The Greek NAS is an overarching policy document, which defines the goals, principles and priorities for adaptation and lists potential adaptation measures (actions) for all environmental and socio-economic sectors that are likely to be significantly affected by climate change in Greece. As such, it provides guidance, insight and priorities, which should be further detailed at regional level and translated into Regional Adaptation Action Plans (RAAPs). Vertical coordination (i.e. between the national and the regional level) is achieved through the MEEN, on the basis of the NAS priorities.

⁷³⁵ ΕΦΗΜΕΡΙΔΑ ΤΗΣ ΚΥΒΕΡΝΗΣΕΩΣ, 2016, ΝΟΜΟΣ ΥΠ' ΑΡΙΘΜ. 4414, URL:

<http://www.ypeka.gr/LinkClick.aspx?fileticket=aG0JrbpJmSA%3d&tabid=303&language=el-GR>

⁷³⁶ Climate Change Impacts Study Committee, June 2011, The Environmental, Economic and Social Impacts of Climate Change in Greece, URL: http://www.bankofgreece.gr/BogEkdoseis/ClimateChange_FullReport1.pdf

Adaptation action plans

B1. National adaptation plan

There is no national adaptation plan (NAP) existing independently from the NAS and the RAAPs. According to Greece, the NAP will in due course be comprised of the 13 RAAPs.

B2. Adaptation plans adopted at sub-national level

Law 4414/2016 required the 13 Regional Authorities of Greece to develop and implement RAAPs (within a 7-year planning cycle). Law 4414/2016 sets the minimum technical specifications for their content. The RAAPs content has been further elaborated by Ministerial Decision (MD) 11258/2017 (Government Gazette, issue B, 873/2017), which provides the detailed specifications/template for the content of the RAAPs. The MD requires Regional Authorities to: perform a detailed assessment of potential climate impacts for short, mid-term and long-term time horizons; identify and map relevant climate-related risks, vulnerabilities and hotspots; prioritise adaptation action on the basis of their cost-effectiveness and benefits; identify synergies with other policies and regional plans (e.g. land-use plans, water management and flood risk management plans); and integrate, as necessary, priority measures into regional planning. Each RAAP will examine the potential measures/actions included in the NAS based on the particular regional circumstances, priorities and needs and will develop regional action plans. Wherever there is a case for sector or sub-regional analysis, specific actions per sector or sub-regional area will be indicated. The development of the 13 RAAPs is ongoing with several regions being more advanced than others. It is expected that the majority of the RAAPs will have been finalised by mid-2019⁷³⁷.

It should be noted that the diversity of climate, socio-economic and environmental conditions vary substantially across the country. As such, detailed plans can only be developed and implemented at sub-national (i.e. regional) level to address vulnerable sectors and hotspots regionally and locally. To this end, each RAAP will define priority actions on the basis of the specificities and characteristics of each region.

Due to the limited administrative and financial resources available, the MEEN submitted a proposal (LIFE IP AdaptInGR) in the September 2017 LIFE Climate Action Integrated Projects Call. LIFE IP AdaptInGR is planned as an 8-year project. It includes actions to a) coordinate cross-regional and enhance national-regional-local adaptation action, in close collaboration with the Union of Greek Regions, the Central Union of Greek Municipalities and individual Regions and Municipalities that are full partners in the project proposal; b) build the capacity of national and regional stakeholders; c) support cross-regional cooperation and transnational cooperation with countries from the Balkans and the wider Mediterranean area; d) develop and operate a National Adaptation Knowledge Hub; e) develop and test methodologies to monitor the progress of NAS and RAAP implementation; f) assess the existing level of mainstreaming and integration of climate adaptation priorities in other

⁷³⁷ Personal communication with MS contact.

sectors at national level. The National Centre for Environment and Sustainable Development and the MEEN will take over training, information sharing and monitoring activities at the end of the project.

B3. Sectoral adaptation plans

As mentioned above, actions per sector will be embedded in the RAAPs. After the finalisation of the RAAPs, it will be possible to better mainstream adaptation in existing sectoral strategies and to identify potential additional needs for sectoral adaptation action plans. Nevertheless, adaptation-related actions are already embedded in some sectoral strategies: i.e. the [National Biodiversity Strategy](#), the [National Research & Innovation Strategy for Smart Specialisation](#), the recent [Maritime Spatial Planning Law](#)⁷³⁸, the [National Strategy for Forests \(currently under consultation\)](#), and the [National Plan for Energy & Climate \(which is under preparation\)](#)⁷³⁹. Further information, on the sectoral aspects of the NAS and RAAPs can be found in relation to Indicators 3c, 6a and 8a-8e below.

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

The MEEN⁷⁴⁰ is the competent national authority for climate mitigation and adaptation, as well as the enhancement of mechanisms and institutions for environmental governance. In this capacity, the MEEN has been the leading body in the development of the NAS. In addition, pursuant to the Law 4414/2016 (Article 42), the MEEN is responsible for the NAS's evaluation and revision.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

The Law 4414/2016 (Article 44) established the National Climate Change Adaptation Committee (NCCAC) as the formal coordination and advisory mechanism body for adaptation policy monitoring, evaluation and formulation.

The NCCAC is chaired by the MEEN Minister and comprises representatives of all competent ministries (Environment and Energy, Economics, Internal Affairs, Economy & Development, Tourism, Infrastructure & Transport, Health, Maritime Affairs & Insular Policy, Rural

⁷³⁸ Law 4546/2018

⁷³⁹ Personal communication with MS contact.

⁷⁴⁰ Ministry of Environment and Energy, URL: www.ypeka.gr, Date accessed: 11/05/2018

Development & Food, Education, Research & Religious Affairs, Culture and Sports, National Defence). The NCCAC also includes representatives from the Union of Greek Regions, the Central Union of Greek Municipalities, the Hellenic Meteorological Service, the Association of Industries, NGOs and academics specialising in climate adaptation issues. Additional participants can be invited to participate on the basis of identified needs.

The Ministerial Decision for the formal appointment of the NCCAC members was issued on 15th September 2017, including the procedures for its operation. According to the provisions of Law 4414/2016, the NCCAC is responsible for: (a) the specification and operationalisation of adaptation policies, and proposals to the MEEN and other competent ministries of relevant policies, measures, actions and legislative/regulatory measures; (b) the specification of horizontal policies and actions included in the NAS, especially those concerning awareness, dissemination and capacity building; (c) the development of recommendations for the review or revision of the NAS and of the RAAPs; (d) the development of recommendations for any matter relating to climate adaptation, as put forward by the MEEN.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / In progress / No

The formalised channel for vertical coordination among national, regional and local authorities is through the NCCAC (see Indicator 1b), which includes representatives from the Union of Greek Regions (UGR) and from the Central Union of Greek Municipalities (CUGM), as well as from the Ministry of the Interior (the competent authority for coordinating regional and local authorities).

In addition, several meetings and seminars are held regularly, at the initiative of the MEEN, UGR and CUGM to spread awareness, and exchange information on adaptation progress, issues and knowledge developments. Examples include: (a) consultation with the Regional Authorities in May 2015 regarding the NAS priorities and the specifications of the RAAPs, (b) a consultation/information seminar in December 2016 regarding the specifications of the RAAPs, and (c) conferences organised by CUGM on climate adaptation in April 2017 and in June 2017 on adaptation needs, progress, and knowledge developments. In order to further facilitate the exchange of information between national and regional experts, contact persons for climate change have been nominated in each region.

The consultation procedure leading to the formal endorsement of RAAPs ensures good vertical coordination across the three levels of governance (national, regional and local). Specifically, pursuant to the Law 4414/2016 (Article 43), the MEEN is checking the compliance of the RAAPs with the NAS, while the local authorities participate in the Regional Consultation Committees giving formal opinions on the RAAPs of the respective regions.

The Covenant of Mayors (CoM) also fosters vertical cooperation by enabling local authorities to influence climate adaptation policy making. A total of 48 signatories from Greece joined the Mayors Adapt initiative, 38 of which have also committed to the integrated 2030 Covenant of Mayors for Climate and Energy⁷⁴¹. Coordinators⁷⁴² of the CoM include the Regions of Attica, Crete, Central Macedonia and Western Macedonia. Supporters⁷⁴³ to the CoM, besides the Central Union of Greek Municipalities, include the Regional Union of Municipalities of Central Greece, which is the union of municipalities of the Region of Central Greece; the Regional Union of Municipalities of Attica (PEDA), which is the union of municipalities of Attica; the Network of Sustainable Greek Islands, the Network of Cities with Lakes, and the Association for the Sustainable Development of Cities. The CoM Coordinators and Supporters support and help to coordinate adaptation efforts by their corresponding members.

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

The draft NAS was subject to a public consultation⁷⁴⁴ prior to its finalisation. Stakeholders who provided feedback included academia, ministries, the Hellenic National Meteorological Service and NGOs⁷⁴⁵.

Stakeholder engagement and public consultation have been made mandatory for the development of the RAAPs through the Ministerial Decision 11258/2017. The main regional stakeholders (public authorities, scientific community, business and industry, civil society etc.) are invited to identify/submit their views on measures that can contribute to the adaptation of their region/area of interest. In addition, regional authorities are required to consult and coordinate with neighbouring regions, in the case of shared vulnerability hotspots (e.g. shared protected areas or river basins).

Public consultation on the RAAPs will also take place through the Strategic Environmental Assessment (SEA) process, as the RAAPs will have to undergo this step before their final endorsement.

As already mentioned, the draft RAAPs will be subject to an opinion-giving procedure by the Regional Consultation Committee. The Regional Consultation Committee comprises the

⁷⁴¹ At the end of 2015, the Covenant of Mayors and the Mayors Adapt initiatives merged under the new integrated Covenant of Mayors for Climate and Energy.

⁷⁴² Covenant community, URL: <http://www.covenantofmayors.eu/about/covenant-community/coordinators.html>, Date accessed: 11/05/2018

⁷⁴³ Covenant community, URL: <http://www.covenantofmayors.eu/about/covenant-community/supporters.html>, Date accessed: 11/05/2018

⁷⁴⁴ Public consultation has been made obligatory for the development of future or revised NAS by Law 4414/2016 (Article 42). Individual citizens, public authorities and other stakeholders are able to submit written views and contributions through an open online process.

⁷⁴⁵ Personal communication with MS contact.

mayors of the relative municipalities and the representatives of the government authorities within the territorial boundaries of the respective region, as well as regional stakeholders and citizens representatives (Law 3852/2010 “Kallikratis Administrative Programme”, Article 178).

Furthermore, the NCCAC (see Indicator 1b) is an essential instrument for stakeholder engagement at the national level.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

The NAS recognises that Greece shares a significant amount of water resources, mountainous areas and forests with neighbouring countries and that it is, therefore, important to establish communication channels with those countries. A number of specific actions are mentioned in the NAS, including identifying and recording transboundary adaptation issues, creating processes for the development of common policies, creating shared data collection stations, training and capacity building. The development of these actions is still in progress.

The RAAPs assess the transboundary character of climate impacts (Ministerial Decision 11258/2017) to identify needs for international cooperation. There are already bilateral and sectoral programmes in this field. For example, a Greece-Bulgaria bilateral cooperation programme funded through Interreg foresees the development of common technical specifications for national flood risk management plans covering the border area and the subsequent revision of the existing plans to improve cohesion and coordination.

Cooperation on adaptation issues is a priority in the 2017 trilateral cooperation agreements between Greece-Cyprus-Israel and Greece-Cyprus-Egypt mainly focusing on the exchange of knowledge and know-how on adaptation policy monitoring, evaluation and good practice at regional and local scales.

Transboundary public consultations on the RAAPs will also occur through the Strategic Environmental Assessment (SEA) process to consider potential transboundary impacts. Transboundary public consultations, as part of the SEA process, are currently ongoing for the transboundary flood risk management plans (the consultation on the Evros River Basin shared by Greece and Bulgaria has recently been concluded).

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / In progress / No

Observation systems are in place to monitor climate change, extreme climate events and their impacts. The Hellenic National Meteorological Service⁷⁴⁶ (HNMS) operates a network of 79 land surface and three upper air measurement stations⁷⁴⁷. Several other stations are operated by other entities, such as the Ministry of Rural Development and Food (agrometeorological stations), the Institute of Mediterranean Forest Ecosystems and Forest Products Technology⁷⁴⁸, the National Observatory of Athens⁷⁴⁹, and a number of national research centres. The country's oceanic observation is highly developed. Greece is a member of the European organisation for the exploitation of Meteorological Satellites (EUMETSAT).

Further information on the observation systems in place and Greece's contribution to the Global Climate Observing System can be found in the corresponding national report submitted to UNFCCC⁷⁵⁰. The HNMS is updating their monitoring strategy plans focusing on climate change needs, as is the National Observatory of Athens. The General Secretariat for Civil Protection also tracks records of extreme events (forest fires, floods, extreme weather conditions, etc.) and presents impacts kept by relevant national authorities, according to their competences.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

The NAS was based upon a [national multi-sectoral climate impact and vulnerability assessment](#) developed by the CCISC in 2011. The assessment used model simulation datasets for four Intergovernmental Panel on Climate Change (IPCC) 4th Assessment Report (AR4) greenhouse gas (GHG) emissions scenarios (A2, A1B, B2 and B1), developed by the Research Centre for Atmospheric Physics and Climatology of the Academy of Athens, to estimate variation in the mean seasonal and annual values of six climate parameters (air temperature, precipitation, humidity, cloud cover, total incident short-wave radiation, wind speed) for the periods 2021-2050 and 2071-2100. Extreme weather events and their impacts were also assessed. A regional climate model (ENSEMBLES) was used to project changes in maximum summer and minimum winter temperatures, number of warm days and nights, number of days with precipitation and dry days, number of frost days and growing seasons.

⁷⁴⁶Hellenic National Meteorological Service, URL: <http://www.emy.gr/emv/en/climatology/climatology>, Date accessed: 11/05/2018

⁷⁴⁷Hellenic National Meteorological Service, URL: <http://www.emy.gr/emv/en/observation/>, Date accessed: 11/05/2018

⁷⁴⁸Institute of Mediterranean Forest Ecosystems and Forest Products Technology, URL: <http://www.fria.gr/EngPage/>, Date accessed: 11/05/2018

⁷⁴⁹National Observatory of Athens, URL: http://www.meteo.noa.gr/ENG/iersd_research.htm, Date accessed: 11/05/2018

⁷⁵⁰Hellenic Ministry of Environment, Energy and Climate Change, January 2013, Greek report on activities with respect to the GCOS Implementation Plan, URL: http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/gcos_2014_greece.pdf

The degree-days method was used to assess changes in energy demand for heating and cooling, the Forest Fire Weather Index (FFWI) to assess the wildland fire potential, and the Humidex to estimate the number of days with high thermal discomfort. Moreover, the ECHAM5 and the HadCM3 models were used to assess changes in the intensity and distribution of landslides and floods. In addition, changes in mean sea level and its impact on Greece's shoreline were assessed.

The risks and impacts of climate change by sector were assessed based on the outcomes of the climate projections using state-of-the-art impact assessment models. The economic cost of climate change was estimated using the GEM-E3 general equilibrium model (estimations per climate scenario and per sector). Priority sectors were identified based on the climate change costs per sector. The results per sector were further downscaled to a regional level in the NAS report, based on the mix and intensity of economic activities in each region.

Pursuant to Law 4414/2016 (Article 42), multi-sectoral climate impact and vulnerability assessments will be an integral part of the NAS in the future. In particular, the NAS will include projections of future climate trends for various GHG emissions scenarios, climate vulnerability analyses of various sectors and activities, and climate impact assessments of the most vulnerable sectors at national level. Priority sectors for action will be identified based on vulnerability analyses and impact assessments.

In addition, detailed regional climate impact and vulnerability assessments will be undertaken as part of the RAAPs (Ministerial Decision 11258/2017). The RAAPs will include: projections of future climate trends and sea-level rise for multiple GHG scenarios and three time periods (i.e. short-term, 2050, 2100); climate vulnerability analyses for specific sectors and geographical areas within the region; climate impact assessments of the most vulnerable sectors and geographical areas considering probability, magnitude, intensity, complexity, timing, reversibility, cross-border and cross-sectoral aspects. Priority sectors and priority geographical areas for action will be identified based on the vulnerability analyses and impact assessments.

Geographical specificities have been considered in the NAS but will be further analysed within the regional climate impact and vulnerability assessments for the RAAPs.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

As mentioned in relation to Indicator 3b, the NAS was built on a national multi-sectoral climate impact and vulnerability assessment developed by the CCISC in 2011. The vulnerability of 11 priority sectors was assessed: biodiversity and ecosystems; agriculture; forest ecosystems; fisheries and aquaculture; water resources; coastal zones; tourism; human

health care; built environment; transport; and mining industry. The climate risks and impacts by sector were assessed based on the outcomes of climate projections using state-of-the-art impact assessment models.

The RAAPs will also include multi-sectoral climate impact and vulnerability assessments. The climate risks and impacts identified by sector and geographical area will drive decision making and adaptation action planning at regional level.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / In progress / **No**

Transboundary risks and the need to raise awareness of vulnerable sectors at a transboundary level is mentioned in the NAS. However, it is unclear whether transboundary risks were considered in the vulnerability assessments. Nevertheless, it is planned that the regional climate impact and vulnerability assessments will take transboundary risks into account.

According to the RAAPs' technical specifications (Ministerial Decision 11258/2017), climate impacts will be assessed based on, *inter alia*, their cross-border character. Adaptation plans in areas shared by neighbouring regions should be compatible and coordinated accordingly (Ministerial Decision 11258/2017, Article 2, Paragraph 7).

Transboundary cooperation regarding shared rivers in the north of the country is linked to the protection and management of Greece's water resources rather than being specific to climate change considerations.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / **In progress** / No

The research priorities and knowledge gaps outlined in the NAS were based on a thorough assessment of available information through the CCSIC, and have been subjected to stakeholder and public consultation. The NAS outlines sectoral knowledge gaps that need to be closed.

It is expected that the development of the RAAPs will allow the MEEN to identify additional regional and/or sectoral knowledge and information needs arising from the climate impact and vulnerability assessments and/or for specific geographical areas/hotspots. This information will be communicated through the NCCAC to relevant bodies (e.g. academic institutions and the Ministry of Education, Research and Religious Affairs) to also inform their work.

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / In progress / **No**

The need to create an online National Adaptation Knowledge Hub that pools together adaptation relevant data, information, good practices and approaches has already been identified but is not yet implemented due to resource constraints. The MEEN has developed a plan to: a) build capacities and foster cooperation at local, regional and national level; and b) allow sharing of information, knowledge and good practices through the Hub. The MEEN is trying to secure necessary funding to implement this plan.

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / In progress / **No**

The need to create training materials and build the capacities of the key national, regional and local stakeholders was identified at an earlier stage, however, no evidence was found of a systematic and coordinated approach driven by the NAS. The MEEN is trying to secure necessary funding (see Section B2) to provide a capacity building and a training programme targeting key regional and national stakeholders.

It is worth noting that a number of projects under the Seventh Framework Programme for Research (FP7) address relevant issues that could lead to future capacity building (ClimateCost⁷⁵¹, MEECE — Marine Ecosystem Evolution in Life-IPa Changing Environment⁷⁵², ADAGIO⁷⁵³, SERPEC-CC⁷⁵⁴, Climate-KIC⁷⁵⁵).

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

The RAAPs will include actions aiming to address impacts on the priority sectors and/or geographical areas, identified through the climate impact and vulnerability assessments mentioned in relation to Indicators 3b and 3c. The NAS is a guiding document and contains a list of potential actions per sector based on best available scientific knowledge, international and European practice.

⁷⁵¹Climate Cost, URL: <http://www.climatecost.cc/>, Date accessed: 11/05/2018

⁷⁵²MEECE, URL: <http://www.meece.eu/>, Date accessed: 11/05/2018

⁷⁵³ADaptation of AGriculture in European RegIOns at Environmental Risk under Climate Change, URL: <http://www.adagio-eu.org/>, Date accessed: 11/05/2018

⁷⁵⁴European Commission, Sectoral emission reduction potentials and economic costs for climate change, URL: http://cordis.europa.eu/project/rcn/84044_en.html, Date accessed: 11/05/2018

⁷⁵⁵EIT- Climate-Kic, URL: <http://www.climate-kic.org/>, Date accessed: 11/05/2018

The elaborate national risk assessment for all priority sectors undertaken by the CCSIC in 2011 provided background evidence for development of the NAS.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

The methodology used to identify priority sectors and/or priority geographical areas is described in relation to Indicators 3b and 3c above. The NAS priority sectors have been identified through the climate impact and vulnerability assessment conducted by the CCISC, using robust modelling methods to quantify risks and potential economic losses associated with climate impacts.

The list of potential actions included in the NAS was the outcome of an extensive consultation with experts from various disciplines, the national administration, which has thorough knowledge of sectoral planning, as well public stakeholders.

Pursuant to the respective technical specifications for RAAPs, the adaptation actions per sector or geographical area are prioritised based on cost-effectiveness and cost-benefit analyses. The effectiveness of actions corresponds to their climate change prevention, mitigation and restoration capacity (in order of priority). The wider economic, environmental and social benefits arising from their implementation are considered in order to focus on 'win-win' and 'no-regret' actions. Stakeholders will also be involved in the selection of adaptation actions through the public consultation processes described in relation to Indicator 2a.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / In progress /No

There are mechanisms in place to coordinate disaster risk management and climate adaptation and thereby ensure coherence between the two policies.

The MEEN (notably the Climate Change & Air Quality Directorate, the Forest Protection & Forest Environment Directorate, and the Special Secretariat for Water) is represented within the structure of the Hellenic National Platform for Disaster Risk Reduction. The Platform is coordinated by the Ministry of Interior (i.e. General Secretariat for Civil Protection)⁷⁵⁶.

The NCCAC is chaired by the MEEN Minister and includes representatives of the Ministry of Interior (see Indicator 1b above), which is responsible for Civil Protection.

⁷⁵⁶ United Nations Office for Disaster Risk Reduction, URL: <https://www.unisdr.org/partners/countries/grc>, Date accessed: 11/05/2018

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / In progress / No

Adaptation actions are primarily financed by EU funds. The Sectoral Operational Programme on ‘Transport Infrastructure, Environment and Sustainable development’ and the 13 Regional Operational Programmes (one for each administrative region of Greece) of the National Strategic Reference Framework 2014-2020 (NSRF, cohesion policy) include specific budget and measures under the Thematic Objective 5 ‘Climate Change Adaptation & Disaster Risk Management’. These instruments, together with the Rural Development Programme, are the main source of EU funding for adaptation actions nationally and in the 13 administrative regions until 2020.

A Greek LIFE Task Force⁷⁵⁷ was established to support potential LIFE Programme beneficiaries and to facilitate the exchange of experiences and good practices, inter alia, on climate adaptation issues. In September 2017, a proposal was submitted to the LIFE Climate Action Integrated Projects Call to support NAS implementation.

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

Pursuant to the Law 4416/2014 (Article 43) and the Ministerial Decision 11258/2017 (Article 2, Paragraphs 6 and 7), synergies of proposed adaptation actions with other existing national policies (e.g. for biodiversity, disaster risk management and infrastructure) will be addressed by the RAAPs, which will suggest ways of integrating adaptation. The complementarity and compatibility of RAAPs with other regional plans (e.g. spatial plans, flood risk management plans) will be investigated in order to inform these plans and thereby mainstream adaptation considerations. The climate projections and climate impact and vulnerability assessments conducted as part of the RAAPs will provide useful data and information for planners and decision makers. In short, the RAAPs will provide the necessary information to mainstream adaptation into planning processes and, more specifically, to revise existing plans and policies.

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

⁷⁵⁷ URL: <http://www.lifetaskforce.gr/en/>

The transposition of the revised EIA directive has been completed (the joint ministerial decisions 1915/24.01.2018 and 5688/ 12.03.2018 are available online⁷⁵⁸) and takes all necessary provisions into account⁷⁵⁹.

Climate adaptation is not explicitly mentioned in the national legislation for Strategic Environmental Assessment (SEA). However, the competent national authority for climate adaptation gives its opinion on draft plans (e.g. RBMPs, FRMPs) and their SEA reports before their adoption, through the existing official SEA information and consultation process.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / **No**

The General Secretariat for Civil Protection is the national competent authority for the coordination of all actions for prevention, preparedness, response and recovery concerning natural and manmade disasters. Climate change is considered during the formation of national disaster risk management plans. Long-term climate risk prevention, which is the focus of climate adaptation planning, will be integrated into the RAAPs. As already mentioned, RAAPs have to take into account synergies with existing planning (e.g. for flood risk management) and integrate relevant measures into sectoral plans.

In addition, the regional climate impact and vulnerability assessments (to be conducted as part of the RAAPs) will improve climate-related disaster risk analyses and, thus, enable better integration of climate change considerations in disaster risk management plans. As mentioned previously, the RAAPs will analyse the synergies between proposed adaptation actions and disaster risk management policies and plans, and will suggest ways to integrate adaptation.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / **No**

Climate impacts appear to be taken indirectly into account in land-use and spatial planning policies. The General National Framework for Spatial Planning and Sustainable Development 2008⁷⁶⁰ includes priorities that may contribute to climate adaptation, such as energy-saving measures, forest-fire prevention and reforestation measures, implementation of bioclimatic energy, food etc.

⁷⁵⁸ Εθνικό Τυπογραφείο- Αναζήτηση ΦΕΚ, URL: <http://www.et.gr/index.php/anazitisi-fek>, Date accessed: 16/05/2018, ΕΦΗΜΕΡΙΣ ΤΗΣ ΚΥΒΕΡΝΗΣΕΩΣ ΤΗΣ ΕΛΛΗΝΙΚΗΣ ΔΗΜΟΚΡΑΤΙΑΣ ΤΕΥΧΟΣ ΔΕΥΤΕΡΟ Αρ. Φύλλου 304/2018 και 988/2018

⁷⁵⁹ Personal communication with MS contact.

⁷⁶⁰ ΒΟΥΛΗ ΤΩΝ ΕΛΛΗΝΩΝ, July 2008, ΕΦΗΜΕΡΙΣ ΤΗΣ ΚΥΒΕΡΝΗΣΕΩΣ ΤΗΣ ΕΛΛΗΝΙΚΗΣ ΔΗΜΟΚΡΑΤΙΑΣ ΤΕΥΧΟΣ ΠΡΩΤΟ Αρ. Φύλλου 128, URL: <http://www.ypeka.gr/LinkClick.aspx?fileticket=znJpFQj917U%3d&tabid=513&language=el-GR>

On coastal zone management, reference is made to climate impacts in the law concerning the creation of new settlements or the expansion of existing ones. Additional useful provisions exist in the Specific Framework Spatial Plans published in 2009⁷⁶¹ and refer to climate change with regards to fisheries, tourism, industry, renewable energy and sustainable development. The majority of spatial plans date back to 2009. Several of these spatial plans are being or will be revised. In addition, the new framework for maritime spatial planning aims to ensure, inter alia, resilience to climate impacts (Law 4546/2018, Article 4)

Furthermore, as mentioned above, the RAAPs will propose ways to integrate adaptation into existing strategies, policies and plans, including urban and spatial (land and marine) policies and plans. Future climate projections and climate impact and vulnerability assessments used by the RAAPs will also be valuable input for land-use, urban and spatial plans and studies, and in other sectoral planning, such as flood risk management plans.

The RAAPs will refer to regional level plans and policies, which take into account climate impacts.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / **In progress** / No

Adaptation is mainstreamed in some sectors, but it is unclear whether the NAS has been the driver. Examples of sectors where adaptation has been mainstreamed include:

- Agriculture and forests (supported by Civil Protection): concerning operations to prevent forest fires and natural disasters⁷⁶², reforestation and mountain anti-flood actions for burned forest areas⁷⁶³
- Biodiversity (supported by the MEEN): the National Biodiversity Strategy⁷⁶⁴ includes “Prevention & Reduction of climate change impacts on biodiversity”
- Health (supported by the Ministry of Health): the ‘Response to Environmental Hazards Threatening Health’ for 2008-2012⁷⁶⁵ includes a special action dedicated to ‘Exploring Climate Change Impacts on Health’.

⁷⁶¹ΧΩΡΟΤΑΞΙΚΟΣ ΣΧΕΔΙΑΣΜΟΣ ΕΘΝΙΚΟΥ ΕΠΙΠΕΔΟΥ, URL: <http://www.ypeka.gr/?tabid=513>, Date accessed: 11/05/2018

⁷⁶²Γενική Γραμματεία Πολιτικής Προστασίας, <http://civilprotection.gr/el>, Date accessed: 11/05/2018

⁷⁶³Γενική Γραμματεία Πολιτικής Προστασίας, Σχέδια-Εγκύκλιοι, URL: <http://civilprotection.gr/el/εγκυκλιοι>, Date accessed: 11/05/2018

⁷⁶⁴Υπουργείο Περιβάλλοντος & Ενέργειας, Βιοποικιλότητα, URL: <http://www.ypeka.gr/Default.aspx?tabid=237&language=el-GR#biodiv>, Date accessed: 11/05/2018

⁷⁶⁵Υπουργείο Υγείας & Κοινωνικής Αλληλεγγύης, 2008, Εθνικό Σχέδιο Δράσης για την Αντιμετώπιση των Περιβαλλοντικών Κινδύνων που Απειλούν την Υγεία 2008 – 2012, URL: <http://www.moh.gov.gr/articles/health/domes-kai-drasesis-gia-thn-ygeia/ethnika-sxedia-drashs/95-ethnika-sxedia-drashs?fdl=223>

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / No

The NAS recognises that insurance schemes could be updated to ensure that they incentivise climate adaptation. However, no evidence could be found that adaptation is already mainstreamed in insurance policies or alternative policy instruments in order to provide incentives for investments in risk prevention.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / In progress / No

Sectoral adaptation measures have been implemented in relation to specific vulnerabilities, as documented by the CCISC in 2011 (see Indicator 3c). The measures include responding to sectoral impacts at a regional level, such as the regional river basin management plans, the regional framework spatial plans, and the anti-flooding measures implemented by important coastal cities and regions (City of Thessaloniki, Heraklion, etc.). Several research projects/programmes (e.g. MEDROPLAN, ORIENTGATE) address climate adaptation options.

Implementation of adaptation-related actions is ongoing at sectoral, regional and local levels. For example, the bioclimatic restoration of urban areas, underway in several regions of Greece, is embedded in municipalities existing sustainable urban development plans. However, coordinated implementation of the NAS has only just begun.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / No

The implementation of adaptation actions is not yet completed. However, the framework to foster and support implementation at local and regional levels is in place and is described in Sections B1 to B3 and in relation to Indicator 1c above.

A relevant project proposal (LIFE IP AdaptInGR) for funding, submitted to the September 2017 LIFE Climate Action Integrated Projects Call, is described in Section B2.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / No

Apart from various guidelines issued by the European Commission, no specific procedures or guidelines issued or used by the Greek authorities for assessing climate impacts on major projects or programmes and for facilitating their adaptation could be identified.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / No

As already mentioned in relation to Indicator 2a, the MEEN will invite regional stakeholders (public authorities, scientific community, business and industry, civil society, etc) to identify measures that they could take to contribute to the climate resilience of their region and to support the implementation of adaptation policies and measures.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / No

As of May 2018, no monitoring reports have been published.

Pursuant to the Law 4416/2014 (Article 44), the NCCAC will regularly monitor NAS implementation and propose changes to political, legislative or other means and arrangements necessary to promote action. Pursuant to the same Law (Article 43) and the Ministerial Decision 11258/2017 (Article 2, Paragraph 11), an indicator-based system will be developed for each RAAP, which will be used to continually monitor the progress and effectiveness of implementation. The timeline and the periodicity of monitoring is not indicated.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

As of May 2018, no sectoral monitoring reports have been published.

Sector-specific adaptation actions will be included in the RAAPs. It is expected that the majority of the RAAPs will have been finalised by mid-2019⁷⁶⁶ and will be monitored through the respective regional monitoring plans.

⁷⁶⁶ Personal communication with MS contact.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / **No**

As of May 2018, no sub-national level monitoring reports have been published.

Monitoring and reporting of RAAPs is described under Indicator 10a. The Central Union of Greek Municipalities and the Union of Greek Regions will also provide feedback to the NCCAC.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

The NAS (adopted in 2016) and RAAPs (to be adopted by mid-2019) will be subject to evaluation and revision at least once every ten years and at least once every seven years, respectively (pursuant to Law 4414/2016, Articles 42 and 43). Furthermore, the NCCAC plans to regularly monitor and evaluate the NAS and suggest political, legislative or other measures and arrangements necessary to promote action (see Indicator 10a).

11b. Stakeholders are involved in the monitoring and review of the national adaptation policy

Yes / **No**

As indicated in 10a and 11a, monitoring and evaluation have not taken place yet.

Pursuant to Law 4414/2016 (Article 42), any future revisions of the NAS will be subject to open online public consultation for minimum of 30 days to allow individual citizens, public authorities and other stakeholders to submit written views and contributions.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 <i>Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	<u>Yes</u> / In progress / No
2 <i>Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 <i>Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	<u>Yes</u> / In progress / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take	Yes / In progress

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	transboundary risks into account, when relevant	/ <u>No</u>
4 Knowledge gaps		
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	Yes / <u>In progress</u> / No
5 Knowledge transfer		
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	Yes / In progress / <u>No</u>
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	Yes / In progress / <u>No</u>
Step C: Identifying adaptation options		
6 Identification of adaptation options		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	<u>Yes</u> / In progress / No
7 Funding resources identified and allocated		
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / <u>In progress</u> / No
Step D: Implementing adaptation action		
8 Mainstreaming adaptation in planning processes		

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	Yes / <u>No</u>
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	Yes / <u>No</u>
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	Yes / <u>In progress</u> / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 <i>Implementing adaptation</i>		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / In progress / <u>No</u>
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	Yes / <u>No</u>
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	Yes / <u>No</u>
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	Yes / <u>No</u>
Step E: Monitoring and evaluation of adaptation activities		
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are	Yes / <u>No</u>

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	disseminated	
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
11 Evaluation		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	Yes / <u>No</u>

Adaptation preparedness scoreboard for Hungary

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List of abbreviations

CF	Cohesion Fund
EEE OP	Environment and Energy Efficiency Operative Programme
ERDF	European Regional and Development Fund
ESIF	European Structural and Investment Funds
HMS	Hungarian Meteorological Service
LRAs	Local and regional authorities
NAC	National Adaptation Centre
NAGiS	National Adaptation Geo-Information System
NCCP	National Climate Change Programme (i.e. National Climate Change Action Plan)
NCCS-I	First National Climate Change Strategy
NCCS-II	Second National Climate Change Strategy
OP	Operational Programme
RDP	Rural Development Programmes

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

The 2007 Climate Change Act (no. LX)⁷⁶⁷ provided a mandate for the Hungarian Government to develop a strategy on climate change in Hungary. In 2008, the former Ministry for the Environment and Water developed Hungary's First National Climate Change Strategy for 2008-2025 (NCCS-I)⁷⁶⁸, which entered into force via the Parliamentary Resolution 29/2008⁷⁶⁹. The NCCS-I covers three major areas of action: mitigation, adaptation and awareness-raising. Compared to mitigation, consideration of adaptation plays only a minor role and the chapter is mostly descriptive and theoretical. The sectors covered by the adaptation chapter include: nature, human health, water, agriculture and spatial planning.

In accordance with the 2007 Climate Change Act, a draft Second National Climate Change Strategy for 2017-2030 (draft NCCS-II)⁷⁷⁰ was submitted to the Hungarian Parliament in 2017. As of June 2018, the draft NCCS-II has not been adopted. The draft NCCS-II includes a National Adaptation Strategy, a National Decarbonisation Roadmap, and a "Partnership for Climate" Awareness-Raising Plan. Compared to the NCCS-I, adaptation plays a much more prominent role in the draft NCCS II. The draft NCCS-II treats the following sectors as priority for adaptation actions: human health, water, disaster risk reduction, agriculture, nature protection, forestry, built environment and spatial planning, energy and tourism. It also includes a SWOT (strengths, weaknesses, opportunities, threats) analysis of the NCCS-I and specifically highlights the weaknesses of the adaptation chapter.

A2. Adaptation strategies adopted at subnational levels

While the NCCS-I does not discuss subnational-level adaptation strategies, the draft NCCS-II emphasises the need to actively involve regional and local authorities (LRAs), as part of its stakeholder engagement objectives, and also identifies a set of sectoral actions specifically linked to LRAs.

⁷⁶⁷ 2007 Climate Change Act (no. LX), URL:https://net.jogtar.hu/jr/gen/hjegy_doc.cgi?docid=a0700060.tv

⁷⁶⁸ Hungary's National Climate Change Strategy for 2008-2025, URL:

<http://www.kvvm.hu/cim/documents/nes080214.pdf>

⁷⁶⁹ Parliamentary Resolution 29/2008, URL:

<https://mkogy.jogtar.hu/?page=show&docid=a08h0029.OGY#ljb0idafef>

⁷⁷⁰ Draft of the Second National Climate Change Strategy for 2017-2030 (NCCS-II), URL:

http://www.kormany.hu/download/f/6a/f0000/N%C3%89S_2_strat%C3%A9gia_2017_02_27.pdf#!DocumentBrowse

Currently, the 2014-2020 Environmental and Energy Efficiency Operational Programme (EEE OP), funded by the EU Cohesion Fund (CF) and the European Regional Development Fund (ERDF), provides support for the preparation of county-level adaptation strategies.⁷⁷¹

As of May 2018, 18 of the 19 county-level climate change strategies, as well as the climate change strategy of Budapest have been adopted. Currently, the only exception is Békés County, where a strategy is being finalised.

As of May 2018, there are twelve signatories⁷⁷² to the adaptation actions of the Covenant of Mayors of Climate & Energy⁷⁷³ at the city level in Hungary.

Adaptation action plans

B1. National adaptation plan

The objectives of the NCCS-I were planned to be implemented by National Climate Change Programmes developed every two years. The first National Climate Change Programme (1st NCCP) for 2009-2010 was adopted in 2010 by the Governmental Decree 1005 /2010.⁷⁷⁴ The Programme included a set of adaptation actions for the priority sectors and identified indicators, financial resources and the responsible authorities for these actions.

Nevertheless, no further National Climate Change Programmes have been adopted since 2010 and, thus, currently, no adaptation plans are in place.

The draft NCCS-II indicates that National Climate Change Programmes will be developed every three years.

B2. Adaptation plans adopted at sub-national level

The county-level strategies described in Section A2 also include adaptation action plans.

B3. Sectoral adaptation plans

Separate sectoral adaptation plans do not exist, but sectoral adaptation actions are integrated into relevant sectoral strategies – see Indicator 8d.

⁷⁷¹ Personal communication with MS contact.

⁷⁷² The 12th and the 18th district of Budapest, Békéscsaba, Debrecen, Dunaujváros, Kaposvár, Kőszegdoroszló, Nagypáli, Nyíregyháza, , Répceszemere, Szeged and Sárvár.

⁷⁷³ Covenant of Mayors signatories, URL:

http://www.covenantofmayors.eu/about/signatories_en.html?q=Search+for+a+Signatory...&country_search=hu&population=&date_of_adhesion=&status=&commitments2=1 [Accessed: 23/04/2018]

⁷⁷⁴ 1005/2010. (I.21.) Korm. határozata Nemzeti Éghajlatváltozási Programról, URL:

http://klima.kvvm.hu/documents/103/N_P_v_gleges_honlapra.pdf

SCOREBOARD

As the draft NCCS-II has not been adopted, the scores below are based on the NCCS-I.

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

The Department for Climate Policy in the Ministry for Innovation and Technology (former: Ministry of National Development)⁷⁷⁵ is responsible for adaptation policy making and the implementation of the NCCS-I. Some of the priority goals of the Ministry are to support domestic climate and environmental projects and to keep the private sector representatives informed of the latest EU and domestic funding opportunities. The Climate Policy Department is responsible for international and EU-level climate negotiations and national climate law-making. It also includes the National Climate Protection Authority, which carries out tasks related to administration on F-gases and the EU Emissions Trading System, and to the National Administrator of the Registry.

The National Adaptation Centre (NAC)⁷⁷⁶ acts as a background institute, and takes part in the development of climate change strategies, national adaptation strategies and climate change action plan(s) and supports the coordination of implementation. Furthermore, the Mining and Geological Survey of Hungary (former Geological and Geophysical Institute of Hungary) acts as an institution providing background research.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

There is no systematic horizontal coordination mechanism in place in Hungary. The central coordinating body is the Ministry for Innovation and Technology (as Indicated in 1a) while other relevant ministries include the Ministry of Interior (responsible for the protection of surface waters and groundwater) and the Ministry of Agriculture (responsible for agricultural and rural development policy).⁷⁷⁷

⁷⁷⁵ See at: <http://www.kormany.hu/hu/innovacios-es-technologiai-miniszterium/energiaugyekert-es-klimapolitikaert-felelos-allamtitkar>; former: <http://www.kormany.hu/hu/nemzeti-fejlesztési-miniszterium/fejlesztés-es-klimapolitikaert-valamint-kiemelt-kozzolgaltatasokert-felelos-allamtitkarsag>;

⁷⁷⁶ See at: <http://nak.mfgi.hu/hu>

⁷⁷⁷ It should be noted that following the parliamentary elections held in April 2018, a new Government has formed modifying the competencies of certain governmental institutions. Further changes may happen regarding the responsibilities in the near future.

The NCCS-I indicates that the responsible coordinating authority should have formed a Climate Change Policy Working Group in order to support the horizontal coordination of adaptation policy making with the relevant ministries. It is unclear if this working group is in place and how the various sectoral ministries were involved in the drafting of the NCCS-I.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / In progress / No

County-level climate change platforms exist, including one for the capital. These platforms include a wide range of county-level stakeholders, including relevant governmental authorities, academia and environmental NGOs. The platforms are responsible for the dissemination of climate change related information to local stakeholders, to assess adaptation needs and to identify good practices, and as such support the implementation of climate adaptation policy.⁷⁷⁸ The platforms are supported by the EEE OP.

The Hungarian Alliance of Climate-Friendly Cities⁷⁷⁹, initiated by the Institute of Sociology of the Hungarian Academy of Sciences, is a partnership of local governments and NGOs providing technical advice, tools, case studies and information to cities on climate adaptation and mitigation. As of June 2018, the Alliance had 46 Hungarian member cities. The county-level platforms are responsible to report on their progress to the Hungarian Alliance of Climate-Friendly Cities.

As mentioned above, a number of cities are part of the Covenant of Mayors initiative. The Hungarian Alliance of Climate-Friendly Cities is responsible for the national and regional coordination between the members of the Covenant of Mayors.

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

The most recent draft of the NCCS-II was open for public consultation for a limited time (two weeks) in 2017. Stakeholders were invited to send their comments to a governmental email address, but no templates or questions were publicly available. Following this administrative consultation, the draft NCCS-II was first discussed by the National Environmental Protection Council, whose members are mainly NGOs and scientific institutions, and second by the

⁷⁷⁸ Personal communication with MS contact.

⁷⁷⁹ Klimabarat.hu, URL: <http://klimabarat.hu/> [Accessed: 23/04/2018]

National Council for Sustainable Development, which consists of members of parliamentary parties and NGOs.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

The NCCS-I does not discuss transboundary adaptation issues and, thus, did not drive transboundary cooperation. In contrast, the draft NCCS-II describes some plans in this area. Furthermore, there are a number of transnational initiatives in which Hungary takes part. These are presented below in chronological order.

In 2011, during the Hungarian Presidency, the EU Strategy for the Danube Region⁷⁸⁰ was adopted. The main objectives of the Strategy are to sustainably develop the river basin macro-region, protect its natural areas, landscapes and natural values. Climate adaptation is listed as one of the issues that needs to be addressed by the Strategy.

Hungary is also a party to the International Convention for the Protection of the Danube River, under which a dedicated Climate Adaptation Strategy⁷⁸¹ was developed in 2013.

In 2014, a Carpathian Home Development Concept Note was developed, and discussed and supported by the National Assembly of Foreign Hungarian Communities. The Concept Note provides a strategic development framework for the Carpathian region until 2030. The draft NCCS-II indicates that the Concept Note supports the objectives of the draft NCCS II.

In 2016, a water summit was organised in Budapest, which specifically aimed to align actions with the UN's Sustainable Development Goals. Building on the event, the draft NCCS-II suggests that a regional adaptation centre should be established in Hungary for the Danube, but no further details are provided on this action.

The draft NCCS-II also indicates that adaptation could be strengthened via the Framework Convention on the Sustainable Development and Protection of the Carpathians⁷⁸² and calls for action in the Visegrad 4 countries. The need for transboundary action also appears in a small number of adaptation options identified by the draft NCCS-II but a systematic assessment has not been completed.

⁷⁸⁰ European Union Strategy for Danube Region, 2010, URL: <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52010DC0715>

⁷⁸¹ ICPDR Programmes, URL: <http://www.icpdr.org/main/publications/programmes> [Accessed: 16/05/2018]

⁷⁸² 306/2005. (XII. 25.) Korm. rendelete Kárpátok védelméről és fenntartható fejlesztéséről szóló Keretegyezmény kihirdetéséről, URL: http://net.jogtar.hu/jr/gen/hjegy_doc.cgi?docid=A0500306.KOR

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / **In progress** / No

The Hungarian Meteorological Service (HMS) operates a network for observations and measurements, providing quality control and harmonisation of long-term observation data. The HMS has a large number of meteorological stations measuring temperature, precipitation, wind, sunshine and many other meteorological parameters.

The primary impacts of climate change on climate and on weather events are fully tracked by the HMS. The secondary impacts of extreme events are tracked by the institutes mentioned below:

- Water management related information (e.g. flood, inland inundation) – General Directorate of Water Management
- Geological hazards related data and information (e.g. landslide) – Mining and Geological Survey of Hungary
- Environmental and other disaster situations related data and information – National Directorate General for Disaster Management
- Agriculture and forestry risk related data and information (e.g. ice and storm damage) – National Food Chain Safety Office
- Human health related data and information (e.g. high mortality rates caused by heat waves) – National Public Health and Medical Officer Service.

Observation and monitoring systems to assess secondary climate impacts are not operated by the HMS.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

The HMS (Regional Climate Modelling Group) applies two regional climate models: the ALADIN Climate model and the REMO model.⁷⁸³ The scenarios and projections, included in the draft NCCS-II, are based on these models.

⁷⁸³ [OMSZ Modellkísérletek, URL: http://met.hu/omsz/tevekenysegek/klimamodellezes/modellkiserletek/](http://met.hu/omsz/tevekenysegek/klimamodellezes/modellkiserletek/)
[Accessed: 16/05/2018]

With regards to scenarios and projections, the latest and most important initiative is the National Adaptation Geo-information System (NAGiS)⁷⁸⁴, which was established in 2014 and became operational in 2016. The NAGiS is operated by the Mining and Geological Survey of Hungary⁷⁸⁵ according to Government Decree No. 94/2014 (III. 21.)⁷⁸⁶ and the detailed rules of operation of the System. The legal foundation of NAGiS was laid down by the 2007 Climate Change Act, which stipulates that the implementation of the adaptation strategy framework should be supported by a national adaptation geo-information system, and by the results of climate vulnerability assessments based on this system. The reference years of the NAGiS are 1961-1990. It provides projections for the period of 2021-2050 and 2071-2100, which are based on the IPCC SRES A1B scenario⁷⁸⁷ (AR4).

The follow up project NAGiS2 was launched at the end of 2016, which will be implemented by August 2019. Its main objectives are to further develop the methodology assessment scheme and the databases of the current system, and to create a new toolkit for local and governmental climate adaptation decision making.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / **In progress** / No

The NCCS-I was built on the so-called VAHAVA project⁷⁸⁸, which undertook a climate vulnerability assessment between 2003 and 2007. The project was carried out by the Hungarian Academy of Sciences and the former Ministry of Environment and Water, now the Ministry of National Development. It was a nationwide project, involving leading researchers from a number of scientific institutions across Hungary. The vulnerability assessment covered the following sectors: natural resources, agriculture, forestry, water, energy, transport, spatial planning, tourism, human health and insurance.⁷⁸⁹

The draft NCCS-II, building on the results of the NAGiS (see above), provides a vulnerability assessment of the following sectors and areas:

- Human health impacts as a result of heatwaves
- Vulnerability of arable lands and agriculture production
- Vulnerability of forests
- Impacts on natural ecosystems

⁷⁸⁴ See at: <http://nater.mfgi.hu/en>

⁷⁸⁵ See at: <http://mbfsz.gov.hu/>

⁷⁸⁶ 94/2014. (III. 21.) Korm. Rendelet a Nemzeti Alkalmazkodási Térinformatikai Rendszer működésének részletes szabályairól, URL: http://njt.hu/cgi_bin/njt_doc.cgi?docid=168214.261603

⁷⁸⁷ Personal communication with MS contact.

⁷⁸⁸ [The website of the project is not operating anymore.](#)

⁷⁸⁹ KvVM, 2005, A GLOBÁLIS KLÍMAVÁLTOZÁS: HAZAI HATÁSOK ÉS VÁLASZOK, ELŐZETES ÖSSZEFOGLALÁS, URL: <http://netrix.mta.nsd.sztaki.hu/fileadmin/2005/09/vahava0915.pdf>

- Flash flood risks in hills and mountains
- Vulnerability of drinking water supply.

The NAGiS was extended to the agricultural sector (AGRAGiS) in order to assess its vulnerability in more detail. A further project of the NAGiS was the “Long-term socio-economic forecasting for Hungary”⁷⁹⁰, which was implemented by the Institute for Regional Studies, Centre for Economic and Regional Studies, Hungarian Academy of Sciences.

A set of background studies were conducted to support some of the vulnerability assessments (e.g. nature and water)⁷⁹¹. A further project called ‘CRIGiS: Vulnerability/Impact Studies with a focus on Tourism and Critical Infrastructures’, funded by an EEA grant, was also undertaken.⁷⁹²

Only limited information is available on the VAHAVA project, so it is difficult to deduce whether its vulnerability assessment was comprehensive. While the draft NCCS-II applied a sound vulnerability assessment methodology, it has not been officially adopted. Subsequently, an ‘in progress’ score has been assigned.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

Transboundary risks are not covered by the NCCS-I.

Transboundary risks are also not covered by the vulnerability assessment in the draft NCCS-II and the NAGiS only covers Hungary. Nevertheless, one of the planned actions of the draft NCCS-II is to develop a geo-information model, which considers the whole water catchment area of the Danube and builds on regional hydrological models. At the same time, as noted under Indicator 2b, Hungary is part of a range of transboundary cooperation initiatives. Some of these by nature consider transboundary risks, as part of the conducted vulnerability assessments. The assessments primarily focus on the river Danube.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / **In progress** / No

⁷⁹⁰ See at: <http://nater.rkk.hu/english/>

⁷⁹¹ See for instance: Somodi I., Bede-Fazekas Á., Lepesi N., Czúcz B.: *Természetes ökoszisztémák éghajlati sérülékenységeinek elemzése*, 2016.; *A klímaváltozás hatása a villámárvíz kockázatra*, D4.10 NATÉR kutatási jelentés, Magyar Földtani és Geofizikai Intézet, 2016.; Rotárné Szalkai Ágnes - Homolya Emese - Selmeczi Pál: *A klímaváltozás hatása az ivóvízbázisokra*. Kutatási jelentés. MFGI, Budapest, 2015. december 15.

⁷⁹² See at: <http://www.met.hu/KRITeR/en/kezdo/>

The NCCS-I identified a list of areas where further research and development is needed. However, this was not done in a systematic way.

The draft NCCS-II includes a SWOT analysis of the NCCS-I and indicates that it will address the identified gaps.

Research, development and innovation are also considered in the draft NCCS-II, as a key horizontal tool, and short-, mid- and long-term actions are established. For instance, in the short-term the draft NCCS-II aims to further implement regional climate models and observation systems.

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / In progress / No

A dedicated portal on the Government's website on climate change is available⁷⁹³. This website provides detailed information about domestic climate change policy, including on the NCCS-I and the draft NCCS-II.

The National Adaptation Centre⁷⁹⁴ also provides information about Hungary's adaptation policy, including detailed information on the NCCS-I and the draft NCCS-II.

The website of the NAGiS⁷⁹⁵ provides detailed information and guidance on the use of the databases.

There is a dedicated website for climate change on the website of the Hungarian Meteorological Service (HMS)⁷⁹⁶. Information on climate projections and regional climate models is available, however, it is not fully up to date.

Finally, in 2016, a Facebook page was launched by the Ministry for National Development to share information with the public on climate change issues.

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / **In progress** / No

⁷⁹³ The Government's website on climate change: <http://klima.kormany.hu>

⁷⁹⁴ National Adaptation Centre website: <http://nakfo.mbfisz.gov.hu>

⁷⁹⁵ NAGiS website: <http://nater.mbfisz.gov.hu/>

⁷⁹⁶ HMS website: <http://met.hu/eghajlat/eghajlatvaltozas/>

The NCCS-I covers education within its horizontal chapter and the 1st NCCSP identified a set of indicators for it. While the first (and only) progress report on the 1st NCCSP indicated some progress within this area, no further data (post-2012) is available on these indicators.

Capacity building and stakeholder engagement appears as an important horizontal tool in the draft NCCS-II, however, no systematic action is planned and activities are uncoordinated.

During the Hungarian presidency in 2011, guidance was developed for cities and regions with support for climate action. Furthermore, a set of newly developed guidance documents on how to develop climate change strategies is available for counties, cities and villages⁷⁹⁷ on the website of the Hungarian Alliance of Climate-Friendly Cities.

In 2013, the NAC established an online platform, the Climate Dialogue, where registered stakeholders can discuss climate change informally. This platform has targeted stakeholders during the development of the first draft of the NCCS II in 2014⁷⁹⁸. Furthermore, as indicated in Indicator 1c, support is provided at the county-level as part of the climate change platforms.

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / **No**

The NCCS-I identifies a set of adaptation options within the identified priority sectors, nevertheless, no references are made to the results of the VAHAVA vulnerability assessment and it is unclear what process has been used to identify these options. In contrast, the draft NCCS-II defines short-, medium- and long-term actions for the priority sectors and the identified objectives seem to build on the results of the vulnerability assessments and the observed climate impacts and projections; furthermore, expert judgement seems to be applied. The aim was to integrate the sectoral actions into other sectoral policies and strategies, as, in many cases, the NAS provides the links between the various strategies. Compared to the identification of sectoral adaptation options, the geographical focus is less apparent. Nevertheless, it is addressed in more detail in the vulnerability assessment.

⁷⁹⁷ See at: <http://klimabarat.hu/>

⁷⁹⁸ Bemutatóközik a Klímadiológus, URL: <http://klimadialogus.mfgi.hu/hu/cikk/bemutakozik-klimadialogus>
[Accessed: 16/05/2018](#)

Overall, given that the draft NCCS-II has not been adopted the score is based on the NCCS-I.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / **No**

Adaptation options are not prioritised within the NCCS-I and no prioritisation tools have been applied. Actions are listed for all of the priority sectors. The same applies to the draft NCCS-II. While time horizons (short-, mid- and long-term) are identified for each of the adaptation actions, it is unclear how their duration was determined or what will be their actual timescales.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / **In progress** /No

The 2001 Disaster Risk Reduction Act (No. CXXVIII)⁷⁹⁹ makes no reference to climate change or adaptation and provides no further details about a disaster risk reduction strategy.

Although the current National Security Strategy⁸⁰⁰ makes a reference to climate change, it does not present adaptation actions as a potential tool to address security problems. In order to comply with the European Strategic Investment Fund's (ESIF) ex-ante conditionality for the Thematic Objective 5 ("the existence of national or regional risk assessments for disaster management, taking into account climate change adaptation"), Hungary prepared a report⁸⁰¹ on its approach to disaster risk management, which considered climate impacts.

Disaster risk management is not discussed in detail in the NCCS-I and is only briefly mentioned in relation to the built environment and infrastructure.

The draft NCCS-II specifically assesses disaster risk reduction and security concerns and considers the projected impacts on key infrastructure, industrial security, ecological security, food safety and impacts on health care, and national security (including for instance climate migration). Short-, mid- and long-term actions are identified for disaster risk reduction and the draft NCCS-II emphasises that adaptation needs to be considered in the National Disaster

⁷⁹⁹ 2011. évi CXXVIII. Törvény a katasztrófavédelemről és a hozzá kapcsolódó egyes törvények módosításáról, URL: http://njt.hu/cgi_bin/njt_doc.cgi?docid=139408

⁸⁰⁰ A Kormány 1035/2012. (II. 21.) Korm. határozata Magyarország Nemzeti Biztonsági Stratégiájáról, URL: http://2010-2014.kormany.hu/download/f/49/70000/1035_2012_korm_hatarozat.pdf

⁸⁰¹ BM, 2014, Jelentés Magyarország nemzeti katasztrófakockázat-értékelési módszertanáról és annak eredményeiről <http://www.katasztrofavedelem.hu/letoltes/szervezet/20140718-katasztrofakockazat-ertekelesrol-jelentes.pdf>

Risk Reduction Strategy, which was adopted in 2012 by the Government Decision 1035/2012. (II. 21.).

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / **In progress** /No

While the NCCS-I does not provide details about the financing framework, the 1st NCCP indicated the specific financial resources for all of its actions. These included both EU and national funds. In contrast, information on funding resources are specifically discussed as part of the implementation framework of the draft NCCS-II and details are provided separately for mitigation and adaptation.

The key financial resources for adaptation actions come from EU funds, particularly the ERDF, CF and European Agriculture Fund for Rural Development (EAFRD). Adaptation actions are mainstreamed through Operational Programmes (the Environment and Energy OP⁸⁰², the Competitive Central Hungary OP⁸⁰³ and the Territorial and Settlement Development OP⁸⁰⁴) and the Rural Development Programme (RDP)⁸⁰⁵. Unsurprisingly, the Environment and Energy OP delivers the majority of adaptation actions. In total, during the 2014-2020 Cohesion Policy programming period EUR 892.71 million is allocated to adaptation actions under these three OPs (no figures are included in the draft NCCS-II on the RDP). In comparison, EUR 3024.53 million is allocated to mitigation under five OPs.

The draft NCCS-II also describes national funding sources that are allocated to both mitigation and adaptation actions.

No evidence was found on the funding of cross-cutting adaptation actions.

⁸⁰² See more information at: http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/hungary/2014hu16m1op001

⁸⁰³ See more information at http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/hungary/2014hu16m2op002

⁸⁰⁴ See more information at http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/hungary/2014hu16m2op001

⁸⁰⁵ See more information at https://ec.europa.eu/agriculture/rural-development-2014-2020/country-files/hu_en

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

The EIA Directive and the SEA Directive are translated into Hungarian legislation via the Governmental Decree 314/2005. (XII. 25.)⁸⁰⁶ and the Governmental Decree 2/2005. (I. 11.)⁸⁰⁷, respectively.

In June 2017, the Governmental Decree 139/2017 introduced the amended provisions of the EIA Directive. The modification prescribes, *inter alia*, that the pre-examination documentation shall include a climate sensitivity analysis for certain investment types, the analysis of potential climate impacts, risk-evaluation and potential adaptation actions.

The Governmental Decree 2/2005 transposing the SEA Directive does not provide specific details on climate adaptation.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / No

In order to comply with the European Strategic Investment Fund's (ESIF) ex-ante conditionality for the Thematic Objective 5 ("the existence of national or regional risk assessments for disaster management, taking into account climate change adaptation"), Hungary prepared a report⁸⁰⁸ on its approach to disaster risk management, which considered climate impacts.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / No

While the NCCS-I discusses adaptation options for the built environment it does not make any reference to related policies. In contrast, the draft NCCS-II makes a specific reference to

⁸⁰⁶ [314/2005. \(XII. 25.\) Korm. Rendelet a környezeti hatásvizsgálati és az egységes környezethasználati engedélyezési eljárásról](http://net.jogtar.hu/jr/gen/hjegy_doc.cgi?docid=A0500314.KOR), URL: http://net.jogtar.hu/jr/gen/hjegy_doc.cgi?docid=A0500314.KOR

⁸⁰⁷ [2/2005. \(I. 11.\) Korm. Rendelet egyes tervek, illetve programok környezeti vizsgálatáról](https://net.jogtar.hu/jr/gen/hjegy_doc.cgi?docid=a0500002.kor), URL: https://net.jogtar.hu/jr/gen/hjegy_doc.cgi?docid=a0500002.kor

⁸⁰⁸ BM, 2014, Jelentés Magyarország nemzeti katasztrófakockázat-értékelési módszertanáról és annak eredményeiről <http://www.katasztrofavedelem.hu/letoltes/szervezet/20140718-katasztrofakockazat-ertekelesrol-jelentes.pdf>

the National Development and Spatial Development Concept Note, which establishes the strategic orientation for the development priorities for Hungary until 2030. The legal base of the concept note is the Parliamentary Resolution 1/2014. (I. 3.)⁸⁰⁹ and is linked to the Act XXI of 1996 on Regional Development and Spatial Planning⁸¹⁰, which is the main legal base of land-use and spatial planning in Hungary. The Concept Note assesses climate impacts on land-use and spatial planning and discusses the implications primarily at the national level. Nevertheless, some regional specificities are also presented. The Concept Note also provides an overview of the climate vulnerability of key sectors in Hungary and emphasises regional variations and differences in adaptation capacities. Practical implementation of the Concept Note is achieved through the operational programmes referenced in Indicator 7a.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / **In progress** / No

The NCCS-I does not provide an overview of key national policies and how adaptation is mainstreamed into them. In contrast, the draft NCCS-II includes a specific chapter on the links between the Strategy and other sectoral policies. The following strategies, which are already in place, are specifically mentioned:

- National Rural Strategy (2012-2020)⁸¹¹: the NAS makes a specific reference to the need to better adapt to climate change in the agriculture sector via for instance water use efficiency and capacity building for farmers.
- National Forestry Strategy (2016-2030)⁸¹²: the need to implement alternative forestry practices to better adapt to climate change is mentioned.
- National Environmental Protection Strategy (2015-2020)⁸¹³: adaptation actions at the local and regional level are emphasised.
- National Nature Protection Strategy (2015-2020)⁸¹⁴: for instance, the importance of green infrastructure is indicated.
- National Biodiversity Strategy (2015-2020)⁸¹⁵: the need to maintain ecosystem services is emphasised.

⁸⁰⁹ [1/2014. \(I. 3.\) OGY határozat a Nemzeti Fejlesztés 2030 - Országos Fejlesztési és Területfejlesztési Koncepcióról](https://mkogy.jogtar.hu/?page=show&docid=a14h0001). URL: <https://mkogy.jogtar.hu/?page=show&docid=a14h0001>. OGY

⁸¹⁰ [1996. évi XXI. Törvény a területfejlesztésről és a területrendezésről](https://net.jogtar.hu/jr/gen/hjegy_doc.cgi?docid=99600021). URL: https://net.jogtar.hu/jr/gen/hjegy_doc.cgi?docid=99600021. TV

⁸¹¹ [Nemzeti Vidékstratégia 2012 – 2020](http://videkstrategia.kormany.hu/download/4/37/30000/Nemzeti%20Vid%C3%A9kstrat%C3%A9gia.pdf). URL: <http://videkstrategia.kormany.hu/download/4/37/30000/Nemzeti%20Vid%C3%A9kstrat%C3%A9gia.pdf>

⁸¹² [Nemzeti Erdőstratégia 2016-2030](http://www.kormany.hu/download/a/1a/d0000/Nemzeti_Erd%C5%91strat%C3%A9gia.pdf). URL: http://www.kormany.hu/download/a/1a/d0000/Nemzeti_Erd%C5%91strat%C3%A9gia.pdf

⁸¹³ [27/2015. \(VI. 17.\) OGY határozat a 2015–2020 közötti időszakra szóló Nemzeti Környezetvédelmi Programról](https://mkogy.jogtar.hu/?page=show&docid=a15h0027) URL: <https://mkogy.jogtar.hu/?page=show&docid=a15h0027>. OGY

⁸¹⁴ [NEMZETI TERMÉSZETVÉDELMI ALAPTERV](http://2010-2014.kormany.hu/download/6/c7/11000/Nemzeti%20Term%C3%A9szetv%C3%A9delmi%20Alapterv%20IV.pdf). URL: <http://2010-2014.kormany.hu/download/6/c7/11000/Nemzeti%20Term%C3%A9szetv%C3%A9delmi%20Alapterv%20IV.pdf>

- National Environmental Technology Innovation Strategy (2011-2020)⁸¹⁶: the strategy aims to support the development of innovative and new technologies, which could help to adapt to climate change.
- National Water Strategy⁸¹⁷ (2014-2020): water policy has the explicit aim of adaptation to climate change, with special emphasis on extreme weather events and droughts. The National Water Strategy includes several adaptation measures in the field of local water management, such as water retention in local (both groundwater and surface) water reservoirs, improved irrigation and land-use change, where necessary (less arable lands at extreme low elevations).
- National Tourism Development Strategy 2030: describes climate change as among the most important future challenges that can have serious impacts on tourist destinations, and responds by putting greater emphasis on the need for climate and environmental awareness in developing tourist attractions.

Furthermore, the Constitution, the National Sustainable Development Strategy, the Partnership Agreement, the National Reform Programme, the National Development and Spatial Development Concept Note and the Carpathian Home Development Concept Note are also listed as key strategic documents that are closely linked to the overarching objectives of the draft NCCS-II and are integrating climate objectives.

Overall, there are many sectoral strategies that are increasingly considering adaptation, nevertheless, some of the key sectors are still missing, such as human health, built environment and infrastructure.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

The need to re-evaluate the insurance sector's role in climate change policy is very briefly discussed within the NCCS-I.

In the draft NCCS-II, the need to ensure adequate insurance instruments primarily appears linked to the agriculture sector. The 2011 Act (no. CLXVIII.)⁸¹⁸ on climate-related risk management affecting agriculture production provides a framework on how to deal with risk prevention in the agriculture sector, nevertheless it does not refer to the need for adaptation actions.

⁸¹⁵ [28/2015. \(VI. 17.\) OGY határozat a biológiai sokféleség megőrzésének 2015-2020 közötti időszakra szóló nemzeti stratégiájáról](https://mkogy.jogtar.hu/?page=show&docid=a15h0028.OGY), URL: <https://mkogy.jogtar.hu/?page=show&docid=a15h0028.OGY>

⁸¹⁶ [Nemzeti Környezettechnológiai Innovációs Stratégia](http://kornyezettechnologia.kormany.hu/download/c/66/40000/NKIS.pdf), URL: <http://kornyezettechnologia.kormany.hu/download/c/66/40000/NKIS.pdf>

⁸¹⁷ [Kvassay Jenő Terv tájékoztatás és társadalmi konzultáció](https://www.vizugy.hu/index.php?module=vizstrat&programelemid=143), URL: <https://www.vizugy.hu/index.php?module=vizstrat&programelemid=143> [Accessed: 16/05/2018]

⁸¹⁸ [2011. évi CLXVIII. Törvény a mezőgazdasági termelést érintő időjárás és más természeti kockázatok kezeléséről](https://net.jogtar.hu/jr/gen/hjegy_doc.cgi?docid=a1100168.tv), URL: https://net.jogtar.hu/jr/gen/hjegy_doc.cgi?docid=a1100168.tv

Overall, no evidence could be found that adaptation is mainstreamed into insurance policies or alternative policy instruments to provide incentives for investments in risk prevention.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In progress** / No

As indicated in the policy framework section, Hungary only adopted one action plan, which covered the years 2009 and 2010. In 2012, the Hungarian Government published a report⁸¹⁹ on the implementation of the 1st NCCP, which identified some progress with adaptation actions, including on nature and biodiversity, human health, water, agriculture, forestry and spatial planning. Furthermore, progress has been registered on some horizontal climate actions, such as in education, capacity building and research.

Since 2010, no further documented evidence has been published on the implementation of adaptation actions. Nevertheless, some actions are taking place sectorally (see mainstreaming under Indicator 8d) and at the sub-national level (see Indicator 9b).

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / No

As indicated in Indicator 1c, county-level climate change platforms are in place and support the implementation of adaptation actions. Furthermore, the Hungarian Alliance of Climate-Friendly Cities⁸²⁰ and the Climate Protection Alliance⁸²¹ also provide support at the sub-national level.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / No

In January 2017, climate risk guidance was developed by the Government on how the resilience and vulnerability of major projects and other projects funded by ESIF should be assessed. The adaptation guidance follows eight steps:

⁸¹⁹ J/6926. Számú jelentés a 2009-2010. évi Nemzeti Éghajlatváltozási Programról, URL: <http://www.parlament.hu/irom39/06926/06926.pdf>

⁸²⁰ See at: klimabarat.hu

⁸²¹ See at: <http://www.eghajlatvedelmiszovetseg.hu/>

- Assessment of the project's sensitivity
- Analysis of the project's exposure
- Assessment of the potential impacts
- Risk assessment
- Identification and selection of possible adaptation options
- Assessment of the possible adaptation options
- Integration of adaptation options into the project
- Monitoring the effectiveness of adaptation options.

In addition to the guidance, a detailed description of the methodology is also available⁸²².

The Ministry of National Development held several trainings and briefings for the leaders of major projects supported by the Cohesion Policy on the practical utilisation of the Governmental Decree 314/2005 on the procedure of environmental impact assessment (EIA) and integrated pollution prevention and control. The Prime Minister's Office has published a technical guidance document on the detailed climate risk assessment methodology⁸²³. This document is an amendment of the European Commission's guidance on integrating climate adaptation into the programmes and investments supported by the Cohesion Policy⁸²⁴ with the addition of Hungarian local and regional specificities.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.

Yes / No

In 2009, a Climate Change Committee was formed⁸²⁵ to support implementation of the NCCS-I and included stakeholders from relevant ministries, academia and environmental NGOs.

As indicated in Indicator 1c, County Climate Change Platforms have also been established in every county, as a result of the support of the EEE OP, and include a wide range of stakeholders.

⁸²² Szechenyi 2020, Útmutatók, szabályzatok, URL: <https://www.palyazat.gov.hu/tmutatkszablyzatok> [Accessed: 16/05/2018]

⁸²³ Szechenyi 2020, Útmutató projektek klímakockázatának becsléséhez és csökkentéséhez, URL: <https://www.palyazat.gov.hu/tmutat-projektek-klimakockzatnak-becslshez-s-cskkentshez> [Accessed: 16/05/2018]

⁸²⁴ https://ec.europa.eu/clima/sites/clima/files/adaptation/what/docs/swd_2013_135_en.pdf

⁸²⁵ Éghajlatváltozással foglalkozó kormányzati bizottság alakult, URL: <http://www.alternativenergia.hu/eghajlatvaltozassal-foglalkozo-kormanyzati-bizottsag-alakult/4054>, Date accessed: 15/05/2018

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / **No**

A progress report on the 1st NCCP was published by the Hungarian Government in 2012. This report provided an overview of progress on the specific adaptation actions, including on the results for the specific indicators and the allocation of funds.

Nevertheless, as no further action plans have been published by the Government, no monitoring has been in place since 2012.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / **No**

No evidence was found of the existence of sectoral monitoring since 2012.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / **No**

Subnational-level monitoring reports are not published or disseminated.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

The NCCS-I was expected to be reviewed first after two years of its adoption (in 2010) and then every five years (2015, 2020 and 2025). A first evaluation started in 2013, which eventually led to the drafting of the draft NCCS-II in 2017. The NCCS-I also states that National Climate Change Programmes (i.e. action plans) are to be adopted every two years. Nevertheless, there was only one NCCP adopted in 2009 and a progress report was published in 2012 (see Indicator 10a).

There is a more detailed evaluation framework in the draft NCCS-II, nevertheless, given the delay with its adoption, this evaluation framework is expected to be revised.

The first two-year long Climate Change Action Plan is planned to be developed six months after the NCCS-II is adopted. The following timeline for review is foreseen by the NCCS-II:

- The second action plan is planned to be developed in 2020 for 2021-2023 and then every three years, i.e. 2023 for 2024-2026 and 2026 for 2027-2029.
- The NCCS II is planned to be evaluated in 2020 and 2026. This evaluation will be in line with the Regulation on the Governance of the Energy Union.
- Finally, an ex-post evaluation of the NCCS-II and the renewal of the Strategy is planned to take place in 2031.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / No

No description is provided in the NCCS-I and the draft NCCS-II on plans for involving stakeholders in the evaluation processes. Nevertheless, as noted in relation to Indicator 2a, ministries, NGOs and research organisations took part in discussions about the draft NCCS-II and had a chance to influence the revision of the NCCS-I.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 <i>Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	Yes / In progress / <u>No</u>
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	<u>Yes</u> / In progress / No
2 <i>Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 <i>Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	Yes / <u>In progress</u> / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	Yes / <u>In progress</u> / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No
4 <i>Knowledge gaps</i>		
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	Yes / <u>In progress</u> / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
5	<i>Knowledge transfer</i>	
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	<u>Yes</u> / In progress / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	Yes / <u>In progress</u> / No
Step C: Identifying adaptation options		
6	<i>Identification of adaptation options</i>	
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	Yes / <u>No</u>
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	Yes / <u>No</u>
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	Yes / <u>In progress</u> / No
7	<i>Funding resources identified and allocated</i>	
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / <u>In progress</u> / No
Step D: Implementing adaptation action		
8	<i>Mainstreaming adaptation in planning processes</i>	
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	<u>Yes</u> / No
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	<u>Yes</u> / No
8d	National policy instruments promote adaptation at	Yes / <u>In</u>

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	<u>progress</u> / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 <i>Implementing adaptation</i>		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	<u>Yes</u> / No
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	<u>Yes</u> / No
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	<u>Yes</u> / No
Step E: Monitoring and evaluation of adaptation activities		
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
11 <i>Evaluation</i>		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	<u>Yes</u> / <u>No</u>

Adaptation preparedness scoreboard for Ireland

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List of abbreviations

ARC	Adaptive Responses to Climate impacts
ATS	Annual Transition Statement
BIC	British Irish Council
CCAC	Climate Change Advisory Council
CCRP	Climate Change Research Programme
CFRAM	Catchment Flood Risk Assessment
DCCAIE	Department of Communications, Climate Action and Environment
DRR	Disaster Risk Reduction
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
GCM	Global Climate Models
NAF	National Adaptation Framework
NCCAF	National Climate Change Adaptation Framework
NDCA	National Dialogue on Climate Action
NMP	National Mitigation Plan
NSMC	North South Ministerial Council
NUIG	National University of Ireland Galway
OPW	Office of Public Works
SEA	Strategic Impact Assessment
SEM	Strategic Emergency Management

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

The former Department of Environment, Community and Local Government published a National Climate Change Adaptation Framework (NCCAF) in December 2012⁸²⁶. This non-statutory, but Government-approved, framework mandated the development and implementation of sectoral adaptation plans and local government adaptation strategies which, together, would form the national response to climate impacts.

The policy in relation to climate adaptation, first set out in the NCCAF, was subsequently restated in the National Policy Position on Climate Change (2014)⁸²⁷. The National Policy Position provides a high-level policy direction for the adoption and implementation by Government of plans to enable the State to pursue the transition to a low carbon, climate resilient and environmentally sustainable economy by 2050 (known as the “national transition objective”).

The enactment on 10 December 2015 of the Climate Action and Low Carbon Development Act 2015⁸²⁸ (The Climate Act) was an important milestone in establishing the national transition objective on a statutory basis. To facilitate this ‘transition’, the Climate Act provided for the development and submission to the Government of national mitigation and adaptation plans. It also established the institutional and governance framework within which these plans can be developed and implemented on a cyclical basis. The framework identifies the key participants at sectoral level (i.e. relevant government ministers) and at local level (i.e. the local government sector) that will drive the adaptation effort.

Under Section 5 of the Climate Act, the Minister for Department of Communications Climate Action and Environment (DCCA)E⁸²⁹ published a National Adaptation Framework (NAF) in January 2018. The NAF must be reviewed not less than once in every five-year period⁸³⁰. This replaces the previous NCCAF and specifies the national strategy for the application of adaptation measures in different sectors and by local authorities in their administrative areas.

⁸²⁶ DCCA)E, 2012, National Climate Change Adaptation Framework, URL: <http://www.dccae.gov.ie/en-ie/climate-action/publications/pages/national-climate-change-adaptation-framework.aspx>

⁸²⁷ DCCA)E, 2014, National Policy Position on Climate Action and Low Carbon Development, URL: <http://www.dccae.gov.ie/en-ie/climate-action/publications/Pages/National-Policy-Position.aspx>

⁸²⁸ Climate Action and Low Carbon Development Act 2015, URL: <http://www.irishstatutebook.ie/eli/2015/act/46/enacted/en/html>

⁸²⁹ Department of Communications, Climate Action and Environment, home page, URL: <https://www.dccae.gov.ie/en-ie/Pages/default.aspx>

⁸³⁰ DCCA)E, 2018, National Adaptation Framework, URL: <http://www.dccae.gov.ie/en-ie/climate-action/topics/adapting-to-climate-change/national-adaptation-framework/Pages/default.aspx>

The aim of the NAF is to reduce the vulnerability of the State to the negative effects of climate change and to avail of any positive effects that may occur.

A2. Adaptation strategies adopted at subnational levels

In Ireland, regions and regional assemblies have limited competencies and a low degree of autonomy, although they are granted regional planning competences, such as the preparation and adoption of regional spatial and economic strategies. Local-level authorities (i.e. city councils or county councils) were identified by the NCCAF as the appropriate implementation level. These authorities are responsible for integrating climate adaptation measures into their future planning decisions.

The NAF requires that local authorities develop climate adaptation strategies and integrate these strategies into their statutory plans and policies (e.g. county and city development plans). Some local authorities have already undertaken small-scale projects and participated in EU-funded projects on adaptation.

Adaptation action plans

B1. National adaptation plan

The statutory NAF, developed by the DCCAE, identifies the sectors and lead departments that will be required to prepare sectoral adaptation plans. The plans will need to be developed in line with the requirements of the Climate Action and Low Carbon Development Act and will be subject to approval at Government level. These sectoral adaptation plans should be revised and updated at least every five years. Sectoral specific guidelines were published in May 2018 to help the sectors required to prepare sectoral adaptation plans.

B2. Adaptation plans adopted at sub-national level

Local authorities are mandated under the NAF to prepare local adaptation strategies. Completed strategies should then be integrated into each local authority's existing plans, policies and services (such as city and county development plans). A network of four Climate Action Regional Offices (CAROs) has been set up in order to support this requirement and to drive climate action at local level.

The Minister for Communications, Energy and Natural Resources launched the Local Authority Climate Change Adaptation Strategy Guidelines in May 2016. The guidelines were designed to assist local authorities to develop their own adaptation strategies. While these strategies will be distinct and separate from the NAF, it is intended that they should complement sectoral adaptation plans to be prepared by government departments. The guidelines describe six steps (tasks) that a local authority needs to complete to develop, adopt and implement an adaptation strategy:

- Forming an adaptation team and preparing the ground

- Assessing the current adaptation baseline
- Assessing future climate risk
- Identifying, assessing and prioritising adaptation options
- Developing an adaptation pathway map and drafting the adaptation strategy
- Mainstreaming, monitoring and reviewing the adaptation strategy.

The guidelines are currently being updated as a key action under NAF and the updated guidelines will be published in Autumn 2018.

B3. Sectoral adaptation plans

In March 2017, a subgroup of the National Adaptation Steering Committee was established to consider how adaptation planning can be effectively progressed in sectors where roles and responsibilities are fragmented.

Under the 2012 Framework and with the input of the National Adaptation Steering Committee, four sectoral plans covering five sectors were developed, including:

- Sectoral Adaptation Plan for Flood Risk Management⁸³¹
- Adaptation Planning – Developing Resilience to Climate Change in the Irish Agriculture and Forest Sector⁸³²
- Adaptation Planning – Developing Resilience to Climate Change in the Irish Transport Sector⁸³³
- Adaptation Plan for the Electricity and Gas Networks Sector⁸³⁴.

These plans are non-statutory and will be re-developed in line with current legislation and in line with the NAF.

Under the newly published NAF, government departments (or agencies, where appropriate) with responsibility for priority sectors are required to prepare sectoral adaptation plans in line with the requirements of Sections 5, 6 and 7 of the Climate Act. The NAF identifies twelve

⁸³¹ OPW, 2015, Climate Change Sectoral Adaptation Plan: Flood Risk Management (2015-2019), URL: <https://opw.ie/en/media/FRM%20CC%20Sectoral%20Adaptation%20Plan%20-%20Dec%202015%20-%20Finalb.pdf>

⁸³² DAFM, 2017, Adaptation Planning – Developing Resilience to Climate Change in the Irish Agriculture and Forest Sector, URL: <https://www.agriculture.gov.ie/media/migration/ruralenvironment/climatechange/ApprovedAdaptationPlanning040817.pdf>

⁸³³ DTTAS, 2017, Adaptation Planning – Developing Resilience to Climate Change in the Irish Transport Sector, URL: <https://www.agriculture.gov.ie/media/migration/ruralenvironment/climatechange/ApprovedAdaptationPlanning040817.pdf>

⁸³⁴ DCCAE, 2017, Climate Change Adaptation Plan for the Electricity and Gas Networks sector, URL: <https://www.dccae.gov.ie/en-ie/news-and-media/publications/Pages/Climate-Change-Adaptation-Plan-for-the-Electricity-and-Gas-Networks-sector-0221-5002.aspx>

key sectors where sectoral adaptation plans are to be prepared: seafood, agriculture, forestry, biodiversity, built and archaeological heritage, transport infrastructure, electricity and gas networks, flood risk management, water quality, water services infrastructure, and health.

In March 2018, the Government requested, in line with its obligations under Section 6(1) of the Climate Act, that relevant ministers begin the preparation of their respective plans. The statutory deadline for the submission of completed sectoral adaptation plans to the Government for approval is no later than 30 September 2019.⁸³⁵

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

The DCCAE is a central component of the climate change governance architecture, leading and coordinating national adaptation policy and supporting the implementation of the adaptation effort at national, sectoral and local government levels.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

The Climate Change Advisory Council (CCAC) was established by Ministerial Order on 18 January 2016 under Section 8 of the Climate Action and Low Carbon Development Act 2015. The Council, which is independent in the performance of its functions, provides advice and recommendations to, *inter alia*, the DCCAE Minister in relation to the preparation of the NAF; the development by a relevant minister of a sectoral adaptation plan; and the approval by the Government of a NAF.

Sectoral coordination has taken place under the auspices of the National Adaptation Steering Committee which is chaired by DCCAE. As a key action under the NAF, the National Adaptation Steering Committee has been restructured to ensure that a coordinated, comprehensive and coherent approach continues to operate in implementing actions under the NAF. The need for appropriate cross sectoral coordination and consultation is identified as critical to the effective implementation of the NAF.

⁸³⁵ Personal communication with MS contact

The National Adaptation Steering Committee’s membership now includes representatives of those preparing plans under the NAF, as well as other key departments and agencies. These include the Departments of Finance and Public Expenditure and Reform, representatives of local government and the Climate Action Regional Offices, the Environmental Protection Agency, Met Éireann and the National Standards Authority of Ireland. This Steering Committee now reports to a National Climate Action High-Level Steering Group, chaired by the Minister for Communications, Climate Action and Environment. This group addresses climate mitigation and adaptation. In terms of adaptation, the High-Level Steering Group will:

- Monitor progress by sectors and agencies in delivering on climate adaptation actions for which they are responsible; and
- Ensure that a coordinated and coherent approach is adopted and maintained towards achieving a climate resilient Ireland⁸³⁶

In order to support key national sectors in planning for climate adaptation and departments and agencies in the preparation of sectoral adaptation plans required under the NAF and the Climate Act, “Sectoral Guidelines for Planning for Climate Change Adaptation” were published in May 2018. These guidelines aim to ensure that a coherent and consistent approach to adaptation planning is adopted at national and local scales and draw on existing sources of climate and adaptation information relevant for Ireland (e.g. Climate Ireland). DCCAE is also considering the ongoing development of the Climate Information Platform for Ireland (Climate Ireland), which can act as a long-term operational support for climate action at local and sectoral level in Ireland.⁸³⁷

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / In progress / No

Mechanisms are in place to coordinate adaptation planning and implementation across national, regional and local levels. As indicated in Indicator 1b, sub-national level governments are part of the National Adaptation Steering Committee and have been involved in the preparation of adaptation policies and are also part of the implementation phase.

In order to further support climate action at local level and to advance key actions identified under both the NAF and the NMP, in January 2018 the Minister for Communications, Climate Action and Environment announced €10 million in funding over five years to set up four Regional Local Authority Climate Action Offices.⁸³⁸

⁸³⁶ Personal communication with MS contact

⁸³⁷ Personal communication with MS contact

⁸³⁸ Personal communication with MS contact

The regional offices are located in four lead authorities (Cork County Council, Dublin City Council on a rotating basis, Kildare County Council and Mayo County Council) and are based on four geographical areas with the associated grouping of local authorities in each region based upon shared climate change risks.

Local authorities have been contacted through the regional lead authorities outlining the obligations and governance arrangements for the sector in relation to climate action, including the preparation of local adaptation strategies by each local authority. It is intended that these strategies will be in place by 30 September 2019. The regional offices will contribute to the implementation of national climate adaptation, mitigation and awareness (e.g. the National Dialogue on Climate Action) policy. The regional offices will provide expertise and capacity at local and regional level to contribute effectively to the national transition to a low carbon and climate resilient economy. The regional offices will also provide a more focused approach for how local government liaises centrally with relevant government departments, regional assemblies and agencies on climate-related matters and in the preparation of sectoral adaptation plans and local adaptation strategies.⁸³⁹ Twelve⁸⁴⁰ Irish local authorities have signed the Covenant of Mayors for Climate & Energy and the regional structure above will provide them with a platform to further coordinate any action under the Covenant of Mayors.

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

The 2012 NCCAF was subject to a stakeholder consultation in 2009. Prior to the preparation of the current NAF, an initial public consultation took place from 21 March 2016 to 20 May 2016, in which members of the public and stakeholders were invited to comment on the contents and development of such a framework. This feedback was incorporated into the draft NAF, and a period of public consultation opened on 15 September 2017 and closed after six weeks on 27 October 2017.

The Government also has a commitment to establishing a National Dialogue on Climate Action (NDCA) which will inform the national objective to transition to a low carbon and climate resilient economy and society. In terms of climate resilience, the publication of the draft NAF was a key landmark in informing the NDCA and how it addresses the issue of climate impacts.

An advisory group on the NDCA has also been established to provide advice in relation to the overall strategy, structure and operation of the national dialogue to the DCCAE Minister. The

⁸³⁹ Personal communication with MS contact

⁸⁴⁰ Seven have made commitments in relation to adaptation.

Advisory Group held its first meeting in July 2017. A regional gathering of the NDCA will take place in Athlone on 23 June 2018. This is the first in a series of regional and local meetings to be held across Ireland.⁸⁴¹

In addition to the NDCA, the Citizens' Assembly provided an avenue for stakeholder engagement. The Citizens' Assembly was an exercise in deliberative democracy, placing the citizen at the heart of important legal and policy issues facing Irish society today. The Assembly was a body comprising the Chairperson and 99 citizens, randomly selected to be broadly representative of the Irish electorate. The Assembly considered the topic "How the State can make Ireland a Leader in tackling Climate Change" over two weekends 30 September-1 October 2017 and 4-5 November 2017. The Citizens' Assembly's final report on the topic was published on 18 April 2018.⁸⁴²

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

The British and Irish Council (BIC) and North South Ministerial Council (NSMC) are identified as potential avenues for transboundary cooperation on climate adaptation.

Both initiatives were established under the Belfast Agreement and their membership comprises representatives from the Irish Government; UK Government; Scottish Government; Northern Ireland Executive; Welsh Government; Isle of Man Government; Government of Jersey and Government of Guernsey.

The objective of the NSMC is to facilitate cooperation between the governments of Ireland and Northern Ireland, while the objective of the BIC is to facilitate dialogue between the Irish and UK Government.

The British-Irish Council's Environment Working Group held its fifteenth ministerial meeting, hosted by the Government of Ireland, on 23 March 2018. Ministers discussed the observed and projected climate impacts, including increases in average temperature, changes in precipitation patterns, sea-level rise and changes in the frequency and character of weather extremes, such as storms.

Ministers recognised that, given Ireland's shared geographic location and climatic influences, some impacts, such as extreme weather events, are likely to affect member administrations simultaneously. It was agreed by ministers that these shared challenges offer significant

⁸⁴¹ <https://dcaae.gov.ie/en-ie/news-and-media/press-releases/Pages/Minister-publishes-National-Adaptation-Framework.aspx>

⁸⁴² Personal communication with MS contact; See the report at: <https://www.citizensassembly.ie/en/How-the-State-can-make-Ireland-a-leader-in-tackling-climate-change/Final-Report-on-how-the-State-can-make-Ireland-a-leader-in-tackling-climate-change/Climate-Change-Report-Final.pdf>

potential for cooperation in terms of sharing information and best practice across the administrations and that the possibilities for better coordinated and co-funded research should be examined.

There was agreement that the private sector, local government, communities and civil society all have a key role to play in increasing climate resilience and all administrations are committed to sharing their experiences on supporting and engaging these sectors.⁸⁴³

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / In progress / No

The Irish Meteorological Office Met Éireann has primary responsibility for atmospheric observations, with the National University of Ireland Galway (NUIG) and other bodies also providing support. Responsibility for oceanic and terrestrial observations lies with the Marine Institute, Met Éireann, EPA, universities and other institutions.

Met Éireann is currently collaborating with the Office of Public Works (OPW) in developing a National Flood Forecasting Service, which will have a critical role to play in disseminating climate-related information at regional and local levels.

In the Status of Ireland's Climate report⁸⁴⁴, it was concluded that many elements of a climate observation, analysis and reporting system are in place. Nonetheless, there are a number of outstanding issues that need to be addressed to make the system more robust and capable of addressing Ireland's long-term climate change needs and reporting requirements.

Research on analysis and re-analysis of climate information and data is ongoing through a number of research projects. These include work on temperature, precipitation, extreme events, flooding and droughts. The continued systematic observation of key climate parameters and data analysis is central to research in this area. The aim is to ensure the sustainability of the observation systems while providing on-going support of data analysis.

The EPA Research Programme is funding a number of research projects collecting observation data in areas other than meteorology. The CIViC (Critical Infrastructure Vulnerability to Climate Change) study at NUIG will assess the vulnerability of elements

⁸⁴³ British Irish Council, 2018, paper prepared on the topic of adaptation to climate change, URL: <https://www.britishirishcouncil.org/sites/default/files/Climate%20Adaptation%20Paper.pdf>

⁸⁴⁴ Environmental Protection Agency, 2013, The Status of Ireland's Climate, URL: <http://www.epa.ie/pubs/reports/research/climate/ccrpreport26.html>

(water, energy, transport and communications) of Ireland's critical infrastructure to climate change. The overall aim is to inform critical asset management decisions in the context of climate change.

The Adaptive Responses to Climate Impacts (ARC) project developed a framework for costing climate impacts on the Irish economy and assessing the options for adaptation, with a specific focus on the role of key stakeholders.

Information on the impact of severe weather events is being compiled at the Government level. An example of this is the report compiled by the National Directorate on Fire and Emergency Management in the Department of Housing, Planning, Community and Local Government following severe flooding at the end of 2015 and the beginning of 2016. This Department is the lead government department in Ireland for the response to severe weather events and flooding and coordinated the report across government.

The 2017 "Strategic Emergency Management: National Structures and Framework" notes the potential to include climate impacts in the national risk assessment process. This document will be complemented by a series of "Strategic Emergency Management (SEM) Guidelines" dealing with specific aspects of strategic emergency management. It is likely this will lead to more impact monitoring.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

The 2015 projections of climate change in Ireland for 2050 and 2100 utilise outputs from global climate models (GCMs). These are downscaled using both dynamic and statistical approaches. New global model simulations carried out in Ireland by Met Éireann (2013) provide an update on the expected changes climate over the 21st Century. Regional climate models were run at high spatial resolution, maximum of 4 km, allowing for a better evaluation of the potential local effects of climate change (Nolan, 2015⁸⁴⁵).

The Department of Housing, Planning and Local Government continues to support Met Éireann in its development of climate projection systems and provision of climate services for Ireland.

⁸⁴⁵ EPA, 2015, Research 159: Ensemble of regional climate model projections for Ireland, URL: <http://www.epa.ie/pubs/reports/research/climate/research159ensembleofregionalclimatemodelprojectionsforireland.html>

Analyses of potential climate impacts for Ireland are summarised in the State of Knowledge Report⁸⁴⁶ and in Climate Ireland⁸⁴⁷.

Potential negative sectoral impacts arising from climate projections are summarised in the NAF. This includes impacts on agriculture, forestry, biodiversity, coastal areas, critical infrastructure, marine and fisheries, water management, and human health and wellbeing.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / **In progress** / No

Research on climate impacts and adaptation is coordinated by the Environmental Protection Agency, through its Climate Change Research Programme (CCRP). The programme supports and develops research to inform decision making and planning on adaptation and identify options to reduce the adverse climate impacts and their associated costs.

The report by the Irish Academy of Engineering, Ireland at Risk Critical Infrastructure – Adaptation for Climate Change⁸⁴⁸ and the report by the Heritage Council and Fáilte Ireland (the National Tourism Development Authority), Climate Change, Heritage and Tourism, Implications for Ireland's Coast and Inland Waterways⁸⁴⁹ are early examples of initiatives of this kind.

Research on specific impacts is included in the Hydrodetect project⁸⁵⁰, which identified a reference river flow network for monitoring and detecting climate driven changes in Irish river flows. A phenological study (Donnelly et al., 2012⁸⁵¹) showed that the warmer Irish climate has led to a change in the seasonal cycle of a range of plant and animal species.

A National Climate Change Vulnerability Scoping Study⁸⁵² was undertaken to identify first generation vulnerabilities for Ireland based on a sensitivity analysis across key sectors. The analysis identified a clustering of impacts and their importance in relation to an assessment of likely resilience by sector. By comparing sensitivity versus impacts, an estimate of first-generation vulnerability was made. A deliberative risk-ranking methodology was applied

⁸⁴⁶ Desmond et al., 2017, A Summary of the State of Knowledge on Climate Change Impacts for Ireland, URL : https://www.epa.ie/pubs/reports/research/climate/EPA%20RR%20223_web.pdf

⁸⁴⁷ Climate Ireland, 2018, Website, URL : <http://www.climateireland.ie/#/about>

⁸⁴⁸ http://www.iae.ie/site_media/pressroom/documents/2009/Nov/17/Ireland_at_Risk_2.pdf

⁸⁴⁹ Heritage Council and Failte Ireland, 2009, Climate Change, Heritage and Tourism : Implications for Ireland's Coast and Inland Waterways, URL :

https://www.heritagecouncil.ie/content/files/climate_change_heritage_tourism_main_report_2009.pdf

⁸⁵⁰ EPA, 2013, Climate Change Research Programme 2007-2013 Report Series No.27, URL :

https://www.epa.ie/pubs/reports/research/climate/CCRP_27_HydroDetect.pdf

⁸⁵¹ Donnelly et al., 2012, Surviving in a warmer world : environmental and genetic responses, URL :

http://www.int-res.com/articles/cr_oa/c053p245.pdf

⁸⁵² EPA, 2013, Current and future vulnerabilities to climate change in Ireland, URL:

https://www.epa.ie/pubs/reports/research/climate/CCRP_29.pdf

using multiple stakeholder perspectives. The priority sectors identified were: biodiversity and fisheries; water resources and the built coastal environment; forestry and agriculture. As each sector develops its sectoral adaptation plan (under the Climate Action and Low Carbon Development Act 2015), detailed vulnerability and risk analysis will be required. Some preliminary work has been undertaken on costing climate impacts in Ireland⁸⁵³. This is now being supported by more detailed analysis of the current and future costs of flood risk management.

The EPA is currently funding a research project called Urb-Adapt, which aims to identify climate impacts on Dublin city and surrounding towns within the greater Dublin region. The project aims to identify possible risks to the population living in that area and future risks posed to it by the changing climate. The project is divided into two key strands, water and heat.

The DCCAIE is providing funding for two EPA funded research projects, which aim to establish a national risk and impacts assessment of the effect on Ireland of current and future climate warming pattern while also assessing the vulnerability of elements of Ireland's critical infrastructure (water, energy, transport and communications) to climate change.

“Ongoing development of Ireland's first dedicated national climate change risk assessment and assessing the vulnerability of critical infrastructure to climate change” is included as a supporting objective in the NAF.

The National Risk Assessment of Impacts of Climate Change (C-RISK) has commenced. The aim of this EPA-funded project is to establish a national assessment of the risks and impacts on Ireland of current and future climate warming patterns in the 21st century. The EPA-funded Critical Infrastructure Vulnerability to Climate Change (CIViC) study, will assess the vulnerability of elements (water, energy, transport and communications) of Ireland's critical infrastructure to climate change.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / In progress / **No**

Transboundary cooperation with the Northern Ireland Devolved Government and 'Climate Northern Ireland' is on-going with a view to understanding areas of commonality, sharing of experiences and best practices. The NAF states that Ireland will “continue to avail of opportunities to collaborate with other jurisdictions to tackle common challenges on adaptation and resilience and to consider transboundary impacts and synergies when they

⁸⁵³ UCC, Costing Climate Change Impacts & Adaptation in Ireland, URL : <https://www.ucc.ie/en/eri/projects/cosclimchange/>

arise.” Vulnerability assessments to date such as the National Climate Change Vulnerability Scoping Study have not considered transboundary risk.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / In progress / No

The DCCAE prioritises climate research needs and ensures that accessible information is provided to support the NAF. Climate research is also funded by a number of state bodies including Teagasc, the Sustainable Energy Authority of Ireland and the Economic and Social Research Institute (ESRI) (NAF). €38.2 million was spent on research funding for climate change related research in Ireland from 2010-2015 by the EPA, SEAI and the Department of Agriculture, Food and the Marine.⁸⁵⁴

The Climate Change Research Programme (CCRP), established and administered by the EPA, supports research addressing specific knowledge gaps of direct relevance to the National Climate Change Strategy⁸⁵⁵. The CCRP research outputs are aimed at strengthening data and the information base, and filling gaps in knowledge. A significant number of research projects has been funded to date with a focus on the policies and measures needed to adapt to climate impacts^{856,857}.

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / In progress / No

Ireland’s Climate Information Platform “Climate Ireland”⁸⁵⁸ provides support to decision makers in the development of their adaptation plans. The objective of the platform is to support adaptation decision making at all levels, including the public. This is achieved through the provision of essential climate information (observed and projected) to support impact and risk assessment.

It is an objective of the NAF to develop Climate Ireland further on an operational basis. Climate Ireland delivered training on climate adaptation to the regional offices in May 2018.

⁸⁵⁴ Irish Government Economic and Evaluation Service, 2017, Spending Review 2017 – Climate Change Related-Research & Funding in Ireland. URL: <file:///C:/Users/js77/Downloads/Climate-Change-Related-Research-and-Funding-in-Ireland.pdf>

⁸⁵⁵ EPA, 2018, Climate Change Research Programme, URL: <http://www.epa.ie/climate/climatechangeresearch/>

⁸⁵⁶ EPA, 2018, Climate Change Research Programme, URL: <http://www.epa.ie/climate/climatechangeresearch/>

⁸⁵⁷ CoFoRD Programme of Competitive Forestry Research for Development: Publication Irish Forests and Climate Change <http://www.coford.ie/publications/forestry2030/irishforestsandclimatechange/>

⁸⁵⁸ Climate Ireland platform: www.climateireland.ie

The final phase of Climate Ireland⁸⁵⁹ has now been developed by University College Cork, under the EPA's research programme. As part of the project's third and final phase of development the functionality of the platform was enhanced through the provision of greater data analysis and additional decision-support tools.

The DCCAE is considering the ongoing development of the Climate Information Platform for Ireland (Climate Ireland), which can act as a long-term operational support for climate action at local and sectoral level in Ireland.⁸⁶⁰

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / In progress / No

A science-policy interface was set up to assist in developing the NCCAF. Various research institutes and the national meteorological administration ensured feedback in that process. Further workshops have been held since, such as for the preparation of the report on Current and Future Vulnerabilities to Climate Change in Ireland (Coll and Sweeney, 2013)⁸⁶¹.

Knowledge transfer activities (e.g. science/policy interfaces) between researchers and decision and policymakers occur when research reports are published and disseminated⁸⁶². Key findings are accompanied by press releases and research dissemination seminars.

There is an ongoing programme of capacity building, outreach and training measures aimed at decision makers and adaptation practitioners within local authorities, which includes training seminars and workshops.⁸⁶³ Most recently, in May 2018 a series of seminars were held by the Climate Ireland research team in order to build the capacity of local authority staff, which have been particularly timely in the context of the ongoing development of the CAROs project.

Climate change features in the education curriculum at the 2nd and 3rd level of secondary school. A number of universities includes climate adaptation education at Masters level⁸⁶⁴.

⁸⁶⁰ Personal communication with MS contact

⁸⁶² For example, the State of Knowledge Report 2009.

⁸⁶³ DCCAE, 2018, Local level adaptation, URL: <https://www.dccae.gov.ie/en-ie/climate-action/topics/adapting-to-climate-change/national-adaptation-framework/Pages/Localadaptation.aspx>

⁸⁶⁴ Maynooth University MSc Climate Change <https://www.maynoothuniversity.ie/study-maynooth/postgraduate-studies/courses/msc-climate-change>, University College Dublin: https://sisweb.ucd.ie/usis/!W_HU_MENU.P_PUBLISH?p_tag=PROG&MAJR=F112; NUI Galway <http://www.nuigalway.ie/ccafs/>

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

Twelve sectors are required to prepare sectoral adaptation plans not later than 30 September 2019 in line with NAF and the Climate Act. These plans will contain the adaptation measures that the minister responsible for that sector intends to introduce over the lifetime of the plan. A key step in the development of each sectoral plan will be the preparation of sector-specific risk and vulnerability assessments using up-to-date research in the area, as well the prioritisation of actions based upon the risks identified in those assessments.

Work has been completed in a number of sectors under the NCCAF (2012) that will provide a strong foundation for statutory sectoral adaptation plans. The following sectoral plans have been prepared under the NCCAF and the experience of preparing these informed drafting of the statutory NAF:

- Sectoral Adaptation Plan for Flood Risk Management (OPW, 2015)
- Adaptation Planning – Developing Resilience to Climate Change in the Irish Agriculture and Forest Sector (DAFM, 2017)
- Adaptation Planning – Developing Resilience to Climate Change in the Irish Transport Sector (DTTAS, 2017)
- Draft Adaptation Plan for the Electricity and Gas Networks Sector (DCCAE, 2017).

These four existing plans identify adaptation options for these sectors.

Under the statutory NAF each sectoral plan must be approved by the Government. Plans should be based primarily on the results of a sectoral risk assessment. As a minimum, each plan should present: clear evidence of climate risks to the sector, its vulnerabilities to such risks, and actions to address the risks and ensure the sector's climate resilience.

In drawing up the sectoral plans, three basic steps must be reflected:

- Clear understanding of the consequences of a changing climate
- Actions to equip decision-makers with skills and tools; and
- Integration of adaptation into policy and administration at sectoral level in Ireland.

Sectoral adaptation plans will be developed in line with sectoral adaptation guidelines, which were approved in May 2018. The guidelines aim to ensure that a coherent and consistent approach to adaptation planning is adopted at national and local scales and draws on existing

sources of climate and adaptation information (e.g. Climate Ireland⁸⁶⁵). The guidelines were published in May 2018 having been originally developed as part of an Environmental Protection Agency (EPA) research project ('A Climate Information Platform for Ireland') with funding provided by the DCCA. The guidelines are structured around six steps: 1) Preparing the Ground; 2) Climate Impact Screening; 3) Prioritisation; 4) Priority Impact Assessment; 5) Develop your Plan; 6) Implement, Monitor and Review.

The NAF also discusses the potential synergies of a themed approach to considering the sectoral plans as part of four thematic areas: Natural Capital, Critical Infrastructure, River and Coastal Flood Risk Management, and Public Health. Such a thematic approach is intended to further coordinate sectors' responses to cross-cutting issues and enhance collaboration in the preparation of sectoral adaptation plans. The NAF identifies the following sectors will produce individual adaptation plans using the NAF and tools such as Climate Ireland for guidance: seafood, agriculture, forestry, biodiversity, built and archaeological heritage, transport infrastructure, electricity and gas networks, communications networks, flood risk management, water quality, water services infrastructure, and health. These plans will be reviewed and updated as a minimum once every five years.

A number of technical supports have been produced to assist in the development of local level adaptation strategies, such as Climate Ireland and the Local Authority Adaptation Strategy Development Guidelines⁸⁶⁶. The Guidelines, originated as research commissioned by the EPA and prepared by University College Cork, are designed to assist local authorities to develop their own adaptation strategies and to ensure that they will complement sectoral adaptation plans. The Guidelines are currently under review with a view to publication before end 2018.

In January 2018, the Minister for Communications, Climate Action and Environment announced €10 million in funding over five years to set up four Regional Local Authority Climate Action Offices.⁸⁶⁷ The regional offices are located in four lead authorities (Cork County Council, Dublin City Council on a rotating basis, Kildare County Council and Mayo County Council) and are based on four geographical areas with the associated grouping of local authorities in each region based upon shared climate change risks.

The approach taken harnesses the potential to group certain local authorities based on similar geographical and topographical characteristics and on the basis of existing synergies in addressing threats and impacts of severe weather events and ongoing climate change risks. The approach is, therefore, based on climate risk assessment with a focus on the predominant risk(s) in each geographical area.

⁸⁶⁵ Climate Ireland. URL: www.climateireland.ie

⁸⁶⁶ Gray, S. 2016. Local Authority Adaptation Strategy Development Guideline. Environmental Protection Agency Research Report 164. Available at: <http://www.epa.ie/pubs/reports/research/climate/researchreport164.html>

⁸⁶⁷ Personal communication with MS contact

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

The NAF lays out the principles for the identification of adaptation options in Ireland. The sectoral guidelines provide a detailed step by step guide on how sectors should develop and prioritise their adaptation actions.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / In Progress / No

The NAF includes as a supporting objective: “Ensure continued alignment with emergency planning for extreme weather events including where plans related to emergencies assigned to a sectoral department as Lead Government department under the ‘Strategic Emergency Management National Structures and Framework’ are climate proofed”. The NAF notes the emerging acknowledgement of the need to enhance coherence and complementarity between the Paris Agreement, the Sendai Framework for Disaster Risk Reduction, as well as the UN Sustainable Development Goals.

A subgroup of the Government Task Force on Emergency Planning, jointly chaired by the Department of Foreign Affairs and Trade and the Office of Emergency Planning, is in place regarding Ireland’s engagement with the Sendai Framework on Disaster Risk Reduction. The DCCAE is represented on this subgroup.

Ireland’s “Sustainable Development Goals National Implementation Plan 2018 – 2020” was published in May 2018. It sets out how Ireland will work to achieve the Goals, including those related to climate adaptation, both domestically and internationally.⁸⁶⁸

Statutory responsibility for emergency planning in various sectors lies across a number of government departments. Departments must engage with key players in their respective sectors, championing adaptation policies and instruments, and encouraging the private sector and civil society to partake in the collective adaptation effort.

Ireland published a National Framework on Emergency Planning⁸⁶⁹ in October 2017. This will be complemented by a series of strategic emergency guidelines dealing with specific aspects of strategic emergency management, including climate adaptation. The NAF recognises that the local government sector plays a pivotal role in planning for, and responding to, emergency situations. Local authorities can react faster and more effectively to

⁸⁶⁸ Personal communication with MS contact

⁸⁶⁹ URL: <https://www.emergencyplanning.ie/system/files/media/file-uploads/2017-11/SEM.pdf>

local climate events than other government agencies, as they have closer relationship with communities. Local authorities also have essential local knowledge of the natural and man-made environment and have a critical role to play in managing climate risks and vulnerabilities and identifying adaptation actions.

It is also important to note the establishment of an Interdepartmental Flood Policy Coordination Group to support OPW⁸⁷⁰ National Catchment-based Flood Risk Assessment and Management (CFRAM) Programme⁸⁷¹. Through this group the OPW is coordinating Ireland's whole of government approach to flood risk management across three strategic policy areas: prevention, protection and preparedness. The purpose of the Coordination Group is to help inform the ten-year implementation strategy of the flood risk management plans (FRMP) and to ensure that policies that can benefit communities and individuals directly are carefully considered. It will be critical that the work of the Coordination Group also aligns with the on-going development of climate resilience being carried out by the relevant sectors under the NCCAF and NAF.

Ireland is currently looking at how best climate adaptation and emergency planning can be coordinated particularly at the sectoral and local level. In this regard Ireland is aware of the challenges that exist at the European level in terms of integrating these areas.

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / **In progress** / No

In the ongoing development of Ireland's National Development Plan (2018-2027), the role of public capital investment in achieving national climate action goals is recognised. The plan identifies flood defences, resilient infrastructure and agriculture as priority actions.

Climate change research is carried out funded by FP7 and Horizon 2020, with €33 million target income under Horizon 2020 and €18.2 million FP7 drawdown allocated to climate action, environment, resource efficiency and raw materials.⁸⁷²

⁸⁷⁰ The Office of Public Works (OPW) is the lead State body for the coordination and implementation of Government policy on the management of flood risk in Ireland. The OPW is also the national authority for the implementation of the EU Directive on the Assessment and Management of Flood Risks [2007/60/EC]

⁸⁷¹ <https://www.cfram.ie/>

⁸⁷² D/JEI, 2016, Evaluation of Ireland's Participation in FP7 and Horizon 2020, URL: <https://dbei.gov.ie/en/Publications/Publication-files/Evaluation-of-Participation-in-FP7-and-Horizon-2020-DJEL-Summary-Report.pdf>

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

The provisions of EIA Directive 2014/52/EU (hereafter called the 2014 EIA Directive) came into effect in Ireland in May 2017. The provisions are detailed in Circular Letter PL 1/ 2017 and the accompanying Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licensing Systems, Key Issues Consultation Paper issued from the Department of Housing, Planning, Community and Local Government in May 2017 to relevant competent authorities.

The EPA has published specific guidelines on integrating consideration of climate change into Strategic Environmental Assessments (SEA)⁸⁷³. More recent national guidance from the EPA on EIA and SEA also gives due consideration to climate change in preparation and implementation of assessments⁸⁷⁴.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / No

The NAF recognises the need to develop early-warning systems, as part of its response to extreme events, such as flooding. The response to these events is coordinated across relevant sectors, and managed by local authorities to take advantage of their local knowledge. The NAF states the importance of maintaining coherence between long-term adaptation planning and short-term emergency management of extreme weather events.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / No

The national administration has made significant effort to integrate adaptation in land use and resource planning policies, though this is work in progress.

⁸⁷³ EPA, 2015, Integrating Climate Change into Strategic Environmental Assessment in Ireland, URL: <http://www.epa.ie/pubs/advice/ea/Climate-Change-SEA-Ireland-Guide-Note.pdf>

⁸⁷⁴ EPA, 2017, Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports, URL: <http://www.epa.ie/pubs/advice/ea/drafteiarguidelines.html>

The Planning and Development Act 2000, as amended, requires that local authority development plans and the forthcoming Regional Spatial and Economic Strategies address the promotion of sustainable settlement and transportation strategies in urban and rural areas, including promotion of measures to address the need for climate adaptation. In addition, current statutory planning guidance for local authorities and An Bord Pleanála makes reference to climate change (e.g. Development Plan Guidelines, 2007; The Planning System and Flood Risk Management Guidelines, 2009; and Local Area Plans Guidelines, 2013). Current guidelines on flood risk management require local authorities to be vigilant in ensuring that future risks of flooding are identified and integrated into the planning process.

The NAF identifies the importance of spatial planning, as a means of integrating climate adaptation into national policies. It identifies the importance of considering the heat-island effect, biodiversity and green spaces, development layouts and building materials within existing planning decision-making processes.

The National Planning Framework (NPF)⁸⁷⁵ is Ireland's overarching planning and development framework for the period up to 2040. It sets a high-level strategy for the coordination of a range of national, regional and local policies and activities, planning and investment, for delivery through both the public and private sectors. The NPF seeks to ensure that climate change considerations are further integrated into the planning system, and continue to be addressed as a matter of course in planning-related decision-making processes. The NPF contains a number of national policy objectives to achieve this aim.

The NPF provides a framework for national spatial planning, pulling together relevant government policies and investment on national and regional development. It focuses on economic development and investment in housing, water services, transport, communications, energy, health and education infrastructure focusing on greenhouse gas emissions, adaptation and resilience.

The NPF, together with the National Investment Plan (2018-27), sets the context for each of Ireland's three regional assemblies to develop their Regional Spatial and Economic Strategies. The NPF will also be considered during the preparation of local authority development plans. The approach is intended to ensure coherence of national, regional and local plans with regard to climate adaptation.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / **In progress** / No

The NAF identifies the sectors and lead departments that will be required to prepare sectoral adaptation plans in line with the requirements of the Climate Action and Low Carbon

⁸⁷⁵ URL: <http://npf.ie/wp-content/uploads/Project-Ireland-2040-NPF.pdf>

Development Act. Twelve sectors are identified in the NAF: seafood, agriculture, forestry, biodiversity, built and archaeological heritage, transport infrastructure, electricity and gas networks, communications networks, flood risk management, water quality, water services infrastructure, and health. Guidelines for sectoral adaptation plans were published in May 2018.

Under the 2012 Framework and with the input of the National Adaptation Steering Committee, four sectoral plans covering five sectors have been developed:

- Sectoral Adaptation Plan for Flood Risk Management⁸⁷⁶
- Adaptation Planning – Developing Resilience to Climate Change in the Irish Agriculture and Forest Sector⁸⁷⁷
- Adaptation Planning – Developing Resilience to Climate Change in the Irish Transport Sector⁸⁷⁸
- Adaptation Plan for the Electricity and Gas Networks Sector⁸⁷⁹.

These plans are non-statutory and will be the basis for statutory plans required under NAF.

The Sectoral Adaptation Plan for Flood Risk Management:

- Outlines existing flood risk and flood-risk management practice in Ireland
- Summarises existing science on climate change and the current state of knowledge for impacts on flooding and flood risk in Ireland
- Defines the policy for adaptation in the flood risk management sector
- Sets out a series of actions to enhance understanding of the potential climate impacts on flooding and flood risk and to embed adaptation into flood-risk management practice
- Identifies how changing flood risk should be considered in spatial planning and other sectors; and
- Sets out what is required for the monitoring, review and evaluation of the plan.

⁸⁷⁶ OPW, 2015, Climate Change Sectoral Adaptation Plan: Flood Risk Management (2015-2019), URL: <https://opw.ie/en/media/FRM%20CC%20Sectoral%20Adaptation%20Plan%20-%20Dec%202015%20-%20Finalb.pdf>

⁸⁷⁷ DAFM, 2017, Adaptation Planning – Developing Resilience to Climate Change in the Irish Agriculture and Forest Sector, URL: <https://www.agriculture.gov.ie/media/migration/ruralenvironment/climatechange/ApprovedAdaptationPlanning040817.pdf>

⁸⁷⁸ DTTAS, 2017, Adaptation Planning – Developing Resilience to Climate Change in the Irish Transport Sector, URL: <https://www.agriculture.gov.ie/media/migration/ruralenvironment/climatechange/ApprovedAdaptationPlanning040817.pdf>

⁸⁷⁹ DCCAE, 2017, Climate Change Adaptation Plan for the Electricity and Gas Networks sector, URL: <https://www.dccae.gov.ie/en-ie/news-and-media/publications/Pages/Climate-Change-Adaptation-Plan-for-the-Electricity-and-Gas-Networks-sector-0221-5002.aspx>

The Catchment Flood Risk Assessment and Management (CFRAM) Programme is the mechanism through which many of the actions will be implemented. It will embed adaptation in long-term flood-risk management and the development of capital projects in Ireland. The future scenario flood maps produced under the CFRAM Programme will facilitate this approach, inform other sectors, and provide a valuable resource for local adaptation planning and sustainable land use management and planning.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

The NAF recognises that the private sector has significant experience in quantifying, pricing, reducing risk and managing weather-related risks across the relevant sectors. In partnership with Government, therefore, it can play an important role in collecting and disseminating data on weather and catastrophe risk, financing risk assessments, and supporting the design and provision of insurance schemes.

One project that sought to examine climate impacts on the insurance industry was the Adaptive Responses to Climate impacts (ARC) project.⁸⁸⁰ The aim of the ARC project, funded by the EPA, was to develop a framework for costing climate impacts on the Irish economy and assessing the options for adaptation, with a specific focus on the role of key stakeholders. The study applied a framework to the specific case of flood risk in Cork and the South West region of Ireland.

The ARC project included a stakeholder forum, comprised of policy makers, local authorities, business groups and the insurance industry, to assess information needs and concerns of those exposed to current and future climate risks. It proceeded to examine two parallel but interlinked strands of research:

- 1) Empirical estimates of the costs of climate impacts without adaptation, particularly focused on flooding; and
- 2) The range of adaptation options available, including the appropriate role for insurance.

The outputs from this project included: costs of flooding; recommendations on the use of tools and methods for costing climate impacts; policy recommendations on the design of adaptation strategies; and implications for the private sector, including insurance.

⁸⁸⁰ EPA, 2017, Adaptive Responses to Climate Impacts (ARC), URL: <http://erc.epa.ie/droplet/modalFull.php?cid=18136>

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / In progress / No

Most adaptation activities in Ireland are currently linked to assessing climate impacts and vulnerabilities, and significant effort is being put into mainstreaming. Adaptation has not yet moved from integration to the effective definition or implementation of actions to meet specific objectives, at least at the national level. The NAF states that following its publication, ministers will be requested to prepare sectoral plans assigned to them and that these plans will specify adaptation policies. This has taken place and the statutory deadline for the submission of completed sectoral adaptation plans to the Government for approval is 30 September 2019. Development and implementation of the sectoral plans will be an iterative process, and they will be revised every five years. Sectoral adaptation plans covering the agriculture, forestry, transport and energy sectors have been written, however, are non-statutory and based upon the requirements of the draft NAF, so may be amended.

There are no specific programmes or projects focused on implementing adaptation measures, although many activities to manage natural resources (water, biodiversity, etc.) have a high potential to contribute to adaptation.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / No

DCCAIE leads and coordinates national adaptation policy and supports the implementation of the NAF at national, sectoral and local government levels.

Arising from the 2012 NCCAF, a National Adaptation Steering Committee was established in 2014 and includes representation from key government sectors, EPA research, the Climate Change Advisory Council Secretariat, and local and regional government. The Steering Group's role is to provide advice and guidance to sectors, identified in the NAF, on the development of sectoral adaptation plans. This includes issues related to coordination at local and regional level and particularly between national level structures and local government. Membership of the Steering Committee has recently been reviewed and now reports into a National Climate Action High-Level Steering Group, chaired by the Minister for Communications, Climate Action and Environment. This group addresses climate mitigation and adaptation. In terms of adaptation, the High-Level Steering Group will:

- Monitor progress by sectors and agencies in delivering on climate adaptation actions for which they are responsible; and

- Ensure that a coordinated and coherent approach is adopted and maintained towards achieving a climate resilient Ireland⁸⁸¹

In January 2018 the Minister for Communications, Climate Action and Environment announced €10 million in funding over five years to set up four Regional Local Authority Climate Action Offices.⁸⁸² The regional offices are located in four lead authorities (Cork County Council, Dublin City Council on a rotating basis, Kildare County Council and Mayo County Council) and are based on four geographical areas with the associated grouping of local authorities in each region based upon shared climate risks.

It is envisaged that the regional teams will develop expertise on the predominant climate risks in its particular region and develop regional strategies on that basis. These regional strategies will then inform the local authority strategies. These structures will also provide an opportunity for the local government sector to play a key role in coordinating relevant activities related to the NDCA.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / No

Progress has been made in mainstreaming climate change considerations into Ireland's planning system. Ongoing work in developing climate resources such as the CIViC and C-RISK projects, Climate Ireland, the Sectoral and Local Authority Adaptation Guidelines and the outputs of the Flood Policy Coordination Group may also be seen as relevant.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / No

The draft NAF was subject to a six-week public consultation in line with the Climate Action and Low Carbon Development Act 2015, closing at the end of October 2017. The NAF is also subject to review every five years. Prior to the preparation of the draft NAF an initial public consultation was also held in 2016 for a period of eight weeks.

The Government has established the NDCA to:

- Create awareness, engagement and motivation to act (locally, regionally and nationally) in relation to the challenges presented by climate change

⁸⁸¹ Personal communication with MS contact

⁸⁸² Personal communication with MS contact

- Create structures and information flows to facilitate people gathering to discuss, deliberate and maximise consensus on appropriate responses to these challenges, and to enable and empower appropriate action
- Establish, on a long-term basis, appropriate networks for people to meet periodically to consider evidence-based inputs on the economic, social, behavioural, environmental and public aspects of climate and energy policy; and
- Provide regular input into the prioritisation and implementation of climate and energy policy, which can be reported and monitored at local, regional and national levels.

An NDCA Advisory Group has been established to provide advice in relation to the overall strategy, structure and operation of the national dialogue. The Advisory Group held its first meeting in July 2017. A regional gathering of the NDCA took place in Athlone on 23 June 2018 in the presence of the Minister for Communications, Climate Action and Environment. This is the first in a series of regional and local meetings to be held across Ireland.

Work undertaken at the sectoral level to date has also involved substantial stakeholder consultation.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / No

Under the Climate Action and Low Carbon Development Act 2015 an annual transition statement (ATS) must be made to each House of the Oireachtas by the Minister for Communications, Climate Action and Environment with regard to a number of mitigation and adaptation-related matters, including adaptation policy measures adopted in the preceding year to enable the achievement of the national transition objective (Section 14 of the 2015 Act). The first ATS⁸⁸³ was published in 2016. Annual sectoral adaptation statements to each House of the Oireachtas are also required.

As described in relation to in Indicator 1b, the CCAC has a number of reporting obligations, including with regard to ‘Annual’ and ‘Periodic Reviews’ of progress towards meeting the National Transition Objective. The CCAC published its first periodic report in July 2017,

⁸⁸³ DCCAE, 2018, Annual Transition Statements, URL: <http://www.dccae.gov.ie/en-ie/climate-action/topics/climate-action-at-a-national-level/climate-action-and-low-carbon-development-act-/Pages/Annual-transition-statement.aspx>

which is a key aspect of the NAF. The Minister for Communications, Climate Action and Environment is required to review the NAF at least once in every 5 years period.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

Twelve sectors are identified in the NAF, which will be required to submit sectoral adaptation plans. Annual sectoral adaptation statements need to be submitted to each House of the Oireachtas.

The CCAC has a number of reporting obligations, including with regard to annual and periodic reviews of progress towards meeting the National Transition Objective. The NAF specifies that the CCCAC must liaise with key sectors to assess and monitor progress in achieving climate resilience.

The National Adaptation Steering Committee reports to the National Climate Action High-Level Steering Group, which is tasked with monitoring progress by sectors in delivering adaptation actions.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / No

No sub-national level reporting on the implementation of adaptation actions has yet taken place.

In January 2018, the Minister for Communications, Climate Action and Environment announced EUR 10 million in funding over five years to set up four Regional Local Authority Climate Action Offices.⁸⁸⁴ The regional offices are located in four lead authorities (Cork, Dublin, Kildare and Mayo) and are based on four geographical areas with the associated grouping of local authorities in each region based upon shared climate change risks. The Offices are overseen by a National Steering Committee, which will approve annual work programmes for each office and monitor the delivery of the actions. The DCCAE is represented on the steering committee.

The Regional Offices are also represented in national adaptation oversight structures on the National Adaptation Steering Committee. National priorities for climate change action will be set by the committee and drive consistency at a central level. The Steering Committee

⁸⁸⁴ Personal communication with MS contact.

monitors progress by sectors and agencies, including local government in delivering on climate adaptation actions for which they are responsible and ensure a coordinated approach.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

A periodic review of adaptation action is mandated by the Climate Action and Low Carbon Development Bill 2015, whereby the relevant minister shall review the NAF not less than once every 5 years. The NAF was published in January 2018 and, as such, is to be expected to be reviewed by early 2023.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / No

As noted in relation to Indicator 2a, stakeholders and members of the public were extensively consulted during development of the NCCAF and NAF. As indicated in relation to Indicator 10a, the CCAC, which is mainly comprised of researchers and scientists, will contribute to the monitoring of the NAF.

The NDCA will inform the national objective to transition to a low carbon and climate resilient economy and society. The NDCA Advisory Group has been established to provide advice in relation to the overall strategy, structure and operation of the national dialogue. A regional gathering of the NDCA took place in Athlone on 23 June 2018. This is the first in a series of regional and local meetings to be held across Ireland.⁸⁸⁵

Also, as noted in relation to Indicator 2a, in addition to the NDCA, the Citizens' Assembly places the public at the heart of important legal and policy issues facing Ireland and has considered the topic "How the State can make Ireland a Leader in tackling Climate Change" with a final report on the topic published on 18 April 2018.⁸⁸⁶

⁸⁸⁵ Personal communication with MS contact.

⁸⁸⁶ Personal communication with MS contact.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 <i>Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	<u>Yes</u> / In progress / No
2 <i>Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 <i>Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	<u>Yes</u> / In progress / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	Yes / <u>In progress</u> / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / In progress / <u>No</u>
4 <i>Knowledge gaps</i>		

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	<u>Yes</u> / In progress / No
5 Knowledge transfer		
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	<u>Yes</u> / In progress / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	<u>Yes</u> / In progress / No
Step C: Identifying adaptation options		
6 Identification of adaptation options		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	Yes / <u>In progress</u> / No
7 Funding resources identified and allocated		
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / <u>In Progress</u> / No
Step D: Implementing adaptation action		
8 Mainstreaming adaptation in planning processes		
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	Yes / <u>No</u>
8c	Key land use, spatial planning, urban planning and	<u>Yes</u> / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	maritime spatial planning policies take into account the impacts of climate change	
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	Yes / <u>In progress</u> / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9	<i>Implementing adaptation</i>	
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	<u>Yes</u> / No
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	<u>Yes</u> / No
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	<u>Yes</u> / No
Step E: Monitoring and evaluation of adaptation activities		
10	<i>Monitoring and reporting</i>	
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
11	<i>Evaluation</i>	
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	<u>Yes</u> / No

Adaptation preparedness scoreboard for Italy

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List of abbreviations

ACCC	Alpine Convention on Climate Change
ANCI	National Association of Italian Municipalities
APCCA	Action Plan on Climate Change in the Alps
ARPAs	Regional agencies for environmental protection
C3-Alps	Climate Change Capitalisation
ClimChAlp	Climate Change, Impacts and Adaptation Strategies in the Alpine Space
CMCC	Euro-Mediterranean Centre for Climate Change
CoM	Covenant of Mayors for Climate and Energy
EIA	Environmental Impact Assessment
ERDF	European Regional Development Fund
ESNACC	Elements for a Strategy Document
EUSAIR	EU Strategy for the Adriatic-Ionian Region
EUSALP	EU Strategy for the Alpine Region
ISPRA	Institute for Environmental Protection and Research
MAREMED	MAritime REgions cooperation for MEDiterranean Project
MATTM	Ministry for the Environment, Land and Sea
MIUR	Ministry for Education, University and Research
NAP	National Adaptation Plan
NAS	National Adaptation Strategy
PNACC	National Adaptation Plan
PNR	National Research Programme
ROP	Regional Operative Programme
SEA	Strategic Environmental Assessment
STRADA	Adaptation Strategies in Transboundary Areas
UPI	Union of Italian Provinces

WIZ

WaterIZe spatial planning project

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

The Italian National Adaptation Strategy (NAS)⁸⁸⁷ was adopted in June 2015 through a Decree of the Climate and Energy Director General.

To help elaborate the NAS, some background documents⁸⁸⁸ were published:

- A national climate impact and vulnerability assessment of the national sectors
- An analysis of the European and national policy framework for climate adaptation
- Elements for a strategy document: 'Elementi per una Strategia Nazionale di Adattamento ai Cambiamenti Climatici' (ESNACC). A public consultation process on its contents was closed in January 2014.

The 'Conferenza Unificata', the Committee of Ministers, Regions and Municipalities delivering advice on areas of its jurisdiction, issued a positive opinion on the Italian NAS⁸⁸⁹ in October 2014. Local authorities, regions and central government, coordinated by the Ministry for the Environment, Land and Sea (MATTM), are expected to implement the NAS, through the development of adaptation plans. The NAS is planned to be updated within 5 years.

A2. Adaptation strategies adopted at subnational level

A survey of the ongoing development of climate adaptation strategies (and plans) at the regional level was carried out in 2016 by the Institute for Environmental Protection and Research (ISPRA, 2016)⁸⁹⁰. The survey indicated that around 50% of regions (e.g. Sardinia⁸⁹¹, Calabria, Apulia) had recognised the cross-cutting nature of adaptation in their governance model and/or were developing their own strategy (and/or plan). Some other regions were reviewing their regulatory measures (e.g. EIA) and planning tools (e.g. EU Structural Funds) to better integrate adaptation (e.g. Abruzzo, Molise). Yet other regions were promoting adaptation at the local level by supporting cities and municipalities who have joined the Covenant of Mayors for Climate and Energy (CoM), as territorial coordinators (e.g. Lazio,

⁸⁸⁷ Ministero dell'Ambiente e della Tutela del Territorio e del Mare, 2015, Strategia Nazionale di Adattamento ai Cambiamenti Climatici. URL:

http://www.minambiente.it/sites/default/files/archivio/allegati/clima/documento_SNAC.pdf

⁸⁸⁸ Ministero dell'Ambiente e della Tutela del Territorio e del Mare, 2015, Documenti di supporto alla strategia nazionale di adattamento ai cambiamenti climatici. URL: <http://www.minambiente.it/pagina/documenti-di-supporto-alla-strategia-nazionale-di-adattamento-ai-cambiamenti-climatici>

⁸⁸⁹ Ministero dell'Ambiente e della Tutela del Territorio e del Mare, 2015, Strategia Nazionale di Adattamento ai Cambiamenti Climatici. URL:

http://www.minambiente.it/sites/default/files/archivio/allegati/clima/strategia_adattamentoCC.pdf

⁸⁹⁰ ISPRA Ambiente, 2016, Strategie e piani di adattamento ai cambiamenti climatici. URL:

<http://annuario.isprambiente.it/entityada/basic/6358> URL: <http://annuario.isprambiente.it/entityada/basic/6358>

⁸⁹¹ Sardegna Resiliente, URL: [http://sardegnaresiliente.it/](http://sardegnaresiliente.it/http://sardegnaresiliente.it/), Date accessed: May 2018

Abruzzo). Since the 2016 ISPRA study, Liguria has been particularly active on climate adaptation, hosting the international network on urban adaptation to climate change and proposing a scoping document on climate adaptation in Genoa for approval by the European Commission⁸⁹². The Lombardy Region has now approved its Regional Adaptation Strategy⁸⁹³.

Under the European Regional Development Fund (ERDF), the Italian Ministry for the Environment, Land and Sea (MATTM) has coordinated a project to support several regional environmental authorities, including Calabria⁸⁹⁴ and Apulia⁸⁹⁵, in implementing the principles of the NAS in future regional adaptation plans.

Adaptation action plans

B1. National adaptation plan

Italy is preparing the Piano Nazionale di Adattamento ai Cambiamenti Climatici (PNACC) – a National Adaptation Plan (NAP) – to implement the NAS. The first draft NAP was published in 2017⁸⁹⁶. The purpose of the NAP will be to guide ministries, regions, and local authorities on integrating adaptation criteria into policy processes. The NAP is being developed by the MATTM's Directorate General for Climate and Energy. The preparatory work is being shared between national, regional and local institutions, including research centres.

The MATTM launched a public consultation on the draft NAP, which closed on 15 October 2017. It has also set up a technical committee to review the draft. Once the output of the public consultation and review are integrated with the draft, the NAP will be finalised.

⁸⁹² Comune di Genova, URL:

<http://www.comune.genova.it/node/76573><http://www.comune.genova.it/node/76573>, Date accessed: May 2018

⁸⁹³ Regione Lombardia, URL: http://www.regione.lombardia.it/wps/wcm/connect/946249ce-87c4-4c39-88f9-5eab3a264f14/Documento+Azione+Adattamento+RL_9dic.pdf?MOD=AJPERES&CACHEID=946249ce-87c4-4c39-88f9-5eab3a264f14, Date accessed: May 2018

⁸⁹⁴ European Commission, 2018, ROP Calabria ERDF ESF, URL:

http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/italy/2014it16m2op006

⁸⁹⁵ European Commission, 2018, ROP Puglia ERDF ESF, URL:

http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/italy/2014it16m2op002

⁸⁹⁶ Ministero dell'Ambiente e della Tutela del Territorio e del Mare, 2017, PNACC, URL:

http://www.minambiente.it/sites/default/files/archivio_immagini/adattamenti_climatici/documento_pnacc_luglio_2017.pdf

B2. Adaptation plans adopted at sub-national level

A total of 220 Italian municipalities are signatories to the CoM, of which 106 have submitted action plans⁸⁹⁷, for example, the city of Bologna produced a Local Plan for Adaptation in the context of the BLUEAP Project.

ISPRA's survey in 2016 addressed the ongoing development of adaptation plans at the sub-national level⁸⁹⁸ (see Section A2). Lombardy⁸⁹⁹ has published an adaptation action plan, with other regions, such as Friuli-Venezia Giulia, working actively towards developing their own regional adaptation plans⁹⁰⁰.

B3. Sectoral adaptation plans

A national operating plan for the prevention of the effects of heatwaves on health was developed by the Italian Ministry of Health in collaboration with other institutions⁹⁰¹. The plan includes a mapping system with bulletins announcing heatwave risks⁹⁰². Its main objective is to foster coordination between institutions at different levels of governance, and to provide guidelines for implementation of a centralised system for prediction and prevention of the effects of heatwaves on health.

A White Paper on “Challenges and opportunities of rural development for mitigation and adaptation to climate change” was published by the National Rural Network in 2011⁹⁰³. It provides information and analysis of climate impacts on agriculture, the livestock sector, food production and forestry, and proposes possible strategies for climate mitigation and adaptation.

⁸⁹⁷ Covenant of Mayors, URL: <https://www.covenantofmayors.eu/about/covenant-initiative/covenant-in-figures.html><https://www.covenantofmayors.eu/about/covenant-initiative/covenant-in-figures.html>, Date accessed: May 2018

⁸⁹⁸ ISPRA Ambiente, 2016, Strategie e piani di adattamento ai cambiamenti climatici. URL: <http://annuario.isprambiente.it/entityada/basic/6358> URL: <http://annuario.isprambiente.it/entityada/basic/6358>

⁸⁹⁹ Regione Lombardia, URL: http://www.regione.lombardia.it/wps/wcm/connect/946249ce-87c4-4c39-88f9-5eab3a264f14/Documento+Azione+Adattamento+RL_9dic.pdf?MOD=AJPERES&CACHEID=946249ce-87c4-4c39-88f9-5eab3a264f14, Date accessed: May 2018

⁹⁰⁰ Cambia il clima in Friuli Venezia Giulia, 2018, URL: <http://www.arpa.fvg.it/cms/tema/osmer/approfondimenti/cambiamenti-climatici.html><http://www.arpa.fvg.it/cms/tema/osmer/approfondimenti/cambiamenti-climatici.html>, Date accessed: May 2018

⁹⁰¹ Piano Nazionale della Prevenzione 2014-2018, 2015, URL: <http://www.salute.gov.it/portale/caldo/dettaglioPubblicazioniCaldo.jsp?lingua=italiano&id=2285><http://www.salute.gov.it/portale/caldo/dettaglioPubblicazioniCaldo.jsp?lingua=italiano&id=2285>

⁹⁰² Ondate di calore. URL: <http://www.salute.gov.it/portale/caldo/homeCaldo.jsp><http://www.salute.gov.it/portale/caldo/homeCaldo.jsp>, Date accessed: May 2018

⁹⁰³ Rete Rurale Nazionale, “Libro bianco: Sfide ed opportunità dello sviluppo rurale per la mitigazione e l'adattamento ai cambiamenti climatici”, 2011. URL: <https://www.reterurale.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/5799>

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

The MATTM is responsible for elaborating the NAS and NAP, and for implementing specific elements. In this context, it promotes the participation of ministries and sub-national governments in the adaptation policy-making process.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

Horizontal coordination is achieved by the Institutional Panel established to support elaboration of the NAS. The Panel includes representatives from the ministries of: Economic Development; Agricultural and Forestry Policies; Infrastructures and Transport; Health; Education, University and Research; Cultural and Environmental Heritage; Regional Affairs; and Tourism and Sport. Other institutional stakeholders are also represented on the Panel, such as the Department of Civil Protection, regional committees, the National Association of Italian Municipalities (ANCI) and the Union of Italian Provinces (UPI).

The Institutional Panel is involved in the elaboration of the NAP. Representatives of the ministries involved have been provided with the draft NAP and have been asked to actively contribute to the contents of the document. Notably, the draft NAP defines roles and responsibilities for implementing the various adaptation actions identified.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / In progress / No

Representatives of local and regional institutions are involved in the Institutional Panel established to support elaboration of the NAS (see Indicator 1b), alongside the ministries: the Union of Italian Provinces (UPI), the National Association of Italian Municipalities (ANCI), and the Italian Committee of the Regions. The process of drafting, finalising and adopting the NAP is following a similar approach. The MATTM has established an interregional panel with the National State-Regions Commission for Climate Change and an inter-ministerial panel, involving the same ministries in the formulation of the NAS. The aim is to collect views from all of the actors involved in the NAP process and to evaluate the implementation

of adaptation actions at national, regional and local level. There is vertical coordination in all sectors (i.e. water, air, energy, nature, territory).

At the subnational level:

- Some regions have recognised the cross-cutting nature of adaptation in their governance model (e.g. Sardinia⁹⁰⁴ has a dedicated website for climate adaptation and resilience)
- Some regions (e.g. Abruzzo, Molise) are reviewing consideration of adaptation in their regulatory measures (e.g. Environmental Impact Assessment, EIA) and planning tools (e.g. EU Structural Funds)
- Some regions (e.g. Lazio, Abruzzo) are promoting adaptation at local level by facilitating the European CoM
- Some municipalities (e.g. Bologna)⁹⁰⁵ have also come up with their own adaptation plan, coherent with the NAS.

In Italy, all 220 municipalities have already committed to adaptation planning and actions through the framework of the CoM⁹⁰⁶.

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

A bottom-up approach was used in developing the NAS, starting with an online survey launched in October 2012 on the perception of climate risks and on the country's "adaptation concept."

In 2013, both an on-line public consultation and "ad hoc" consultations with NGOs, regions and cities were organized, in order to promote the involvement of citizens and stakeholders, such as: NGOs, municipalities, private sector and trade unions. The ESNACC (see Section A1 above) was subject to public consultation, the results of which were integrated in the final NAS, e.g. a chapter on "Intersectoral aspects", addressing disaster risk management, monitoring, synergies, research, and sustainable development.

The MATTM undertook an online public consultation (22 February to 15 March 2017) in order to gauge public perceptions of climate adaptation, to understand climate vulnerabilities and impacts, and to identify adaptation options from the different stakeholders and regions. The MATTM also consulted the public (August to October 2017) on the draft NAP.

⁹⁰⁴ Sardegna Resiliente, URL: <http://sardegnaresiliente.it/http://sardegnaresiliente.it/>, Date accessed: May 2018

⁹⁰⁵ BLUEAP, 2018, Bologna adaptation plan for a resilient city, URL: <http://www.blueap.eu/site/>

⁹⁰⁶ The Covenant of Mayors, URL: http://www.covenantofmayors.eu/index_en.html, Date accessed: May 2018

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

The NAS contains some references to transboundary and international cooperation (albeit not systematic), particularly in relation to: adaptation measures in biodiversity conservation; monitoring and risk evaluation; desertification; and the exchange of good practices and experiences. More specifically, the NAS states that international cooperation programmes will be established on: desertification with countries in the Mediterranean basin (e.g. through the Euro-Mediterranean Centre for Climate Change, CMCC, which was inaugurated in Venice in April 2018⁹⁰⁷); and mountainous areas with countries of the Alpine region.

The draft NAP also contains examples of transboundary and international cooperation, for instance:

- MAritime REgions cooperation for MEDiterranean(MAREMED), which was established to develop tools for enhancing and coordinating regional, European and Mediterranean policies on six thematic strategies, including climate adaptation in coastal areas; the project ended in 2013⁹⁰⁸
- The WaterIZe spatial planning project (WIZ), which encompasses climate adaptation in relation to future management of drinking water, and is an example of transboundary cooperation between Italian and Spanish partners.⁹⁰⁹

At the interregional level, Italy is a contracting party to the Alpine Convention on Climate Change and the implementation of the Action Plan on Climate Change in the Alps adopted in March 2009⁹¹⁰. The country is a partner in the cooperative and transboundary projects carried out in the region to address adaptation, such as Climate Change, Impacts and Adaptation Strategies in the Alpine Space (ClimChAlp), Adaptation Strategies in Transboundary Areas (STRADA), Climate Change Capitalisation (C3-Alps) and others (e.g. that address climate adaptation with regard to management of natural hazards, winter tourism, or transboundary river basin management).

Italy is also participating in the implementation of the two EU-level macro-regional strategies, which include consideration of climate adaptation: the EU Strategy for the Alpine Region (EUSALP⁹¹¹) and the EU Strategy for the Adriatic-Ionian Region (EUSAIR⁹¹²). As part of

⁹⁰⁷ CMCC, 2018, Centre for Climate Change, URL: <https://www.cmcc.it/events/cmcccafoscari-the-new-center-on-climate-change>

⁹⁰⁸ MareMed, 2010, Editorial: Presentation of the results and achievement of the Maremed project, URL: <http://www.maremed.eu/index.php>

⁹⁰⁹ WIZ, URL: <http://www.wiz-life.eu/index.php>, Date accessed: May 2018

⁹¹⁰ Alpine Convention, 2009, Action plan on climate change in the Alps, URL: http://www.alpconv.org/en/ClimatePortal/Documents/AC_X_B6_en_new_fin.pdf

⁹¹¹ EU Strategy for the Alpine region, URL: <https://www.alpine-region.eu/>, Date accessed: May 2018

⁹¹² EU Strategy for the Adriatic and Ionian region, URL: <http://www.adriatic-ionician.eu/http://www.adriatic-ionician.eu/>, Date accessed: May 2018

EUSALP for example, climate change is considered under the risk governance and green infrastructure action groups (as part of a thematic policy area on environment and energy). Furthermore, Italy is actively cooperating internationally on climate change, as relevant for effective management of challenges in the Mediterranean⁹¹³. Climate impacts on alpine tourism have also been researched and general strategies and recommendations have been developed⁹¹⁴.

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / In progress / No

Italy is covered by a comprehensive observational network. Climate monitoring informs weather forecasting and an early warning system. National and regional monitoring networks (such as the Department of Civil Protection's hydro-meteorological networks, and other national and regional agro-meteorological networks, including the Air Force Meteorological Service) provide time-series data of current and recent past climate variability and trends that are used to calculate climate indicators for Italy. However, the time series for each of the different variables have their own characteristics in terms of continuity, completeness, spatial coverage and data quality. Trends in mean temperature and cumulated precipitation, as well as their extremes, are updated regularly.

Some data are available through specific online networks, such as: the ISPRA website⁹¹⁵; the Long-Term Ecosystem Research in Europe website⁹¹⁶; the Polaris website on areas of potential flooding in Italy⁹¹⁷; and the Government's public safety website⁹¹⁸. A monitoring network to help infrastructural projects cope with hydrogeological risk is also in place⁹¹⁹.

The website of the 'National system for the collection, elaboration and dissemination of environmentally relevant climate data' (Sistema nazionale per la raccolta, l'elaborazione e la diffusione di dati Climatici di Interesse Ambientale, SCIA) and annual reports published by

⁹¹³ Farnesina, 2017, The Italian strategy in the Mediterranean stabilising the crisis and building a positive agenda for the region. URL: <http://www.esteri.it/mae/resource/doc/2017/11/rapporto-med-maeci-2017-eng.pdf>

⁹¹⁴ ClimAlpTour, 2011, Climate change and its impact on tourism in the Alpine sector. URL: https://www.researchgate.net/profile/Primo_Pipan/publication/318351465_ClimAlpTour_-_Il_Cambiamento_Climatico_e_i_suoi_impatti_sul_turismo_nello_Spazio_Alpinolinks/59654295a6fdcc69f148bd7a/ClimAlpTour-II-Cambiamento-Climatico-e-i-suoi-impatti-sul-turismo-nello-Spazio-Alpino.pdf

⁹¹⁵ ISPRA website, <http://www.isprambiente.gov.it/it/banche-dati>, Date accessed: May 2018

⁹¹⁶ Long-Term Ecosystem Research in Europe website, <http://www.lter-europe.net/elter/data>, Date accessed: May 2018 (site under construction)

⁹¹⁷ Popolazione a Rischio da Frana e da Inondazione in Italia, <http://polaris.irpi.cnr.it/>, Date accessed: May 2018

⁹¹⁸ Italian Public Safety, <http://italiasicura.governo.it/site/home/dissesto/link.html>, Date accessed: May 2018

⁹¹⁹ ISPRA webpage on infrastructure risks, http://www.rendis.isprambiente.it/rendisweb/geo.jsp?id_reg=20, Date accessed: May 2018

ISPRA disseminate information on extreme temperature and precipitation events. Some indicators of extreme weather events are updated and disseminated annually through the Italian Environmental Yearbook (ISPRA), including with regard to: floods, landslides, number of injured people and deaths due to flooding, number of injured people and deaths due to landslides, losses and damages due to flooding, losses and damages due to landslides, and mortality due to heatwaves.

The National System for Environmental Protection (i.e. the National Institute for Environmental Protection and Research and the regional environmental protection agencies) is seeking to define a national set of climate impact indicators, including a more comprehensive set relating to extreme weather events.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

The NAS is based on several climate scenarios and projections carried out by the CMCC and the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA). The draft NAP⁹²⁰ provides an analysis of current and future climate conditions in Italy. Climate projections for the periods 2021-2050 and 2071-2100 (IPCC AR5) have been produced using high-resolution climate models for two scenarios: RCP 4.5 and RCP 8.5. Sectoral assessments of impacts and vulnerabilities, which are included in the draft NAP, are based on a review of existing literature and on the outputs of climate projections (up to 2050).

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

A number of vulnerable sectors have been identified in the NAS, namely:

- Water resources (quantity and quality)
- Desertification, soil degradation and drought
- Hydrogeological risk (landslides, flooding and erosion)
- Biodiversity and ecosystems (terrestrial ecosystems, marine ecosystems, inland water ecosystems and transition ecosystems)
- Health
- Forestry
- Agriculture, aquaculture, marine fishery

⁹²⁰ Ministero dell'Ambiente e della Tutela del Territorio e del Mare, 2017, Consultazione su piano nazionale adattamento cambiamenti climatici, URL: <http://www.minambiente.it/pagina/consultazione-su-piano-nazionale-adattamento-cambiamenti-climatici>

- Energy (production and consumption)
- Coastal zones
- Tourism
- Urban settlements
- Critical infrastructure (in relation to cultural heritage, transport, and industry)

The NAS also refers to vulnerability assessments addressing the mountainous areas of the Alps and Apennines, and the Po River Basin.

Vulnerability screening processes have taken place in Italy. In 2009 the report "I cambiamenti climatici in Italia: evidenze, vulnerabilità e impatti"⁹²¹ presented the knowledge on impacts and vulnerability assessments across several sectors, including water resources, agriculture, forestry, health and others. A technical panel of experts established in 2012, constituted by about 100 scientists and coordinated by the CMCC (see Indicator 4a), carried out a comprehensive assessment of climate impacts and vulnerabilities. The assessment sought to identify key vulnerabilities, sectors and related measures and was published in 2014⁹²², as part of the NAS process. The approach used was based on literature review and expert knowledge. A sectoral vulnerability assessment included in the draft NAP is based on an updated review of the literature and on climate projections.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

The need for transboundary coordination is not systematically addressed in the NAS. However, the NAS explicitly mentions transboundary coordination when referring to: climate impacts on and adaptation of biodiversity and ecosystems; and desertification. The NAS also refers to the need to harmonise risk indicators with neighbouring countries. The draft NAP does not take transboundary risks into account in a coordinated manner. It includes examples of transboundary cooperation in evaluating climate impacts by some sectors and in particular regions (e.g. the AdaptAlp project⁹²³) linked, in most cases, to specific projects or examples of best practice.

This indicator is assessed as 'in progress', as transboundary risks are not addressed in a coordinated manner across a range of relevant sectors.

⁹²¹ Centro Euro-Mediterraneo sui Cambiamenti Climatici, 2018, I cambiamenti climatici in Italia: evidenze, vulnerabilità e impatti, URL: <http://www.cmcc.it/it/publications/i-cambiamenti-climatici-in-italia-evidenze-vulnerabilita-e-impatti> URL: <http://www.cmcc.it/it/publications/i-cambiamenti-climatici-in-italia-evidenze-vulnerabilita-e-impatti>

⁹²² Ministero dell'Ambiente e della Tutela del Territorio e del Mare, 2014, Rapporto sullo stato delle conoscenze scientifiche su impatti, vulnerabilità ed adattamento ai cambiamenti climatici in Italia. URL: http://www.minambiente.it/sites/default/files/archivio/allegati/clima/snacc_2014_rapporto_stato_conoscenze.pdf

⁹²³ AdaptAlp, 2018, URL: http://www.regione.vda.it/territorio/adaptalp_i.asp

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / **In progress** / No

The NAS identifies cooperation with the research and innovation community as one of its key principles. Research is needed in many sectors. A research programme, or its elements, is not defined as part of the document, and there is no plan for stakeholder involvement in the identification of research priorities. However, the research community was involved in the development of the NAS and is involved in developing the NAP, e.g. through the technical panel of experts established for this purpose in 2012 (see Indicator 3c).

The CMCC facilitates the involvement of the research community and the prioritisation of research. The evaluation of available knowledge and involvement of the research community was essential for the production of the ESNACC. The CMCC was appointed as the institution responsible for collecting the information needed to elaborate the NAS.

Several research programmes funded by the Italian government address climate change as a priority. The most recent National Research Programme (PNR, 2014-2020)⁹²⁴ considers “Climate action, environment, resource efficiency and raw materials” as one of the main challenges for research. The PNR is the result of a wide consultation led by the Ministry for Education, University and Research (MIUR) and the Ministry of Economic Development. The consultation involved the most relevant public and private, national and regional stakeholders. The PNR identifies an action plan addressing the major challenges identified at community level and emerging from the smart approach of territories at national level. The Italian PNR has aligned its structure to Horizon 2020, but there is no description available of the topics to be covered in climate action.

Furthermore, several universities as well as regional agencies for environmental protection (ARPAs) are actively conducting research on climate data monitoring, regional climate modelling and regional impact assessment.

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / **In progress** / No

Trends in mean temperature and cumulated precipitation, as well as their extremes, are updated regularly and disseminated through the SCIA website and the ISPRA annual reports.

⁹²⁴ Ministero dell’Istruzione, dell’Università e della Ricerca, 2016, Programma nazionale della ricerca 2015-2020, URL: http://www.istruzione.it/allegati/2016/PNR_2015-2020.pdf

Some regions have local initiatives, e.g. monitoring systems and weekly forecast of snow cover in Valle d'Aosta.

Despite the draft NAP being featured on a dedicated MATTM web page, Italy does not have a dedicated website providing access to climate adaptation relevant information or data, e.g. a repository of key documents or a climate services website. The NAS encouraged establishment of a national platform, using Climate-ADAPT as a model, as well as a national observatory in order to support decision making. However, such a platform does not exist yet. The intention was also to establish a permanent stakeholder forum to collect requests for training and information from the Italian territory and to implement actions. The websites currently presented in Climate-ADAPT are those of the MetOffice and the CMCC, which present mostly administrative information and a general description of their objectives.

Despite the lack of a dedicated portal, the MATTM regroups key documents such as the NAS in one webpage, as well as some of the aforementioned documents⁹²⁵, such as the vulnerability assessment by the CMCC. These are theoretical, policy-based documents. Other information, such as scientific data and monitoring is provided by separate institutes, as stated under Indicator 3a. Projection data and scenario results are available, for example, through the CMCC.⁹²⁶

The de-centralised sources complement each other and address specific needs, although the proposed central platform would be a desirable improvement.

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / **In progress** / No

There is some evidence of systematic actions on capacity-building taking place in a coordinated manner or, at least, it is encouraged and monitored by the central administration. Several actions are mentioned in the draft NAP that focus on capacity building and education. For example, Lombardia's regional adaptation plan includes capacity-building and knowledge dissemination among its objectives. The CMCC organises training programmes related to climate adaptation for graduate students.⁹²⁷ The IPCC National Focal Point is also responsible, among others, for “disseminating IPCC activity and findings at all the levels within the national territory through web-site, meetings, conferences and dedicated workshops.”⁹²⁸

⁹²⁵ Ministero dell'Ambiente e della Tutela del Territorio e del Mare, 2018, Adattamento ai cambiamenti climatici. URL: <http://www.minambiente.it/pagina/adattamento-ai-cambiamenti-climatici-0>

⁹²⁶ Ministero dell'Ambiente e della Tutela del Territorio e del Mare, 2018, Clime. URL: <http://www.cmcc.it/software/clime-2> and COSMO-CLM. URL: <https://www.cmcc.it/models/cosmo-clm-climate-limited-area-modelling-community>

⁹²⁷ Centro Euro-Mediterraneo sui Cambiamenti Climatici, 2018, Training programs, URL: <http://www.cmcc.it/training-programs>

⁹²⁸ Centro Euro-Mediterraneo sui Cambiamenti Climatici, 2018, URL: <https://www.cmcc.it/ipccitalia/>

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

The risks related to each sector outlined under Indicator 3c are included in the NAS in the form of “key messages” per sector and take into account geographic specificities. For each sector, the NAS identifies a long portfolio of measures classified as soft, green, grey, or long-medium term. It also provides a compilation of good practices, win-win solutions, no or low-regrets measures, desirable options, sectoral needs, etc. These measures and good practices have resulted from the consultation process with institutional authorities and stakeholders, rather than from detailed and specific assessments. The draft NAP proposes a set of adaptation actions in each of the vulnerable sectors, as well as possible competent institutions for their implementation.

To date, implementation of adaptation measures has focused primarily on the most vulnerable sectors: agriculture, water use, forests, human health, flood risk, desertification and drought, coastal areas, biodiversity, tourism, urban settlements.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

The draft NAP identifies 361 actions based on the following criteria⁹²⁹: effectiveness, economic efficiency, side-effects, performance under uncertainties, and conditions for decision making. This methodology has allowed each action to be prioritised as high, medium-high, medium, medium-low or low.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / **In progress** / No

The NAS proposes actions aimed at reinforcing coordination between the strategies for disaster risk prevention and management and adaptation to enhance capacity to cope with some extreme events, particularly hydrogeological damage resulting from climate change.

⁹²⁹ Flörke et al., 2011, Final Report for the Project Climate Adaptation – modelling water scenarios and sectoral impacts.

Italy has significant tools to cope with current climatic extreme events. These include a national-regional warning system on hydro-geological and hydraulic risk for the purpose of civil protection, which build on the activities of Functional Centres.⁹³⁰ Notably, there is also a heatwave prevention, communication and management programme, and a "National Operational Plan to prevent effects on human health from heat waves"⁹³¹ that, inter alia, plans monitoring of negative impacts on health.

The MATTM has taken part in several meetings on disaster risk reduction with a view to its integration with climate adaptation, although there are no mechanisms in place currently to ensure coordination and coherence between these two policy areas.

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / **In progress** /No

The NAS does not provide information on how its governance or the basic horizontal or cross-cutting activities that it identifies would be organised or financed. The 7th National Communication⁹³² mentions that funds disbursed have been allocated to both mitigation and adaptation. The draft NAP provides a detailed table of the necessary financial and human resources, and possible funding sources.

Up to 50% funding for adaptation actions can be obtained from “carbon trading” in relation to Directive 2003/87/CE (Art. 3). MATTM launched a programme in 2013 that used this mechanism to fund the containment of minor landslides in mountain cities, which could be worsened by climate change. Seventeen regions and almost 55 municipalities were involved in this programme.

Climate research and technological development is also financed by the Government through various schemes – see Indicator 4a.

An ongoing initiative for monitoring adaptation actions included in regional operative programmes (ROP) is being undertaken through the “Network of Environmental Authorities and Managing Authorities” in relation to environmental aspects of EU Structural Funds.

⁹³⁰ Protezione Civile, 2018, Attività di previsione. URLs:

http://www.protezionecivile.gov.it/jcms/it/previsione_servizio.wp?sessionId=1534B415C4E0033BA59B4D82703D6B9F.worker3 and http://www.protezionecivile.gov.it/jcms/it/attivita_idrogeologico.wp

⁹³¹ Ministry of Health, 2016, Piano nazionale per la prevenzione degli effetti del caldo sulla salute, URL:

[http://www.salute.gov.it/portale/caldo/dettaglioContenutiCaldo.jsp?lingua=italiano&id=408&area=emergenzaCa](http://www.salute.gov.it/portale/caldo/dettaglioContenutiCaldo.jsp?lingua=italiano&id=408&area=emergenzaCaldo&menu=vuoto)

[ldo&menu=vuoto](http://www.salute.gov.it/portale/caldo/dettaglioContenutiCaldo.jsp?lingua=italiano&id=408&area=emergenzaCaldo&menu=vuoto)
⁹³² UNFCCC, 2017, Seventh National Communication under the UN Framework Convention on Climate Change, URL: https://unfccc.int/sites/default/files/resource/258913076_Italy-NC7-2-Italy%20Seventh%20National%20Communication%20Final.pdf

Structural and cohesion funds have been used to support the implementation of adaptation-related actions, including in the water sector. Under the Partnership Agreement for Italy, 2014-2020, EUR 2,359 million have been allocated to the thematic objective “Promoting climate change adaptation, risk prevention and management”, including EUR 812 million from the European Regional Development Fund and EUR 1,547 million from the European Agricultural Fund for Rural Development.⁹³³

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

Climate impacts are explicitly mentioned in the new EIA law. In 2013, the Guidance on Integrating Climate Change and Biodiversity into Strategic Environmental Assessment (SEA) was published, highlighting the importance of considering climate adaptation (and potential positive/negative impacts on adaptation actions). Some regions are reviewing their regulatory measures (e.g. EIA) and planning tools (e.g. EU Structural Funds) considering adaptation (e.g. Abruzzo, Molise). Furthermore, in 2011 under the Regions for Sustainable Change programme a further guide for local entities on how to integrate climate change considerations into SEA was published for the Piemonte region, illustrating regional attention to the issue⁹³⁴.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / No

The national platform for disaster risk management was established by decree in Italy in 2008⁹³⁵. The national flood risk management plan was published in 2016. Italy has made progress in preventative measures better addressing extreme climate events e.g. for heat waves under the Ministry of Health⁹³⁶ and flooding risks in line with the Floods Directive⁹³⁷.

⁹³³ European Commission, 2014, Summary of the Partnership Agreement for Italy 2014-2020. URL: https://ec.europa.eu/info/sites/info/files/partnership-agreement-italy-summary-oct2014_en.pdf

⁹³⁴ Regione Piemonte, 2011, Cambiamento climatico e valutazione ambientale strategica: guida per enti locali. URL: http://www.lamoro.it/documents/CambiamentoClimaticoeValutazioneAmbientaleStrategica-guida-per-gli-entilocali_000.pdf

⁹³⁵ Protezione Civile, 2008, URL: http://www.protezionecivile.gov.it/resources/cms/documents/DPCM_18_FEBBRAIO_2008.pdf http://www.protezionecivile.gov.it/resources/cms/documents/DPCM_18_FEBBRAIO_2008.pdf

⁹³⁶ Ondate di calore, URL: <http://www.salute.gov.it/portale/caldo/homeCaldo.jsp> <http://www.salute.gov.it/portale/caldo/homeCaldo.jsp>

Date accessed: May 2018

⁹³⁷ Ministero dell’Ambiente e della Tutela del Territorio e del Mare, 2013, Documento definitivo indirizzi operativi direttiva alluvioni,

In particular, a recent study by ISPRA has taken into account climate impacts on water resources⁹³⁸. Preparedness efforts in relation to flood risk are at the watershed level and plans were fully approved in early 2017⁹³⁹. The NAP draft illustrates several actions to better manage different disaster risks due to climate change but it is difficult to assess the extent to which these actions will be implemented in national disaster planning.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / **No**

Although planning at the sub-national level has taken into account climate impacts, currently, there is scarce evidence of a consistent approach to policy. In fact, several actions in the draft NAP refer to the importance of integrating adaptation into spatial planning (e.g. Action TT010). The NAS identifies the need to integrate land-use and land-management policies, taking into consideration the risks from different sources, including those due to climate change (e.g. desertification, hydrogeological risks, rural development, water management). According to the NAS, “the NAP will provide institutional guidance to national and local authorities, for the integration of adaptation measures within policy processes and spatial planning.” As yet, this guidance has not been defined or implemented at national level, although planning is taking place in some instances at regional level, for example, in the regions specified under Indicator 1c. Furthermore, in 2011 a guidance document on the management of climate impacts within the context of spatial planning was published for the Alpine region, illustrating transboundary consideration of this issue⁹⁴⁰. However, no binding maritime spatial plan has yet been adopted in Italy⁹⁴¹.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / **In progress** / No

The main driver of mainstreaming is EU policy, with sector-relevance also playing an important role. The draft NAP includes a sector-based assessment of climate impacts, while also assigning actions. The draft NAP has provided a set of adaptation actions for a large selection of sectors. According to the information published on Climate-ADAPT, the main adaptation activities implemented so far concern the most vulnerable sectors, such as

http://www.minambiente.it/sites/default/files/archivio/allegati/vari/documento_definitivo_indirizzi_operativi_dir_ettiva_alluvioni_gen_13.pdf

⁹³⁸ ISPRA, 2018, Valutazione tramite BIGBANG dell'impatto dei cambiamenti climatici sulla risorsa idrica naturale, URL: http://www.isprambiente.gov.it/pre_meteo/idro/BIGBANG_CC_ISPRA.html

⁹³⁹ ISPRA, 2018, Piani di gestione del rischio di alluvioni, URL: http://www.isprambiente.gov.it/pre_meteo/idro/Piani_gest.htmlhttp://www.isprambiente.gov.it/pre_meteo/idro/Piani_gest.html

⁹⁴⁰ Pütz, M., Kruse, S., Butterling, M., 2011, Assessing the Climate Change Fitness of Spatial Planning: A Guidance for Planners.

⁹⁴¹ MSP, URL: <http://www.msp-platform.eu/countries/italy>, Date accessed: May 2018.

agriculture, water use, forests, human health, flood risk, desertification and drought, coastal areas, biodiversity, tourism, urban settlements.⁵² However, a consistent approach to mainstreaming is clear. Mainstreaming has been reported for the national sustainable development strategy and the National Biodiversity Strategy (minimising climate impacts is considered one of its pillars). Initial steps have also been taken in the agriculture sector through a 2011 White Paper on "Challenges and opportunities of the rural development in adapting and mitigating climate change".⁵³ For coastal areas, first steps have been taken to develop integrated coastal zone management plans in which climate change concerns will be included. The River Basin Management Plan of the Po River catchment (approved in 2013) aims to identify climate adaptation strategies. The Watershed Authority of the Arno River Basin also took climate impacts into account in mapping flood hazards and risks in support of river basin planning (pursuant to Directive 2007/60/EC on flood risks assessment and management)

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

The programming and use of economic instruments for the management of climatic risks is considered as one of the adaptation options for sectors such as cultural heritage, water resources, agriculture, the energy sector, coastal areas, transport and infrastructure, as listed in the NAS. However, they are mostly not yet implemented.

Mainly, the specific actions contained in the NAS are to consider insurance a strong ally towards financing climate adaptations (in the cultural heritage sector, for instance), to increase the coverage of insurance within the transport and infrastructure sector by diffusing risk awareness and systems of obligatory insurance and compensation, and to increase resilience to extreme weather events by using insurance as a way to spread out the risk.

Furthermore, generally speaking, the NAS does state the importance of exploring a public-private partnership between private insurance companies and public administration.

Some of the actions included in the NAP draft fall into the category "economic and financial instruments". Their objective is to promote the use of insurance instruments for risk management due to climate change. Moreover, the draft NAP analyses possible sources of financing: European, National and Regional programmes. It provides information on the amount of resources, the type and objectives of the programme, the beneficiaries, sectors and type of actions involved.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In progress** / No

The draft NAP is available on the website of the Ministry of Environment⁹⁴². It analyses the role of different public administrations in implementing adaptation actions for each sector included in the NAP. Activities, aligned with the NAS preliminary analysis, have already been implemented in key vulnerable sectors. In agriculture, the National Strategic Plan for Rural Development aims, *inter alia*, at promoting adaptation activities for the efficient use of resources and climate resilience in the agro-food and forestry sectors. The Ministry of Health and the Department of Civil Protection have been operating an early warning system in relation to heatwaves. National guidelines for coastal protection have been developed. The strategic plan for tourism, elaborated by the Ministry of Cultural Heritage and Tourism, includes specific actions aimed at minimising climate impacts on tourism in the period 2017-2022.

Furthermore, several regional climate adaptation plans have been published (see Indicator 1c), including in Lombardy, and also at the municipal level with the BLUEAP project in Bologna recognised by the EU⁹⁴³.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / **No**

Cooperation mechanisms are in place with subnational administration bodies to coordinate implementation of adaptation through the “Conferenza Unificata” (see Section A). The “Conferenza Unificata” creates a mandate to translate the NAS to adaptation action plans at all levels, and the “State/Regions Conference”. It is intended that this cooperation mechanism will be reinforced in the future, as one of the aims is to enhance cooperation at all levels and set up a 'multilevel governance' system. This might also be reinforced by the Permanent Forum and national observatory mentioned under Indicator 9d. However, at the moment there is no structural cooperation in place with regions and cities with regard to NAS implementation. The draft NAP also proposes some consideration of governance (governing body, type and level of planning, emergency management) to further implementation of adaptation actions.

⁹⁴² Ministero dell’Ambiente e della Tutela del Territorio e del Mare, 2017, Consultazione su piano nazionale adattamento cambiamenti climatici, URL: <http://www.minambiente.it/pagina/consultazione-su-piano-nazionale-adattamento-cambiamenti-climatici>

⁹⁴³ BLUEAP, URL: <http://www.blueap.eu/site/cambiamenti-climatici-citta-europee-promosse-per-piani-dazione/>, Date accessed: May 2018.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / **No**

It is unclear whether guidelines for assessing the climate impacts on projects/programmes have been developed and promulgated.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / No

The NAS identifies, as one of its basic principles, the need to work in partnership and involve stakeholders and citizens (see also Indicator 1c). Furthermore, there has been detailed consultation of stakeholders in the definition of the draft NAP (which is awaiting final publication of the results of consultation).

The MATTM established an interregional panel with the national state-regions commission for climate change and an inter-ministerial Panel in order to involve institutions in defining the NAP. The aim is to collect the views of all actors involved in the NAP process and to share and evaluate the state of implementation of adaptation actions at national, regional and local level.

Within the framework of the NAP, the establishment of two support instruments is foreseen: a forum, to promote information, education and public capacity building; and an observatory composed of representatives of regional and local authorities. Regions and ministries have been included in the panels set up for the elaboration of the NAP, and were involved in the implementation of adaptation actions throughout 2017 and will also be involved in future phases.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / **No**

Although the NAS makes specific reference to the importance of monitoring adaptation actions, it is not yet clear that information on adaptation actions is being systematically collected, beyond fulfilling the reporting obligations under the UNFCCC. A monitoring system to evaluate progress in implementing the NAS is neither in place at the national level nor at the regional level. The draft NAP provides an analysis of indicators useful to monitor the progress and efficacy of adaptation actions and guidelines for monitoring the

implementation of adaptation actions. However, since it has not been finalised yet, it is difficult to conclude on its implementation and monitoring.

Coherence with all of the existing monitoring systems and initiatives at the national level will be created in close cooperation with ISPRA and ARPAs.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / **No**

A system to monitor sectoral adaptation activities and their related expenditures, or to report adaptation activities, has not been established. Nonetheless, a network for monitoring infrastructural projects to cope with hydrogeological risk is in place⁹⁴⁴. There is no actual reporting by this network, although it maintains a map of the country that identifies all of the projects currently being undertaken and their progress.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / **No**

While climate adaptation reporting is taking place at regional, sub-national and local levels, these efforts are not consistently monitored and disseminated through an overarching system.

While regions and cities are undertaking adaptation planning and implementing adaptation actions, these are not systematically reported, nor is information collected centrally in a systematic way. Nonetheless, provision of feedback from sub-national to national level is planned (given that sub-national institutions participate in the national coordination committee for adaptation, as specified in Indicator 1c). Cities were also committed to report every two years on adaptation activities under the Mayors Adapt initiative⁹⁴⁵.

The 7th UNFCCC National Communication⁹⁴⁶ contains some information about regional and local adaptation activities, as well as planned policies and measures.

⁹⁴⁴ ISPRA, 2018, Repertorio Nazionale degli interventi per la Difesa del Suolo, URL: http://www.rendis.isprambiente.it/rendisweb/geo.jsp?id_reg=20

⁹⁴⁵ Mayors Adapt, 2016, URL: https://www.covenantofmayors.eu/IMG/pdf/Mayors-Adapt_Reporting_Guidelines.pdf

⁹⁴⁶ UNFCCC, 2017, Seventh National Communication under the UN Framework Convention on Climate Change, URL: https://unfccc.int/sites/default/files/resource/258913076_Italy-NC7-2-Italy%20Seventh%20National%20Communication%20Final.pdf

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

The periodic review of adaptation actions is planned on a five-year basis, as defined in the NAS. Thus, the next review is due in 2020. The NAS mentions that the review will be informed by continuous monitoring of progress and evaluation using indicators, and the consideration of available knowledge about climate impacts and vulnerabilities.

As the NAP is still in draft format, it is unclear whether it will also be subject to a periodical review.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / **No**

The NAS identifies that stakeholders will be consulted periodically. However, it is not specified whether or how stakeholders will be involved in the monitoring and review of adaptation policy.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 <i>Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	<u>Yes</u> / In progress / No
2 <i>Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 <i>Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	<u>Yes</u> / In progress / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No
4 <i>Knowledge gaps</i>		

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	Yes / <u>In progress</u> / No
5	<i>Knowledge transfer</i>	
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	Yes / <u>In progress</u> / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	Yes / <u>In progress</u> / No
Step C: Identifying adaptation options		
6	<i>Identification of adaptation options</i>	
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	Yes / <u>In progress</u> / No
7	<i>Funding resources identified and allocated</i>	
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / <u>In progress</u> / No
Step D: Implementing adaptation action		
8	<i>Mainstreaming adaptation in planning processes</i>	
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	Yes / <u>No</u>
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the	Yes / <u>No</u>

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	impacts of climate change	
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	Yes / <u>In progress</u> / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 <i>Implementing adaptation</i>		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	Yes / <u>No</u>
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	Yes / <u>No</u>
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	<u>Yes</u> / No
Step E: Monitoring and evaluation of adaptation activities		
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
11 <i>Evaluation</i>		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	Yes / <u>No</u>

Adaptation preparedness scoreboard for Latvia

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List of abbreviations

ASTRA	Developing Policies and Adaptation Strategies to Climate Change in the Baltic Sea Region
BaltAdapt	The Baltic Sea Region Climate Change Adaptation Strategy,
BaltCICA	Climate Change: Impacts, Costs and Adaptation in the Baltic Sea Region
BaltClim	Supporting Strategies on Climate Change Adaptation in the Baltic States
BalticClimate	Baltic Challenges and Chances for Local and Regional Development Generated by Climate Change
ERDF	European Regional Development Fund
EU	European Union
EUR	European Union Euro
EUSBSR	EU Strategy for the Baltic Sea Region
FCMC	Financial and Capital Market Commission
GHG	Greenhouse gases
IPPC	Intergovernmental Panel on Climate Change
LEGMC	The Latvian Environment, Geology and Meteorology Centre
NAP	National Adaptation Plan
NAS	National Adaptation Strategy
NGOs	Non-governmental organisations
MMR	Greenhouse Gas Monitoring Mechanism Regulation
MoEPRD	Ministry of Environmental Protection and Regional Development
PPP	Public-private partnership
RCP	Representative Concentration Pathways

POLICY FRAMEWORK

A. Adaptation strategies

A1. National adaptation strategy

Latvia has not yet adopted its national strategy on climate change (NAS). The National Environment Policy Guidelines 2014-2020⁹⁴⁷, adopted by Government on 18 March 2014, cover adaptation to some extent. There is a dedicated chapter on climate change covering mitigation and adaptation policy objectives.

A systemic approach to climate adaptation was initiated in 2008 by approval of the Government Report on Adaptation to Climate Change.

The project “Development of Proposal for National Adaptation Strategy, including identification of scientific data, and measures for adapting to changing climate, impact and cost evaluation”, ended in March 2017. The NAS to 2030 together with the National Adaptation Plan (NAP) is in the process of intragovernmental consultation⁹⁴⁸. Two working groups on adaptation (an intragovernmental group and an experts group) were established in September 2017. A working version of the NAS is currently being considered by these two groups. Once they have provided their comments and inputs, the NAS will be updated and prepared for submission to the State Secretaries’ meeting. It is planned that the NAS will be adopted during 2018⁹⁴⁹.

A2. Adaptation strategies adopted at subnational levels

There is evidence that adaptation strategies are being developed at subnational (regional or local) levels, at the initiative of individual municipalities. The Environment Ministry is encouraging their development through provision of information on the importance of climate adaptation planning at regional level, as well as through organising exchanges of experience between Latvia’s municipalities and those of other countries.

Three Latvian municipalities, Valka, Daugavpils and Smiltene, have signed up to the Covenant of Mayors for Climate and Energy initiative, committing to develop local adaptation strategies or plans.

The first regional adaptation strategy in the Salacgriva region⁹⁵⁰ was developed and adopted in August 2011⁹⁵¹. Possible adaptation options have been developed and appraised, and their implementation will be initiated with a particular focus on coastal erosion, flooding, agriculture, forestry, infrastructure, public health.

⁹⁴⁷ The National Environment Policy Guidelines 2014-2020 (in LV), <http://www.varam.gov.lv/lat/pol/ppd/vide/?doc=17913>

⁹⁴⁸ Personal communication with MS contact.

⁹⁴⁹ Personal communication with MS contact.

⁹⁵⁰ Municipality with 9581 inhabitants or 0.47% of the total Latvian population

⁹⁵¹ http://www.salacgriva.lv/lat/salacgrivas_novads/zalais_novads/?text_id=6401

B. Adaptation action plans

B1. National adaptation plan

The NAP together with NAS is currently subject to consultation. A draft version of the NAP has been sent together with the NAS to an expert group and an inter-ministerial working group on adaptation for their comments and inputs, as mentioned above. The NAP is expected to be published with the NAS during 2018.

The draft NAP, in line with the NAS goals and directions for actions, contains 89 measures, identifies institutions that are responsible and involved, and the necessary finance and timeframes for the measures.

B2. Adaptation plans adopted at sub-national level

At the moment, there are no sub-national or regional adaptation strategies and plans. Traditionally, the regional level has not been very relevant in Latvia. Regions have no defined role in climate adaptation.

Local authorities (municipalities) have an important role to play, particularly regarding implementation of adaptation action. For example, three Latvian municipalities have signed up to the Covenant of Mayors for Climate and Energy and have committed to developing and implementing adaptation actions. Some municipalities, such as Riga and Ventspils, have drawn up their local action plans to minimise the greatest risks (e.g. flood boundaries, flood construction level) and these actions are included in flood-risk management plans.

B3. Sectoral adaptation plans

No specific sectoral adaptation plans have been adopted. Sectoral work on climate adaptation is ongoing. The climate risk and vulnerability assessments conducted for six main sectors identify, describe and analyse relevant adaptation measures. The implementation of adaptation actions has started in a coordinated way. Many adaptation actions in specific sectors (agriculture, forestry, public health, civil protection, water management, etc.) are being undertaken, for example, in the framework of the international project “Baltic Climate Change: Impacts, Costs and Adaptation in the Baltic Sea Region”⁹⁵².

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

In Latvia, the Ministry of Environmental Protection and Regional Development (MoEPRD), in particular, the Climate Change and Adaptation Policy Division of the Climate Change

⁹⁵² See: <http://climate-adapt.eea.europa.eu/countries-regions/transnational-regions/baltic-sea-region>

Department⁹⁵³, is responsible for preparing the NAS and for coordinating its implementation. Responsibility for the implementation of particular measures identified in the NAS will be shared among the many institutions that are involved.

1b. Horizontal (i.e. sectoral) coordination mechanisms within the governance system

Yes / In progress / No

The MoEPRD has established two working groups: an intragovernmental group and an expert working group. The main tasks of both groups are (i) information exchange on climate adaptation, including on policy planning documents, legislation, scientific research, events, (ii) fostering implementation of adaptation policies, and (iii) integrating adaptation issues into different legislative proposals. Members of both groups can submit proposals for different policies that are connected to climate adaptation. Both groups have received the draft NAS for their comments and inputs.

The intragovernmental working group involves members from the MoEPRD, the Ministry of Health, the Ministry of Finance, the Ministry of Agriculture, the Ministry of Transport, the Ministry of Economics, the Ministry of Welfare, the State Fire and Rescue Service (SFRS), the Cross-sectoral Coordination Centre, and the State Centre for Defence Military Sites and Procurement.

The expert group involves members from the MoEPRD, the Rural Support Service, the AS "Sadales tīkli", i.e. the State Regional Development Agency, the JSC "Latvian State Roads", the JSC "Latvia's State Forests", the Riga Technical University, the University of Latvia, the Nature Conservation Agency, the Health Inspectorate, the AS "Latvenergo", Employers' Confederation of Latvia, the Latvian Building Material Manufacturers Association, the Latvia University of Agriculture, the Food and Veterinary Service, the Centre for Disease Prevention and Control, the Central Statistical Bureau, the State Forest Service, the Latvian Insurers Association, the State limited Liability Company "Latvian Environment, the Geology and Meteorology Centre" and the Institute of Agricultural Resources and Economics.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / **In progress** / No

Different levels of administration, such as municipalities and planning regions are involved in the development of climate adaptation policy in relation to the following sectors: civil protection and emergency planning, building and infrastructure, biodiversity and ecosystem services, and agriculture, fisheries and forestry.

The MoEPRD Climate Change Department undertakes national-level coordination in the framework of the Covenant of Mayors. The department works closely with the Latvian Association of Municipalities. The NAS is still being prepared, but the MoEPRD foresees a

⁹⁵³ <http://climate-adapt.eea.europa.eu/countries-regions/countries/latvia>, under 'Contact'

role for the municipalities in its implementation⁹⁵⁴. In 2011 the parish of Salacgriva produced a climate adaptation strategy; and the parish of Salapils is currently preparing one⁹⁵⁵.

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

Since 2015, experts from agencies, scientific institutions, ministries, municipalities, business structures and NGOs have participated in several workshops and conferences regarding: climate scenarios, risk and vulnerability assessments, discussions on indicators and adaptation monitoring systems, flood risk warning systems, spatial and coastal zone planning. In addition, an adaptation working group has been established by MoEPRD, with members representing a wide range of public institutions, as well as other social partners. As described in relation to Indicator 1b, two working groups were established to finalise the work on the NAS and NAP and to follow up implementation, monitoring, reporting and evaluation after the adoption of the framework. These working groups include the following stakeholders: ministries, governmental authorities and research institutes.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

There is evidence of transboundary cooperation to address common challenges with relevant countries. Latvia takes active part in the implementation of the EU Strategy for the Baltic Sea Region (EUSBSR, 2009)⁹⁵⁶ and is a member of the Baltic Sea Region Climate Dialogue Platform⁹⁵⁷. The Baltic Sea Region Climate Change Adaptation Strategy and the action plan covers the issue of ever stronger rainfall and urban planning, as well as practical solutions. Special importance is given to visual aid materials, which help to explain the risks of future climate change and its impacts.

Furthermore, several projects on adaptation to climate change in the Baltic Sea region have been implemented, such as BaltAdapt (The Baltic Sea Region Climate Change Adaptation Strategy), BaltClim (Supporting Strategies on Climate Change Adaptation in the Baltic States), BaltCICA (Climate Change: Impacts, Costs and Adaptation in the Baltic Sea Region), BalticClimate (Baltic Challenges and Chances for Local and Regional Development Generated by Climate Change), ASTRA (Developing Policies and Adaptation Strategies to Climate Change in the Baltic Sea Region) and iWater⁹⁵⁸ on integrated storm water management. These projects have included cooperation on sectors/themes such as: marine biodiversity and habitats, food supply – fisheries and agriculture, coastal infrastructure and coastal tourism (BaltAdapt). In addition, regarding all type of adaptation knowledge exchange

⁹⁵⁴ Personal communication with MS contact.

⁹⁵⁵ Personal communication with MS contact.

⁹⁵⁶ <http://www.balticsea-region-strategy.eu/>

⁹⁵⁷ <http://www.cbss.org/strategies/horizontal-action-climate/>

⁹⁵⁸ <https://www.integratedstormwater.eu/content/integrated-storm-water-management>

and capacity building, Latvian experts have met with Estonian, Norwegian, Hungarian, Finnish, British colleagues in many workshops and discussions.⁹⁵⁹

Latvia also has formal agreements with Estonia and Lithuania to cooperate on river basin management. The cooperation entails regular information exchange (for example, during the annual meetings of senior officials). Latvia has agreements on environmental co-operation with Belarus and Russia and the LEGMC exchanges information with the respective services of these countries.

Finally, the SFRS cooperates with neighbouring countries on flood risks in various projects. However, there is no special intergovernmental committee or working group established, especially on flood issues.

No actions are included in the NAS on transboundary cooperation (the NAS is mainly focused on national-level targets), but cooperation is envisaged in the fields of research on climate impacts, and risk and vulnerability assessments. Cooperation and projects to exchange experience, for example, for strengthening Baltic Sea coast, are envisaged⁹⁶⁰.

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / In progress / No

The Latvian Environment, Geology and Meteorology Centre (LEGMC)⁹⁶¹ performed a detailed analysis of long-term (1961-2010) historical climate data (average and extreme values of air temperature, precipitation, wind direction and speed – average and extreme values) and developed future climate scenarios for Latvia using the Intergovernmental Panel on Climate Change (IPCC) Representative Concentration Pathway (RCP) scenarios, RCP4.5 and RCP8.5 for the periods 2011-2040, 2041-2070, 2071-2100⁹⁶².

LEGMC is responsible for continuous climate change data collection, as well as monitoring extreme events, data storage and analyses on long-term observation results. LEGMC acts internationally (as a member, or presents Latvia) in different international organisations, such as through EUMETSAT, a climate atlas tool to help visualise climate datasets for Europe and Latvia.⁹⁶³

The SFRS provides monitoring regarding climate change risks for fire safety and firefighting. Forest fires are identified as Latvia's priority risk due to the importance of forest ecosystems, biodiversity, forest seedlings, the timber industry, the significance of the forest sector to Latvia's national economy and the amount of forested lands. National Forest Inventory

⁹⁵⁹ <http://climate-adapt.eea.europa.eu/countries-regions/countries/latvia>, under 'Engaging stakeholders'

⁹⁶⁰ Personal communication with MS contact.

⁹⁶¹ Latvijas Vides, Geoloģijas un Meteoroloģijas Centrs - LVGMC

⁹⁶² <http://www2.meteo.lv/klimatariks/zinojums.pdf>

⁹⁶³ http://www.eumetsat.int/website/home/Images/ImageLibrary/DAT_2266050.html

(monitoring) is collecting and analysing data about climatic impacts, growth and yield, species composition, forest types, and damage levels.⁹⁶⁴

LEGMC monitors weather extremes as well as average, minimum, and maximum climatic parameters, and regularly sends reports to the World Meteorological Office. There is a newly developed climate change and adaptation monitoring system and database, which includes 38 adaptation indicators. A total of 38 climate change parameters and indices⁹⁶⁵, including extreme events, are included in the NAS.

A database on the annual loss coverage during weather extremes for municipalities is maintained by the Department of Municipalities in the Ministry of Environmental Protection and Regional Development (MoEPRD).

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

Scenarios and projections are developed for impact, vulnerability and adaptation assessments, using the RCP scenarios from the IPCC 5th Assessment Report. These have been produced for specific sectors⁹⁶⁶: biodiversity and ecosystem services; forestry and agriculture; tourism and landscape planning; health and welfare; building and infrastructure planning; civil protection and emergency planning. LEGMC has prepared the report “Climate Change Scenarios for Latvia”⁹⁶⁷ (historical climate change data analysis and scenarios for the future); a summary in English is also available⁹⁶⁸.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

Climate risks in the context of policies were first identified at the national level in the “Report on adaptation to climate change”, approved by the Cabinet of Ministers in August 2008.

The most comprehensive regional level study (for the Baltic Sea Region), which also covered Latvia, was the assessment of climate change risks and vulnerability performed within the BSR Programme 2007-2013 and the ERDF common project BALTADAPT.

In cooperation with SIA “Baltkonsults”, SIA “Estonian, Latvian & Lithuanian Environment”, SIA “Procesu analīzes un izpētes centrs”, LVMI “Silava” and “Zaļā Brīvība”, MoEPRD has prepared research papers on risk and vulnerability assessment and identification of measures

⁹⁶⁴ Document: Latvia’s updated report on the first reporting period on national adaptation actions under article 15 of the MMR (October 2016) – received from Ieva Bruneniece (Senior Expert, Ministry of Environmental Protection and Regional Development of Latvia, Climate Change Department, Climate Change and Adaptation Policy Division) - personal communication (3 May 2017)

⁹⁶⁵ http://etccdi.pacificclimate.org/list_27_indices.shtml

⁹⁶⁶ http://www.varam.gov.lv/lat/publ/petijumi/petijumi_klimata_parmainu_joma/?doc=23668

⁹⁶⁷ <http://www2.meteo.lv/klimatariks/zinojums.pdf>

⁹⁶⁸ <http://www2.meteo.lv/klimatariks/summary.pdf>

for climate adaptation covering six thematic areas. Research was done in the framework of the European Economic Zone Financial Instrument 2009-2014 Programme “National Climate Policy”. The research is available at the website of the MoEPRD⁹⁶⁹.

In 2012, risk and vulnerability assessments in the main sectors were prepared, and proposals for development or improvement of adaptation policies and measures were set out. In addition, the main risks⁹⁷⁰ in the country were recognised and described within an intragovernmental expert group, using a risk assessment matrix.

Significant progress has been achieved, starting from 2015, when detailed climate change risk and vulnerability assessments, and cost-benefit and cost-effectiveness assessments for adaptation measures in the most vulnerable sectors were prepared with scientific expertise and methods. The reports of the risk and vulnerability assessments for the sectors (biodiversity and ecosystem services, forestry and agriculture, tourism and landscape planning, building and infrastructure planning, civil protection and emergency planning, and health and welfare) have been completed and are available on the MoEPRD website.⁹⁷¹ Additionally, all sectoral climate risk and vulnerability assessment reports have included the following steps:

- Context analysis (scientific observations, analysis of existing policies, reports, articles) and socio-economic data analysis has been undertaken in the following sectors: biodiversity and ecosystem services; forestry and agriculture; tourism and landscape planning; health and welfare; building and infrastructure planning; civil protection and emergency planning.
- Use of flowcharts to identify cause–effect relationships between the direct and indirect impacts of climate change on socio-economic considerations and on biodiversity and ecosystems services.
- Use of the European Commission’s “Risk Assessment and Mapping Guidelines for Disaster Management”⁹⁷² and the IEC 31010:2009 (Risk management) standard⁹⁷³.

⁹⁶⁹ MoEPRD website with climate research results

http://www.varam.gov.lv/lat/publ/petijumi/petijumi_klimata_parmainu_joma/?doc=23668

⁹⁷⁰ Storms, floods, damages to power supply systems and interruptions in electricity supply, forest fires, pollution in rivers and Baltic Sea, pandemic influenza, significant accident on the railways, in aviation and in sea transport, significant IT accident, accident in SEVESO facilities, upstream pipeline damage (Latvia’s updated report on the first reporting period on national adaptation actions under article 15 of MMR – Oct. 2016)

⁹⁷¹ <http://climate-adapt.eea.europa.eu/countries-regions/countries/latvia>, under 'Summary', link to webpages of LEGMC, with different reports in Latvian

(http://www.varam.gov.lv/lat/publ/petijumi/petijumi_klimata_parmainu_joma/?doc=23668), published in 2016 Document: Latvia’s updated report on the first reporting period on national adaptation actions under article 15 of the MMR (October 2016) – received from Ieva Bruneniece (Senior Expert, Ministry of Environmental Protection and Regional Development of Latvia, Climate Change Department, Climate Change and Adaptation Policy Division) - personal communication (3 May 2017)

⁹⁷² Commission Staff Working Document. 2010. Risk Assessment and Mapping Guidelines for Disaster Management (SEC 2010) 1626 Final.

https://ec.europa.eu/echo/files/about/COMM_PDF_SEC_2010_1626_F_staff_working_document_en.pdf

⁹⁷³ IEC 31010:2009 (Risk management) standard. <https://www.iso.org/standard/51073.html>

- Use of qualitative methods (risk matrices), quantitative methods (regression analysis and partial correlation), risk mapping (for flood risk zones, sea coastal zones, vulnerable territories for tourism and landscape planning, etc.), and socio-economic assessments.
- Vulnerability assessment – based on risk levels, categories and target groups affected, adaptive capacity, level of estimated economic losses or gains, and ranking of vulnerabilities
- Identification, description and analysis of relevant adaptation measures
- Cost-benefit and cost-effectiveness assessment of adaptation measures for a 50-year period.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

Transboundary risks are not explicitly included in the draft NAS. As noted in relation to Indicator 2b, these risks are considered by some sectors, such as water and flood risk management. Risk assessments performed have not identified any significant transboundary risks. Among others, climate-driven migration was considered.

Climate risk and vulnerability assessments take transboundary risks into account within the framework of the Baltic Sea Region Climate Change Adaptation Strategy⁹⁷⁴, which focuses on such sectors as food supply (including fisheries and agriculture), coastal infrastructure and coastal tourism.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / **In progress** / No

During the development of the NAS, knowledge gaps were identified and prioritised for sectors regarding data collection, monitoring, and research. Information exchange between national and international institutions was carried out and included in the NAS and NAP. The knowledge gaps regarding climate change impacts, risks and adaptation, including adaptation monitoring and evaluation, are included in sectoral policy planning documents and legal acts.

Additionally, experience-exchange seminars have been organised in 2016 with an emphasis on exchange of knowledge and experience related to climate scenarios, data preparation and modelling, analysis and interpretation, development and management of a monitoring system for adaptation, approaches to risk and vulnerability assessment for adaptation, and identification and cost-benefit analysis of adaptation measures. There was no evidence of

⁹⁷⁴ <http://baltadapt.eu/>

specific knowledge gaps identified during these seminars. However, there is a strong need for general awareness raising on climate change and improvement of knowledge regarding climate resilience. In order to help to address this gap MoEPRD will organise a visit of the IPCC⁹⁷⁵ at the end of May 2018 to Latvia.

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).

Yes / In progress / No

A dedicated website (in English), available via the main website of the Ministry of Environment Protection and Regional Development⁹⁷⁶, provides information on the 'Development of a proposal for the National Adaptation Strategy, Including Identification of Scientific Data, and Measures for Adapting to Changing Climate, Impact and Cost Evaluation'.

The Ministry's website in Latvian includes more information, such as sectoral risk and vulnerability and adaptation assessments⁹⁷⁷. MoEPRD is responsible for the content of its website. Information in the official website of the MoEPRD is regularly updated.

The LEGMC prepares reports and provides information to the public, to the state and local governments, and to international organisations. It also provides services for customers, including national aviation, Latvian National Armed Forces, civil protection authorities and energy companies. One of the newest LEGMC products are flood risk management plans and early flood warning systems for the biggest river catchments.

A public tool for visualisation of climate scenarios has been developed, which is available online.⁹⁷⁸

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / **In progress** / No

There are some capacity building, training and education materials on climate adaptation available. The activities are not driven or coordinated by the NAS, as it has been in development. Examples are: the project 'Climate education for all'⁹⁷⁹ and 'Climate Change in Latvia- challenge or opportunity.'⁹⁸⁰

⁹⁷⁵Personal communication with MS contact.

⁹⁷⁶http://www.varam.gov.lv/eng/par_ministriju

⁹⁷⁷http://www.varam.gov.lv/lat/fondi/grants/EEZ_2009_2014/nacionala_klimata_politika/?doc=18209 (Latvian)

http://www.varam.gov.lv/eng/fondi/EEA_Norv/european_economic_area_financial_mechanism_programme_national_climate_policy/?doc=18233 (in English)

⁹⁷⁸<http://www2.meteo.lv/klimatariks/>.

⁹⁷⁹<http://www.zalabriviba.lv/klimata-parmainu-izglitiba-visiem/>

⁹⁸⁰<http://www.homoecoc.lv/lat/projekti/klimata-parmainas-latvija-izaicinajums-iespeja>

The Climate Change Department is currently working on a climate change communication strategy to provide more precise information on climate impacts on sectors, to raise awareness and promote better understanding on climate policies among societal groups and people.

Different universities, such as the University of Latvia, Riga Technical University, and Latvia University of Agriculture, provide academic studies, address and develop knowledge on climate change risks and adaptation. Examples include a course on Climate and Sustainable Development^{981,982}.

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

Comprehensive analyses of possible adaptation options are conducted for the most vulnerable sectors. This is part of the climate change risk and vulnerability assessment and cost-benefit and cost-effectiveness assessments for adaptation measures, that are prepared with scientific expertise and methods for the different sectors, and included in the NAS and NAP.⁹⁸³

In accordance with the assessment of the impacts and risks of climate change, the NAS identifies the overarching target and strategic objectives for climate adaptation, and the directions of action and measures to be implemented in six key sectors: construction and infrastructure planning, civil protection and emergency planning, health and well-being, biodiversity and ecosystem services, agriculture and forestry, tourism and landscape planning.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

Adaptation options are prioritised and there is a systematic analysis of the various options at the sectoral level. A cost-benefit analysis has been produced for adaptation measures in the most vulnerable sectors.⁹⁸⁴ Adaptation options have been chosen based on semi-quantitative analysis methods according to levels of risk, vulnerability and adaptive capacity.

⁹⁸¹ Document: Latvia's updated report on the first reporting period on national adaptation actions under article 15 of the MMR (October 2016) – received from Ieva Bruneniece (Senior Expert, Ministry of Environmental Protection and Regional Development of Latvia, Climate Change Department, Climate Change and Adaptation Policy Division) - personal communication (3 May 2017); <http://climate-adapt.eea.europa.eu/countries-regions/countries/latvia>, under 'Summary'

⁹⁸² [https://www.lu.lv/fileadmin/user_upload/lu_portal/par/starptautiska-](https://www.lu.lv/fileadmin/user_upload/lu_portal/par/starptautiska-sadarbiba/ERASMUS_PLUS/K_GZZF_VidZ1033_Climate-Sustainable-Development.pdf)

[sadarbiba/ERASMUS PLUS/K_GZZF_VidZ1033_Climate-Sustainable-Development.pdf](https://www.lu.lv/fileadmin/user_upload/lu_portal/par/starptautiska-sadarbiba/ERASMUS_PLUS/K_GZZF_VidZ1033_Climate-Sustainable-Development.pdf)

⁹⁸³ <http://climate-adapt.eea.europa.eu/countries-regions/countries/latvia>, under 'Assessments'

⁹⁸⁴ http://www.varam.gov.lv/lat/publ/petijumi/petijumi_klimata_parmainu_joma/?doc=23668

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / **In progress** / No

There is no evidence provided on how the NAS and NAP will contribute to disaster risk reduction. There is a mechanism in place for coordinating disaster risk management and climate adaptation and ensuring coherence. The Civil Protection and Catastrophe Management Law (2016) prescribes the civil protection system, which includes risk assessment and prevention, and disaster management of natural extremes across all sectors and governmental levels (including clear definition of all responsibilities among state and municipal institutions). The main added value of the system is the serious attention paid to risk assessment and prevention. In doing so, it tightly links climate change risk assessment, prevention and adaptation with civil protection⁹⁸⁵.

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / **In Progress** / No

Different funding resources per sector are specified for climate adaptation, such as the general state budget, municipal budget, insurance, EU funds, business, Latvian Environmental Protection Fund, Latvian Environmental Investment Fund and the Climate Change Financial Instrument. In order to realise the measures and tasks specified in the NAS, use of state and municipal budget resources is planned and EU and private funding will be sought (dependent on the particular measure)⁹⁸⁶.

Within the European Structural and Investment Funds for 2014-2020, appropriated funding for measures related to the shift towards a low-carbon economy is more than EUR 480 million, and more than EUR 63 million for climate adaptation. Under the Climate Change Financial Instrument specific activities for adaptation have not been undertaken. However, some of the activities financed by the Emission Allowances Auctioning Instrument promote climate adaptation as a co-benefit.

Resources from the general state budget are used to cover climate-related damages, as and when required.

⁹⁸⁵ Document: Latvia's updated report on the first reporting period on national adaptation actions under article 15 of the MMR (October 2016) – received from Ieva Bruneniece (Senior Expert, Ministry of Environmental Protection and Regional Development of Latvia, Climate Change Department, Climate Change and Adaptation Policy Division) - personal communication (3 May 2017)

<http://climate-adapt.eea.europa.eu/countries-regions/countries/latvia>, under 'Policy & Legal Framework'

⁹⁸⁶ Personal communication with MS contact.

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

The national law on EIA (amended 2017) does not include climate change considerations. Amendments to this law are in preparation, however, no information is available as to whether and how adaptation will be addressed.⁹⁸⁷

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / No

Several rules of Cabinet of Ministers are currently being developed in accordance with the Law on Civil Protection and Catastrophe Management (2016). Climate impacts and extremes are considered in the State Civil Protection Plan (2014). The Latvian Environment, Geology and Meteorology Centre is working on an initial flood risk assessment report, which will be used for the preparation of 2021-2027 flood risk governance plans. Public consultations are ongoing until 30 June 2018.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / No

Climate impacts, risks and adaptation measures are addressed in several documents, including: Coastal Spatial Development Programme 2011-2017, State Long-term Thematic Planning for Baltic Sea Coast Public Infrastructure up to 2030, National Development Plan 2014-2020, Rural Development Programme of Latvia 2014-2020, Regional Policy Programme 2013-2019 (2013), Environmental Policy Programme 2014-2020 (2014).

At the regional level, within the framework of the Estonian-Latvian program "Coastal and Marine Planning in the Pärnu Bay in Estonia and the Coastal Municipalities of Latvia" 2013-2015, guidelines for "Reducing the Impact of Coastal Erosion" have been prepared.

At the local level, activities are carried out in accordance with national and regional level documents and regulations defined in the regulatory acts. For example, local government territorial development planning documents identify territories with flood risks, and coastal areas with increased risk of erosion. These risks need to be taken into account in building regulations, as well as planned activities and investments.

⁹⁸⁷ Document: National Law on environmental impact assessment: <http://likumi.lv/doc.php?id=51522>

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / In progress / **No**

National policy instruments to promote sector-level adaptation are foreseen in the NAS and the NAP. The overarching goal is to minimise the vulnerability of people, economy, infrastructure, buildings and nature to climate impacts, and to promote opportunities created by climate change. The NAS will also include more specific strategic targets and an action plan that will identify specific measures and the institutions responsible for their implementation. The NAP focuses on people, economy, infrastructure and construction, nature, and information and knowledge, and includes 18 main actions. In total 89 actions/measures relate to climate risk and vulnerability assessment. For each action, the NAP details the responsible institution, other involved institutions, duration, necessary financing, finance sources, priority, and other information.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

The insurance system is regarded as an important adaptation tool in relation to extreme weather events or disasters. Particular instruments have been developed under the supervision of the Financial and Capital Market Commission (FCMC). There are three existing insurance schemes relevant to natural disasters. One provides individual cover in the private sector, including for health, life, and property. The second scheme addresses the agricultural and forestry sectors, covering insurance risks through private and State financing. The third covers businesses (commerce, and trade).⁹⁸⁸

The draft NAS defines a specific action on insurance under the second strategic priority on adapting the national economy and reaping the benefits. The specific action foresees strengthening the insurance market through effective schemes and instruments in order to cover and compensate for losses from climate and natural catastrophes and reduce the burden of risk on the state budget.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In progress** / No

Despite the NAS not yet being adopted, autonomous adaptation actions in some sectors (agriculture, civil protection, forestry, public health, building and construction, water

⁹⁸⁸ <http://climate-adapt.eea.europa.eu/countries-regions/countries/latvia>, under 'Policy & Legal framework' Document: Latvia's updated report on the first reporting period on national adaptation actions under Article 15 of the MMR (October 2016) – received from Ieva Bruneniece (Senior Expert, Ministry of Environmental Protection and Regional Development of Latvia, Climate Change Department, Climate Change and Adaptation Policy Division) - personal communication (3 May 2017)

management, etc.) are already underway. The efficiency and sustainability of adaptation measures was analysed in six sectoral studies on climate impacts, vulnerability and adaptation measures, including their cost-benefit.

Practical adaptation options and activities have been implemented with regards to coastal and river basin management, where floods, storm surges, coastal erosion and extreme temperatures have been identified as the main risks. Coastal vulnerabilities have been mapped and adaptation activities have been developed, mainly through EU-funded trans-boundary projects, such as ASTRA, BaltCICA, BaltClim, BalticClimate and BaltAdapt.

Some activities related to climate adaptation have taken place in several municipalities but not as part of a systematic process. Some municipalities, such as Riga and Salacgriva, which have been influenced by extreme weather conditions (storm surges, floods) have been most active in implementing adaptation measures. For example, Riga City has included anti-flood measures (such as raising the level of existing paved roads and embankments, construction of new embankments, reconstruction or installation of new canal locks and culverts) in the Integrated Strategy for Riga City.

Another example is construction of coastal defence structures at dense settlement sites in the Salaca River Basin, as well as introduction of control or prohibition of the expansion of settlement sites in vulnerable coastal areas along the Salaca river (ASTRA project).

In order to reduce climate impacts, a number of Latvian municipalities (in particular, Liepaja, Riga, Vilani, Daugavpils, Cesis, Livani, Sigulda, Salaspils and Ikskile), as well as Zemgale planning region, have elaborated sustainable energy action plans (Zemgale planning region starting from 2012, the municipalities in subsequent years).⁹⁸⁹

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / **No**

Cooperation mechanisms to foster and support adaptation at relevant scales are foreseen in the NAS and NAP.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / **No**

Apart from the drafted Maritime Spatial Plan and various guidelines issued by the European Commission, no specific procedures or guidelines are issued or used to assess potential climate impacts on major projects or programmes.

⁹⁸⁹ Personal communication with MS contact.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / **No**

As coordinated implementation of the adaptation measures has not yet started, the specific mechanisms for ensuring the involvement of stakeholders in the implementation of adaptation policies and measures are not yet in place.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / **No**

Currently, no monitoring or reporting on implementation of the NAS and NAP is in place.

Climate change and adaptation monitoring system is under development. It is planned that it will be finalised by the end of 2018. For each indicator a detailed metadata sheet is proposed (including, description of indicator, the period covered, measurement, spatial coverage, data source, indicator relevance, current trends, trends in the future, vulnerability characteristics). The methodology is under consultation. Both the indicators and the methodology will be published on the LEGMC and MEPRD web links. The NAS includes a task to establish the legal frame for the monitoring system and determine the institutions responsible for data delivery in each sector.⁹⁹⁰

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / **No**

Currently, no monitoring or reporting on the integration of climate adaptation in sectoral policies is in place.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / **No**

Currently, no monitoring or reporting on regional, sub-national or local action is in place.

⁹⁹⁰ <http://climate-adapt.eea.europa.eu/countries-regions/countries/latvia>, under 'Summary' Document: Latvia's updated report on the first reporting period on national adaptation actions under Article 15 of the MMR (October 2016) – received from Ieva Bruneniece (Senior Expert, Ministry of Environmental Protection and Regional Development of Latvia, Climate Change Department, Climate Change and Adaptation Policy Division) - personal communication (3 May 2017)

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / **No**

As the NAS is not yet adopted, no interval has yet been set for its periodic review.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / **No**

As no assessment, evaluation or review is taking place there is no stakeholder involvement.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 <i>Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	Yes / <u>In progress</u> / No
2 <i>Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 <i>Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	<u>Yes</u> / In progress / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No
4 <i>Knowledge gaps</i>		
4a	Work is being carried out to identify, prioritise and	Yes / <u>In</u>

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	address the knowledge gaps	<u>progress</u> / No
5	<i>Knowledge transfer</i>	
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	<u>Yes</u> / In progress / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	Yes / <u>In progress</u> / No
Step C: Identifying adaptation options		
6	<i>Identification of adaptation options</i>	
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	Yes / <u>In progress</u> / No
7	<i>Funding resources identified and allocated</i>	
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / <u>In Progress</u> / No
Step D: Implementing adaptation action		
8	<i>Mainstreaming adaptation in planning processes</i>	
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	Yes / <u>No</u>
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	<u>Yes</u> / No
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the	<u>Yes</u> / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	impacts of climate change	
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	Yes / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / No
9 <i>Implementing adaptation</i>		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / In progress / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	Yes / No
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	Yes / No
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	Yes / No
Step E: Monitoring and evaluation of adaptation activities		
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	Yes / No
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	Yes / No
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	Yes / No
11 <i>Evaluation</i>		
11a	A periodic review of the national adaptation strategy and action plans is planned	Yes / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	Yes / No

Adaptation preparedness scoreboard for Lithuania

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List of abbreviations

Action Plan	Action Plan for the implementation of the goals and objectives of the Strategy of National Climate Change Management Policy 2013-2020
ASTRA	Developing Policies & Adaptation Strategies to Climate Change in the Baltic Sea Region project
Committee	National Climate Change Committee
EIA	Environmental Impact Assessment
LHMS	Lithuanian Hydrometeorological Service under the Ministry of Environment
MoE	Lithuanian Ministry of Environment
NGO	Non-governmental organisation
RADOST	Regional Adaptation Strategies for the German Baltic Sea Cost project
Strategy	Strategy for National Climate Management Policy 2013-2050

POLICY FRAMEWORK

A. Adaptation strategies

A1. National adaptation strategy

Lithuania adopted a ‘Strategy for National Climate Management Policy 2013-2050’ in November 2012⁹⁹¹ (hereafter the “Strategy”). This is an integrated strategy which covers both adaptation and mitigation issues and includes implementation considerations. There are no plans to develop a separate climate adaptation strategy. Until 2012, Lithuania had the National Strategy for the Implementation of the UNFCCC⁹⁹², which included measures for both mitigation and adaptation.

A2. Adaptation strategies adopted at subnational levels

The new guidelines for municipalities on preparing climate mitigation and adaptation plans were developed by the Association of Local Authorities in Lithuania in 2017⁹⁹³, though no regional adaptation strategies have yet been adopted. The municipalities of Panevezys district (“rajonas”) and Klaipeda city, have conducted comprehensive vulnerability studies⁹⁹⁴. The Lithuanian Hydrometeorological Service prepared a climate scenario study for Vilnius until 2100⁹⁹⁵. Lithuania has taken part in several transboundary EU-funded projects⁹⁹⁶ in which local adaptation options have been analysed and elaborated.

B. Adaptation action plans

B1. National adaptation plan

An action plan (hereafter the “Action Plan”) to implement the goals and objectives of the Strategy of National Climate Change Management Policy 2013-2020 was first adopted in April 2013 and contained measures for the years 2013-2016. The Action Plan consisted of general provisions, targets, objectives, measures, financial resources, implementing institutions, assessment criteria and values. Following the strategic planning methodology approved by the Government, the Action Plan was prepared for a three-year period and is updated annually by adding one more year. In 2016, the updated Action Plan with measures

⁹⁹¹Lithuanian Ministry of Environment, URL: [http://www.am.lt/VI/files/File/Klimato%20kaita/Nacionaline klimato kaitos valdymo politikos strategija EN galutinis.docx](http://www.am.lt/VI/files/File/Klimato%20kaita/Nacionaline_klimato_kaitos_valdymo_politikos_strategija_EN_galutinis.docx), Date accessed: 07/05/2018

⁹⁹²Lithuanian Parliament Registry of Legal Acts, URL: <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.314407?positionInSearchResults=0&searchModelUUID=f0d11b05-5d5d-4c2b-bab1-de5e5b8895ef>, Date accessed: 07/05/2018

⁹⁹³ Kaunas Regional Energy Agency (author of the guidelines), URL: <http://www.krea.lt/images/angle180/klimato-kaita-gaires-savivaldybems.pdf>, Date accessed: 07/05/2018

⁹⁹⁴ Panevėžys district municipality, URL: www.panrs.lt/aplinka/2011/ataskaita.doc, Date accessed: 07/05/2018

⁹⁹⁵ Lithuanian Hydrometeorological Service, URL: http://www.meteo.lt/documents/20181/0/klimato_kaita_vilnius_xxi_v2-Vup1VlBw.pdf/2e285f17-8bfb-4451-a865-f0c5e22ff42c, Date accessed: 07/05/2018

⁹⁹⁶ These include: ASTRA (Developing Policies and Adaptation Strategies to Climate Change in the Baltic Sea), Baltadapt, BaltCICA (Climate Change: Impacts, Costs and Adaptation in the Baltic Sea Region), BalticClimate, Baltclim, RADOST. See: selected project websites, URL: <http://www.baltadapt.eu/>, <http://www.balticsea-region-strategy.eu/>, Date accessed: 07/05/2018

for 2017-2019 was adopted by the Government Resolution No. 846⁹⁹⁷. It includes 66 measures of which 31 are related to climate adaptation. An updated Action Plan with measures for was adopted by the Government Resolution No. 147 in 2018⁹⁹⁸.

B2. Adaptation plans adopted at sub-national level

Municipalities, together with relevant national-level ministries, are responsible for the implementation of the Strategy for National Climate Change Management Policy, as well as certain measures of the Action Plan. Independent activities have so far been limited to vulnerability studies in the municipalities of Panevezys district, and Klaipeda city. In Klaipeda, the study was conducted through the EU-funded project ASTRA⁹⁹⁹. Flood risk has received the most attention at the sub-national level, so the EU-funded adaptation projects focus on coastal management and flood risks. The counties of Klaipeda and Taurage have adopted programmes to prepare for and mitigate flood¹⁰⁰⁰ impacts. No adaptation strategies or plans have been prepared under the Covenant of Mayors initiative by the Lithuanian municipalities¹⁰⁰¹.

B3. Sectoral adaptation plans

Adaptation measures at sector level are embedded in specific-sector development programmes, such as those that aim to promote sustainable farming (National Rural Development Programme 2014-2020¹⁰⁰²), and public transport (National Transport Development Programme 2014-2022¹⁰⁰³). There are also other initiatives, such as the National Public Health and Heat Prevention Action Plan for 2016-2020¹⁰⁰⁴. In 2015, a study was conducted on sector-specific climate vulnerabilities and related risk assessments¹⁰⁰⁵. The following priority sectors have been identified: energy, transport, industry, agriculture, landscape, spatial planning, ecosystems and biodiversity, fisheries and aquaculture sector, forestry, tourism, groundwater resources, and waste management.

⁹⁹⁷ Lithuanian Parliament Registry of Legal Acts, URL: <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/bfb5d0406b5311e6a421ea2bde782b94>, Date accessed: 07/05/2018

⁹⁹⁸ Registry of Legal Acts, URL: <https://www.e-tar.lt/portal/lt/legalAct/76fe2cf0122111e88456d055fb6f6244>, Date accessed: 14/05/2018

⁹⁹⁹ Project website: http://www.astra-project.org/02_lithunia.html, Date accessed: 07/05/2018

¹⁰⁰⁰ Registry of Legal Acts, URL: https://www.e-tar.lt/portal/lt/legalAct/TAR.3B87E3056C10/TAIS_237899, Date accessed: 07/05/2018

¹⁰⁰¹ Covenant of Mayors initiative, URL: <https://www.covenantofmayors.eu/plans-and-actions/action-plans.html>, Date accessed: 07/05/2018

¹⁰⁰² Ministry of Agriculture, URL: <https://zum.lrv.lt/lt/veiklos-sritys/lietuvos-kaimo-pletros-2014-2020-m-programa>, Date accessed: 07/05/2018

¹⁰⁰³ Ministry of Transport and Communications, URL: <https://sumin.lrv.lt/lt/administracine-informacija/nacionaline-susisiekimo-pletros-2014-2022-metu-programa>, Date accessed: 07/05/2018

¹⁰⁰⁴ Registry of Legal Acts, URL: <https://www.e-tar.lt/portal/lt/legalAct/78ffb580a97511e5be7f919a1ebe>, Date accessed: 07/05/2018

¹⁰⁰⁵ Ministry of Environment, URL: http://www.am.lt/VI/files/File/Klimato%20kaita/Klimato%20kaita_galutine%20ataskaita_2015_08_31.pdf, Date accessed: 07/05/2018

SCOREBOARD

Step A: Preparing the ground for adaptation

1 Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

The Lithuanian Ministry of Environment (MoE)¹⁰⁰⁶ is the main coordinating institution responsible for: the development and implementation of climate mitigation and adaptation policy, for transposing EU climate policy into national legislation, and advising for other institutions on integrating climate policy objectives and concerns into sectors that are not the MoE's responsibility.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

The National Climate Change Committee (hereafter “the Committee”) is tasked to coordinate the development and implementation of the national climate policy¹⁰⁰⁷. Representatives of the following ministries are involved in the Committee's work: Ministry of Environment (chair), Ministry of Energy, Ministry of Finance, Ministry of Transport and Communications, Ministry of Education and Science, Ministry of Foreign Affairs, Ministry of Economy, Ministry of Agriculture and the Chancellery of the Government of Lithuania. Thus, most of the relevant sectors are covered by the Committee with the Ministry of Health and the Fire and Rescue Department being exceptions.

According to the Decree of the Minister of Environment No. 178 of 30 March 2001, the Committee: coordinates the implementation of the Strategy for National Climate Management Policy and its Action Plan; coordinates the development of new strategies, action plans, and legal initiatives; provides recommendations regarding investment priorities; coordinates preparation of climate policy related reports; and performs other coordination tasks. The Decree also provides procedural guidance on the functioning and decision making of the Committee. Usually there are two annual meetings of the Committee organised by the MoE.

The MoE is responsible for overall coordination of the implementation of the Action Plan. However, certain activities of the Action Plan are assigned to other ministries, such as the Ministry of Agriculture, Ministry of Transport, Ministry of Economy.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / In progress / No

¹⁰⁰⁶ See at: <http://www.am.lt/VI/index.php#a/12866>

¹⁰⁰⁷ Ministry of Environment, URL: <http://www.am.lt/VI/index.php#a/12866>, Date accessed: 07/05/2018

The National Climate Change Committee is tasked with coordinating the development and implementation of the national climate policy.¹⁰⁰⁸ According to the Decree of the Minister of Environment No. 178 of 30 March 2001, the Committee includes a representative of the Association of Local Authorities in Lithuania, other non-governmental organisations (NGOs) and the science community¹⁰⁰⁹.

The Association of Local Authorities in Lithuania also coordinates activities in the framework of the Covenant of Mayors, ensuring cooperation and knowledge exchange of municipalities and national institutions.

Certain activities of the Action Plan are expected to be implemented by municipalities, including adaptation-related actions. The MoE coordinates implementation of the Action Plan.

2 Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

A dedicated process has been in place to facilitate stakeholders' involvement in the preparation of the adaptation policies. Firstly, stakeholders and any interested parties have possibilities to review and provide comments and proposals regarding the draft legal acts as they are made publicly available during their preparation as part of the legislative process.

Secondly, and more specifically to adaptation, the National Climate Change Committee consists of experts from the government, municipalities, research institutions and NGOs, all contributing to climate policy making, including the development of the adaptation strategy.

For developing sectoral programmes (e.g. for public health, agriculture, biodiversity, coastal management, river basin management), targeted working groups involving relevant stakeholders were created. These working groups usually play an important role in selecting specific measures or setting monitoring indicators. For example, the inter-institutional working group for heatwave prevention is set up by the Order No V-725 of the Minister of Health, adopted on 6 June 2016¹⁰¹⁰. At the moment, these groups gather according to the need and they deal with mitigation and adaptation issues in separate sectors.¹⁰¹¹

¹⁰⁰⁸ Climate ADAPT, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/lithuania>, under 'Engaging stakeholders - Governance', Date accessed: 07/05/2018

¹⁰⁰⁹ Ministry of Environment, URL: <http://www.am.lt/VI/index.php#a/12866>, Date accessed: 07/05/2018

¹⁰¹⁰ Registry of Legal Acts, URL: <https://www.e-tar.lt/portal/lt/legalAct/2f2e3aa0344711e69cf5d89a5fdd27cc/BBKjhxNI>, Date accessed: 14/05/2018

¹⁰¹¹ Climate ADAPT, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/lithuania>, under 'Engaging stakeholders - Governance', Date accessed: 07/05/2018

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

The Strategy for National Climate Management Policy and the Action Plan do not contain specific actions to initiate or support transboundary cooperation with relevant countries in addressing common challenges.

However, several adaptation-related activities are being implemented in cooperation with neighbouring countries. The transboundary cooperation in flood risk management is organised within the framework of existing intergovernmental agreements between Lithuania, Latvia and Poland to cooperate and exchange information and data in environmental fields. The transboundary cooperation is also ensured through implementation of the four river basin management plans.¹⁰¹²

Lithuania has taken part in several transboundary projects, including ASTRA, Baltadapt, BaltCICA, BalticClimate, Baltclim, RADOST¹⁰¹³. Lithuania has been active within the Baltic Sea Region Climate Change Adaptation Strategy and Action Plan. In these projects, local adaptation options are analysed and elaborated¹⁰¹⁴. In addition, Lithuania takes part in the implementation of the EU Strategy for the Baltic Sea Region by participating in the Climate Change Dialogue Platform (EUSBSR, 2009)¹⁰¹⁵.

Step B: Assessing risks and vulnerabilities to climate change

3 Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / **In progress** / No

The Lithuanian Hydro-meteorological Service (LHMS) under the MoE is responsible for meteorological (including agrometeorological, aeronautical and marine) and hydrological observations and forecasts. The website of LHMS¹⁰¹⁶ contains information on climate change. In addition, it provides records on extreme events, related to temperature, rain fall, wind

¹⁰¹² See more information about Lithuania's RBMPs at: http://ec.europa.eu/environment/water/participation/map_mc/countries/lithuania_en.htm, Date accessed: 07/05/2018

¹⁰¹³ Project websites, URL: <http://www.astra-project.org/>; <http://www.baltadapt.eu/>; <http://www.baltcica.org/>; <http://www.balticclimate.org/en/project>; <http://www.bef-de.org/index.php?id=52>; <http://www.klimzug-radost.de/en>, Date accessed: 07/05/2018

¹⁰¹⁴ Climate ADAPT, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/lithuania>, under 'Engaging stakeholders - Governance', Date accessed: 07/05/2018

¹⁰¹⁵ EU Strategy for the Baltic Sea Region, URL: <http://www.balticsea-region-strategy.eu/>, www.balticsea-region-strategy.eu/9th-annual-forum, Date accessed: 14/05/2018

¹⁰¹⁶ Lithuanian Hydro-meteorological Service, URL: <http://www.meteo.lt/en/web/guest/climate-change?inheritRedirect=true> and <http://www.meteo.lt/en/web/guest/extreme-phenomena>, Date accessed: 07/05/2018

speed, and snow fall. Moreover, LHMS provides warnings on dangerous and catastrophic hydro-meteorological phenomena, sudden weather changes, ozone layer depletion, etc.

Measures improving the observation of climate and ensuring the implementation of the Strategy for National Climate Management Policy, are being implemented. This includes, among others, increasing capacities of the LHMS observation network, renewing measurement equipment of the automatic agro-meteorological stations network and solar ultraviolet radiation, and developing satellite climatology¹⁰¹⁷.

Meteorological data is collected only from meteorological stations. Sometimes there is information about damage from extreme meteorological phenomena near meteorological stations, but it is only a visual recording of damage. There is no systematic information about impacts, such as loss and damage figures and numbers of people affected.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

Climate projections for the 21st century are based on outputs from numerical climate models. Vilnius University produces climate projections by downscaling output data from COSMO-CLM, HadCM3, and ECHAM5 models. Climate change scenarios for Lithuania and its regions were finalised in 2015¹⁰¹⁸. They reflect potential future the greenhouse gas emissions caused by future social-economic development. Two greenhouse gas emissions scenarios from the Intergovernmental Panel on Climate Change (IPCC) 4th Assessment Report were considered, A1B (a relatively high-emissions scenario) and B1 (a low-emissions scenario).

The Lithuanian Hydro-meteorological Service prepared climate projections for Vilnius city in 2013 using the A1B scenario¹⁰¹⁹.

A study in 2015 on 'Laying down specific sectors vulnerability to climate change impacts, risk assessment and adaptation to climate change, effective adaptation and evaluation criteria' includes an analysis of Lithuanian climate change trends and projections based on the IPCC Representative Concentration Pathway (RCP) scenarios from its 5th Assessment Report. Geographical specifications are included in the scenarios and projections.¹⁰²⁰

¹⁰¹⁷ Lithuania's 6th National Communication and Second Biennial Report under the UNFCCC, URL: http://www.am.lt/VI/files/File/Klimato%20kaita/6_Nacionalinis_pranesimas_2014.pdf and https://unfccc.int/files/national_reports/biennial_reports_and_iar/submitted_biennial_reports/application/pdf/final_2nd_br_lt.pdf, Date accessed: 07/05/2018

¹⁰¹⁸ Climate ADAPT, URL: http://climate-adapt.eea.europa.eu/countries-regions/countries/lithuania_under_Assessments, Date accessed: 07/05/2018

¹⁰¹⁹ Lithuanian Hydro-meteorological Service, URL: http://www.meteo.lt/documents/20181/103901/klimato_kaita_vilnius_xxi_v2-Vup1VlBw.pdf/2e285f17-8bfb-4451-a865-f0c5e22ff42c?version=1.0, Date accessed: 07/05/2018

¹⁰²⁰ Ministry of Environment, 'Laying down specific sectors vulnerability to climate change impacts, risk assessment and adaptation to climate change, effective adaptation and evaluation criteria' URL: http://www.am.lt/VI/files/File/Klimato%20kaita/Klimato%20kaita_galutine%20ataskaita_2015_08_31.pdf, Date accessed: 07/05/2018

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

In 2015, an assessment of individual sectors' vulnerabilities, risks and opportunities to adapt to climate change was completed. It also identified the most efficient adaptation measures and indicators for evaluation. The study focused on the following sectors: spatial planning, transport, energy, waste management, industry, agriculture, underground water resources, ecosystems and biodiversity, fisheries, forestry, tourism and others. The reports are available on the MoE website.¹⁰²¹ For each sector there is a detailed analysis of the sensitivity, vulnerability and potential risk for the sector due to climate change, the impacts, experience in other European countries, adaptation options, and criteria for measuring the effectiveness of adaptation in the sector.

A national risk assessment was conducted between Autumn 2012 and Spring 2013 coordinated by the Fire and Rescue Department under the Ministry of Interior. It assessed all risks in Lithuania, including those associated with climate change. An updated assessment was conducted in 2015¹⁰²².

In 2014, a climate risk and vulnerability assessment was undertaken in the public health sector. The study identified the risks posed to human health by climate change and proposed cost-efficient measures and indicators¹⁰²³.

By agreement with the MoE, the Institute of Ecology of Vilnius University carried out "The study of climate change impact to the land ecosystems, biodiversity, water resources, agriculture and forestry and human health and the strategic plan for the mitigation of consequences" in 2007¹⁰²⁴. This study is still one of the most important studies, which comprehensively investigates the climate impacts on ecosystems, biodiversity, water resources, agriculture and forestry and human health in Lithuania.

Sub-national level vulnerability studies are carried out in most cases as part of EU-funded projects, such as "ASTRA. Developing Policies and Adaptation Strategies to Climate Change in the Baltic Sea" and "BaltCICA. Climate Change: Impacts, Costs and Adaptation in the Baltic Sea Region".

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

¹⁰²¹ Ministry of Environment, 'Laying down specific sectors vulnerability to climate change impacts, risk assessment and adaptation to climate change, effective adaptation and evaluation criteria' URL: http://www.am.lt/VI/files/File/Klimato%20kaita/Klimato%20kaita_galutine%20ataskaita_2015_08_31.pdf, Date accessed: 07/05/2018

¹⁰²² Fire and Rescue Department, URL: <http://www.vpgt.lt/go.php/Nacionalin%C4%97%20rizikos%20analiz%C4%97611>, Date accessed: 07/05/2018

¹⁰²³ Ministry of Environment, URL: <http://www.am.lt/VI/files/File/Klimato%20kaita/Galutine%20ataskaita-2014-09-17.pdf>, Date accessed: 07/05/2018

¹⁰²⁴ Ministry of Environment, URL: <http://www.am.lt/VI/index.php#a/12840>, Date accessed: 07/05/2018

Transboundary risks are not explicitly included in the Strategy for National Climate Change Management Policy. As referred in Indicator 2b, these risks are taken into account by some sectors, such as water and flood risk management.

Climate risk and vulnerability assessments take transboundary risks into account within the framework of the EU Baltic Sea Region Strategy, with horizontal action on climate. The Baltic Sea Region Climate Change Adaptation Strategy and Baltadapt Action Plan were developed, which focus on sectors, such as food supply (including fisheries and agriculture), coastal infrastructure and coastal tourism.¹⁰²⁵

Lithuania has also taken part in several transboundary projects, including Astra, Baltadapt, BaltCICA, BalticClimate, Baltclim, RADOST. Baltadapt (2010-2013) was a flagship project under the EU Strategy for the Baltic Sea Region, developing a Baltic Sea Region-wide climate adaptation strategy and taking transboundary risks into account.

4 Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / **In progress** / No

The Strategy for National Climate Management Policy does not identify specific knowledge gaps, even though the importance of a sound evidence base and knowledge on adaptation are emphasised. The Action Plan includes a number of measures related to climate research, such as studies on soil, forestry, agriculture and public health. No details are provided in the Action Plan as to whether these studies will identify, prioritise and address knowledge gaps. The climate risk and vulnerability assessments mentioned in relation to Indicator 3c do not refer to specific knowledge gaps to be addressed in the future.

Lithuania is now preparing an update of the strategy for the period 2021-2030 and beyond. An analysis of the current situation and a SWOT will be provided to identify, prioritise and address the knowledge gaps. For identifying and addressing knowledge gaps in different sectors working groups are being installed. For example, a Heat prevention working group is established, where specialists from different institutions (national and local authorities, universities, institutes) will be working together to identify adaptation options and promote preparedness to heat events. A working group for National risk assessment is also being established.

Furthermore, numerous Lithuanian universities and research institutions conduct research relevant to climate adaptation. For example:

- Vilnius University performs research on temperature observations and adaptation of ecosystems
- Vilnius Gediminas Technical University is actively involved in green buildings initiatives

¹⁰²⁵ Climate ADAPT, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/lithuania>, under 'Assessments - Impacts & Vulnerability assessments', Date accessed: 07/05/2018

- Vytautas Magnus University conducts research on environmental infrastructure projects.

5 Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / **In progress** / No

Ensuring systematic gathering and dissemination of climate change information to various interest groups and the public is among the main objectives concerning adaptation defined in the Strategy for National Climate Management Policy.¹⁰²⁶ A web-portal on climate mitigation and adaptation is to be developed in accordance with the Action Plan using the EU 2014-2020 funds.

Climate-related information is available on the website of the MoE¹⁰²⁷ and the websites of other ministries, e.g. the Ministry of Energy, the Ministry of Agriculture, and the Ministry of Transport and Communications¹⁰²⁸. The website of the MoE provides information on the Strategy for National Climate Management Policy, studies and teaching material primarily on mitigation but also including limited information on adaptation.

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / **In progress** / No

There is some evidence available on capacity building activities, education and training materials on climate change; mostly on materials and guidelines related to the transnational projects¹⁰²⁹. Several awareness-raising materials, studies and guidelines are publicly available, such as guidance for the Lithuanian municipalities on climate mitigation and adaptation.

The Action Plan's annual implementation in 2017 provided details on the capacity building activities that had been implemented¹⁰³⁰. For example, 806 farmers were consulted on climate impacts and adaptation during 2017, which was significantly more than expected and reflected their high interest in the topic. Fourteen capacity building projects were implemented targeting forestry specialists.

¹⁰²⁶ Climate ADAPT, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/lithuania>, under 'Summary' and under 'Engaging stakeholders - Adaptation capacity, dissemination, education, training', Date accessed: 07/05/2018

¹⁰²⁷ Ministry of Environment, URL: <http://www.am.lt/VI/index.php#r/847>, <http://www.am.lt/VI/index.php#a/12840>, <http://www.am.lt/VI/index.php#a/12844>, Date accessed: 07/05/2018

¹⁰²⁸ Ministry of Energy, the Ministry of Agriculture, the Ministry of Transport and Communications, URL: <http://sumin.lrv.lt/>, <http://enmin.lrv.lt/>, <http://ukmin.lrv.lt/>, Date accessed: 07/05/2018

¹⁰²⁹ Climate ADAPT, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/lithuania>, under 'Engaging stakeholders - Adaptation capacity, dissemination, education, training', Date accessed: 07/05/2018.

¹⁰³⁰ Ministry of Environment, URL: <http://www.am.lt/VI/index.php#a/19247>, Date accessed: 10/05/2018

Step C: Identifying adaptation options

6 Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

The detailed analysis undertaken in 2015 of the climate sensitivities, vulnerabilities and potential risks for sectors identified adaptation options that address geographical specificities by building upon best practices from other European countries (see Indicator 3c). The study focused on the following sectors: spatial planning, transport, energy, waste management, industry, agriculture, underground water resources, ecosystems and biodiversity, fisheries, forestry, tourism and others.¹⁰³¹

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

The 2015 study described in relation to Indicators 3c and 6a provides a list of adaptation options, as well as performance evaluation criteria per sector. However, the study does not provide any information on whether the options have been ranked based on these evaluation criteria and listed in priority order.¹⁰³²

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / In progress/ No

Climate adaptation is a consistent part of the national civil protection system. The citizens are warned and informed about natural disasters, emergency situations and possible threats related to climate change through the public warning and information system. However, it is unclear how the Strategy for National Climate Management Policy and Action Plan include disaster risk management measures, and how climate impacts are integrated in disaster risk reduction planning. It is also unclear if the disaster risk reduction and adaptation policies are coordinated through institutional frameworks to ensure coherence between the policies, as the Fire and Rescue Department and the Ministry of Interior are not part of the National Climate Change Committee.

¹⁰³¹ Ministry of Environment, 2015 study 'Laying down specific sectors vulnerability to climate change impacts, risk assessment and adaptation to climate change, effective adaptation and evaluation criteria' URL: http://www.am.lt/VI/files/File/Klimato%20kaita/Klimato%20kaita_galutine%20ataskaita_2015_08_31.pdf, Date accessed: 07/05/2018

¹⁰³² Ministry of Environment, 'Laying down specific sectors vulnerability to climate change impacts, risk assessment and adaptation to climate change, effective adaptation and evaluation criteria' URL: http://www.am.lt/VI/files/File/Klimato%20kaita/Klimato%20kaita_galutine%20ataskaita_2015_08_31.pdf, Date accessed: 07/05/2018

7 Identifying and making resources available

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / In progress / No

The implementation of the Strategy for National Climate Management Policy is funded from the state budget of the Republic of Lithuania, municipal budgets, EU and international organisations and other sources. The 2016 Action Plan for 2017-2019 and updated 2018 Action Plan for 2018-2020 establish measures ensuring the implementation of goals and objectives set by the Strategy for National Climate Management Policy. The Action Plan indicates what financial resources are dedicated to the measures and identifies the institutions responsible for implementing them. A dedicated budget is indicated for several sectors, including: transport, agriculture, waste, industry, public health, water resources, forestry, ecosystems, biodiversity, landscape.¹⁰³³ As noted in relation to Indicator 5b, capacity-building activities are also supported. The annual reports of the MoE provide in-depth information on the disbursed funds and the achievement of specific objectives and indicators¹⁰³⁴.

Step D: Implementing adaptation action

8 Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

The Law on Environmental Impact Assessment (EIA) of the Proposed Economic Activity transposing requirements of EIA Directive 2014/52/EU was adopted on 27 June 2017¹⁰³⁵. The new law requires the competent authority to consider the climate impact when selecting projects to be subject to EIA (Article 7.5.1). However, no further details are provided in the law. The Minister of Environment issued two decrees in October 2017 setting procedures for project selection (No. D1-845)¹⁰³⁶ and impact assessment (No. D1-885)¹⁰³⁷. Both documents require climate impacts on a project to be assessed. Decree No. D1-885 provides more details on the assessment. The projects are to be assessed with regard to:

- Potential heatwaves and their impact on human health, agriculture, forestry, etc.
- Droughts and water sector impacts

¹⁰³³ Climate ADAPT, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/lithuania>, under 'Policy & Legal Framework', Date accessed: 07/05/2018

¹⁰³⁴ Ministry of Environment, URL: http://www.am.lt/VI/article.php3?article_id=19247, Date accessed: 07/05/2018

¹⁰³⁵ Registry of Legal Acts, URL: <https://www.e-tar.lt/portal/lt/legalAct/d55bc650617c11e7b85cfdc787069b42>, Date accessed: 08/05/2018

¹⁰³⁶ Registry of Legal Acts, URL: <https://www.e-tar.lt/portal/lt/legalAct/f26fcf10b30d11e7be72a4385c9bc055>, Date accessed: 08/05/2018

¹⁰³⁷ Registry of Legal Acts, URL: <https://www.e-tar.lt/portal/lt/legalAct/81ad5250be4511e79122ea2db7aeb5f0>, Date accessed: 08/05/2018

- Extreme precipitation and floods
- Strong winds and storms
- Landslides
- Changes of sea levels, cold spells and others.

The decree requires a vulnerability assessment and analysis of adaptation options, as well as a disaster risk assessment.

The Lithuanian Government Decree No. 967 (2004) on the procedures for Strategic Environmental Assessment (SEA) includes climate impact in the list of the environmental impacts to be assessed¹⁰³⁸. However, no further details are provided.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / No

A national risk assessment was coordinated by the Fire and Rescue Department under the Ministry of Interior in 2012-2013. This assessment evaluates all threats in Lithuania, including those caused by climate change. It was updated in 2015¹⁰³⁹. It is, however, unclear how the disaster risk management plans currently incorporate future climate projections. The MoE is planning on updating the national risk assessment, and disaster risk management plans will be updated in line with the results of climate projections for Lithuania. These projections, addressing four RCP scenarios, were produced by the Hydrology and Climatology Department of Vilnius University in 2013-2015.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / No

There is some indication that land use and spatial and urban policies. Work on the comprehensive national plan, setting out mandatory provisions on the requirements for the spatial structure and use of the territory and principles of protection, including climate impacts, was started in 2018¹⁰⁴⁰. No Lithuanian maritime spatial plan has yet been developed in accordance with Directive 2014/89/EU; the deadline is 31 March 2021.

In addition, there are other initiatives and guidelines being developed for the construction sector and infrastructure, which incorporate sustainable development of urban areas, such as:

¹⁰³⁸ Registry of Legal Acts, URL: <https://www.e-tar.lt/portal/lt/legalAct/TAR.0F35D6D2E316/PIywwvkmkF>, Date accessed: 08/05/2018

¹⁰³⁹ <http://climate-adapt.eea.europa.eu/countries-regions/countries/lithuania>, under 'Sectors & Actions' and under 'Assessments - Impacts and vulnerability assessments'; Documents national risk assessment: <http://www.vpgt.lt/go.php/Nacionalin%C4%97%20rizikos%20analiz%C4%97611>

¹⁰⁴⁰ Personal communication with MS contact.

- Guidelines for the expansion and development of the Lithuanian construction sector in 2015-2020, approved by the Minister of Environment (Order No D1-817, 2015), and
- A concept for the draft Infrastructure Development Law to be coordinated with public and municipal institutions and relevant non-state actors¹⁰⁴¹.

However, climate adaptation is barely mentioned in these documents; the focus is on mitigation measures.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / **In progress** / No

The Strategy for National Climate Management Policy refers to mainstreaming of climate adaptation objectives and measures in the country's economic sectors that are most climate sensitive. The Strategy lists specific adaptation measures to be implemented in agriculture, forestry, water management, energy, transport, industry and public health by 2020.

The Strategy promotes the implementation of economic measures, including tax relief, state aid measures and other instruments to achieve short-term climate adaptation goals and objectives, as well as preparing a legal framework for regulations in the transport and energy sectors and spatial planning.¹⁰⁴²

The Strategy also sets special indicative medium-term (by 2030 and 2040) and long-term (by 2050) climate adaptation goals that include continuous monitoring and survey of the most vulnerable economic sectors, such as agriculture, and ensuring their resilience. The measures for attaining these goals and objectives have been planned during the development of the Action Plans taking into account the developments at the EU and international policy level.¹⁰⁴³

The latest Action Plan includes measures that ensure the implementation of cross-sectoral and short-term climate adaptation goals and objectives. These measures mainly focus on reducing negative climate impacts on different sectors, on improving the sustainability of sectors and on improving management systems. For example, the Ministry of Health is tasked to educate doctors and other health sector employees on climate impacts, health risks and adaptation measures. The Ministry of Agriculture is tasked to implement climate adaptation measures in the forestry sector.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

¹⁰⁴¹ Registry of Legal Acts, URL: <https://e-seimas.lrs.lt/portal/legalAct/lt/TAP/22bc4db2c1a811e48799bc57840226ce> and <https://www.e-tar.lt/portal/lt/legalAct/4a443e3087a811e5b7eba10a9b5a9c5f>, Date accessed: 10/05/2018

¹⁰⁴² Ministry of Environment, URL: <http://www.am.lt/VI/en/VI/index.php#a/717>, Date accessed: 08/05/2018

¹⁰⁴³ Climate ADAPT, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/lithuania>, under 'Engaging stakeholders - Governance' and 'Sectors & Actions', Date accessed: 08/05/2018

There are some plans to mainstream adaptation into insurance or alternative instruments. For example, the Action Plan (2017-2019) includes activities related to crop and animal insurance compensation¹⁰⁴⁴.

The Strategy for National Climate Management Policy (Objective 148.2) specifically identifies the need to develop risk and crisis management instruments to respond to economic effects of climate impacts, taking into account: flood risk maps, flood risk management plans and early warning systems, emergency management plan, insurance and compensation mechanisms for damage to agriculture caused by natural disasters. There is no evidence that insurance schemes are available that incentivise adaptation.

9 Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In progress** / No

Adaptation policies and measures are already being implemented, as defined in the Action Plans or sectoral policy documents, such as the heat prevention action plan for 2016-2020¹⁰⁴⁵. For example:

- Upgraded mechanisms of support for agrarian environmental programmes
- Measures for afforestation of unproductive land with a view to increasing forest cover by 3–5 %¹⁰⁴⁶, and
- Measures to promote the planting of buffer strips in agricultural areas with a view to reducing water and wind erosion, and to retain water resources in the soil.

The annual 2017 implementation report of the Action Plan provides details on the measures implemented in 2017¹⁰⁴⁷. For example, the Ministry of Agriculture reported the number of studies conducted on agricultural plant species that can adapt to climate change, and the number of farmers consulted on climate adaptation. However, no details are available on the MoE website of adaptation-related actions implemented by other ministries and agencies in the framework of their own sectoral development plans (e.g. the heat prevention action plan for 2016-2020¹⁰⁴⁸) where the actions are not integral to the Action Plan. Nevertheless, the website of the Health Education and Disease Prevention Centre provides some information on the implementation of several measures in the heat prevention action plan, such as the development of guidelines on health protection in cases of extreme heat and workshops

¹⁰⁴⁴ Registry of Legal Acts, URL: <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/bfb5d0406b5311e6a421ea2bde782b94>, Date accessed: 08/05/2018

¹⁰⁴⁵ Registry of Legal Acts, URL: <https://www.e-tar.lt/portal/lt/legalAct/78ffb580a97511e5be7f919a1ebe>, Date accessed: 07/05/2018

¹⁰⁴⁶ Convention on Biological Diversity, URL: <https://www.cbd.int/financial/doc/id226-Lithuania-integration-en.pdf>, Date accessed: 08/05/2018

¹⁰⁴⁷ Ministry of Environment, URL: <http://www.am.lt/VI/index.php#a/19247>, Date accessed: 10/05/2018

¹⁰⁴⁸ Registry of Legal Acts, URL: <https://www.e-tar.lt/portal/lt/legalAct/78ffb580a97511e5be7f919a1ebe>, Date accessed: 07/05/2018

conducted on climate change and health threats¹⁰⁴⁹. The MoE has an ongoing project to develop web pages containing comprehensive climate change related information.

At the sub-national level, climate adaptation-related activities have happened as a result of EU-funded transboundary projects, such as ASTRA, BaltCICA, BalticClimate and BaltAdapt.

While adaptation measures are being implemented, it does not appear that they are yet being undertaken in all key sectors.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / No

The National Climate Change Committee is tasked with coordinating implementation of the national climate policy. It includes a representative of the Association of Local Authorities in Lithuania. The Committee usually has two annual meetings to discuss climate policy issues.

The Action Plans include a few adaptation measures which are expected to be implemented by relevant ministries in cooperation with municipalities, such as the implementation of flood risk management projects. The Action Plan obliges ministries to ensure close inter-institutional cooperation during the development and implementation of the sectoral action plans and programmes.¹⁰⁵⁰ However, no projects related to flood risk management were implemented in 2017 due to a lack of funding¹⁰⁵¹. It is, therefore, difficult to judge the effectiveness of this cooperation mechanism for catalysing implementation.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / No

The Strategy for National Climate Management Policy provides some goals and objectives related to assessing climate impacts, including the need to ensure that development of engineering infrastructure takes account of projected climate impacts¹⁰⁵².

Projects which are subject to EIA are to be assessed from an adaptation perspective. The Minister of Environment Decree No. D1-885 of 31 October 2017 setting procedures for the impact assessment requires a vulnerability assessment and analysis of adaptation options, as well as disaster risk assessment¹⁰⁵³. Recommendations for the use of innovative technologies in spatial planning and construction are prepared by the MoE. Application of climate

¹⁰⁴⁹ Health Education and Disease Prevention Centre:
http://www.smlpc.lt/lt/aplinkos_sveikata/klimatas_ir_sveikata/, Date accessed: 30/05/2018

¹⁰⁵⁰ Registry of Legal Acts, URL: <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/bfb5d0406b5311e6a421ea2bde782b94>, Date accessed: 08/05/2018

¹⁰⁵¹ Ministry of Environment, URL: http://www.am.lt/VI/article.php3?article_id=19247#r/640, Date accessed: 08/05/2018

¹⁰⁵² Ministry of Environment, URL: <http://www.am.lt/VI/index.php#a/12869>, Date accessed: 08/05/2018

¹⁰⁵³ Registry of Legal Acts, URL: <https://www.e-tar.lt/portal/lt/legalAct/81ad5250be4511e79122ea2db7aeb5f0>, Date accessed: 08/05/2018

modelling will become obligatory for newly built large public infrastructure constructions from 1 July 2022¹⁰⁵⁴. However, the guidelines for the expansion and development of the Lithuanian construction sector in 2015-2020, for example, do not directly refer to the risks of climate change or the need to climate proof major projects or programmes¹⁰⁵⁵.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / No

Lithuanian non-governmental and academic institutions are quite active in various regional climate adaptation projects, providing analysis and elaboration of adaptation options to be applied at local level. While the 2017 implementation report does not provide enough details to judge if processes are in place for ensuring stakeholder involvement in the implementation of adaptation policies and measures¹⁰⁵⁶, the Member State contact has advised¹⁰⁵⁷ that:

- Academic institutions are involved in the National Climate Change Committee
- New guidelines for municipalities on preparing climate mitigation and adaptation plans were developed by the Association of Local Authorities
- Relevant stakeholders are involved when working groups and task forces are established.

Step E: Monitoring and evaluation of adaptation activities

10 Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / No

The MoE reports on the implementation of the Action Plan annually¹⁰⁵⁸. The latest report available on the website of the MoE is for the year 2017¹⁰⁵⁹. The report contains two files (MS Word and MS Excel). The first file provides detailed information on the achievement of quantitative assessment criteria per activity. The second file provides financial details for each individual activity.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

¹⁰⁵⁴ Personal communication with MS contact.

¹⁰⁵⁵ Registry of Legal Acts, URL: <https://www.e-tar.lt/portal/lt/legalAct/4a443e3087a811e5b7eba10a9b5a9c5f>, Date accessed: 10/05/2018

¹⁰⁵⁶ Ministry of Environment, URL: <http://www.am.lt/VI/index.php#a/19247>, Date accessed: 10/05/2018

¹⁰⁵⁷ Personal communication with MS contact.

¹⁰⁵⁸ Ministry of Environment, URL: http://www.am.lt/VI/article.php?article_id=19247#r/640, Date accessed: 08/05/2018

¹⁰⁵⁹ Ministry of Environment, URL: <http://www.am.lt/VI/index.php#a/19247>, Date accessed: 08/05/2018

Sectoral climate adaptation policies and measures included in the Action Plan are monitored annually, as explained in relation to Indicator 10a¹⁰⁶⁰. The annual report compiled by the MoE, the institution responsible for implementation of climate policy in Lithuania, contains two documents. The first document provides detailed information on the achievement of quantitative assessment criteria per activity. The second document provides details on the financial performance for each individual activity. The list of individual activities includes measures implemented by the MoE as well as sectoral measures implemented by other ministries. However, as noted in relation to Indicator 9a, no details are available on the MoE website on adaptation-related actions implemented by other ministries and agencies if these actions are not part of the climate Action Plan, although such information may be reported and disseminated elsewhere, e.g. the Health Education and Disease Prevention Centre's provision of information on implementation of the heat prevention action plan on its website¹⁰⁶¹.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / No

Measures included in the Action Plan implemented by municipalities are monitored annually. They are included in the annual report of the MoE (see Indicator 10a). Municipal institutions provide the MoE with information by submitting annual activity reports, which are integrated in the annual report posted on the MoE website¹⁰⁶². These institutions also report on planned measures that could be included in the next Action Plan.¹⁰⁶³

11 Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

The outcomes of the monitoring, reporting and evaluation system feed into further development of the Action Plans and update of the Strategy for National Climate Management Policy. The Strategy does not refer to any timing for its revision or update. However, initial work on reviewing the Strategy and setting up legally binding climate mitigation and adaptation objectives for the period of 2021-2030 has started in 2018. It will include indicative mid-term measures and a long-term outlook beyond 2050¹⁰⁶⁴. The Action Plan is updated regularly with the latest update adopted in 2018¹⁰⁶⁵. In accordance with the

¹⁰⁶⁰ Climate ADAPT, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/lithuania>, under 'Assessments', Date accessed: 08/05/2018

¹⁰⁶¹ Health Education and Disease Prevention Centre:

http://www.smlpc.lt/lt/aplinkos_sveikata/klimatas_ir_sveikata/, Date accessed: 30/05/2018

¹⁰⁶² Ministry of Environment, URL: <http://www.am.lt/VI/index.php#a/19247>, Date accessed: 10/05/2018

¹⁰⁶³ Climate ADAPT, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/lithuania>, under 'Assessments', Date accessed: 10/05/2018

¹⁰⁶⁴ Personal communication with MS contact.

¹⁰⁶⁵ Registry of Legal Acts, URL: <https://www.e-tar.lt/portal/lt/legalAct/76fe2cf0122111e88456d055fb6f6244>, Date accessed: 14/05/2018

MoE 2018 Activity Plan, public procurement of services related to the update of the Strategy is planned for the 4th quarter of 2018¹⁰⁶⁶.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / No

The National Climate Change Committee is an advisory body providing comments and proposals for updating the Strategy and its Action Plan. Other stakeholders can be involved in the assessment, evaluation and review of national adaptation policy by providing comments on any proposed changes to the Strategy via the Draft Legal Acts information system and participating in hearings and workshops¹⁰⁶⁷.

¹⁰⁶⁶ Ministry of Environment, URL: <http://www.am.lt/VI/index.php#a/19248>, Date accessed: 30/05/2018

¹⁰⁶⁷ Personal communication with MS contact.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 <i>Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	<u>Yes</u> / In progress / No
2 <i>Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 <i>Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	Yes / <u>In progress</u> / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No
4 <i>Knowledge gaps</i>		
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	Yes / <u>In progress</u> / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
5	<i>Knowledge transfer</i>	
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	Yes / <u>In progress</u> / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	Yes / <u>In progress</u> / No
Step C: Identifying adaptation options		
6	<i>Identification of adaptation options</i>	
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	Yes / <u>No</u>
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	Yes / In progress/ <u>No</u>
7	<i>Funding resources identified and allocated</i>	
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	<u>Yes</u> / In progress /No
Step D: Implementing adaptation action		
8	<i>Mainstreaming adaptation in planning processes</i>	
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	Yes / <u>No</u>
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	<u>Yes</u> / No
8d	National policy instruments promote adaptation at	Yes / <u>In</u>

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	<u>progress</u> / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 <i>Implementing adaptation</i>		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	<u>Yes</u> / No
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	<u>Yes</u> / No
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	<u>Yes</u> / No
Step E: Monitoring and evaluation of adaptation activities		
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
11 <i>Evaluation</i>		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	<u>Yes</u> / No

Adaptation preparedness scoreboard for Luxembourg

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List of abbreviations

BENELUX	Belgium, Netherlands, Luxembourg
CIM	Commission Internationale de la Meuse
CIPMS	Commissions Internationales pour la Protection de la Moselle et de la Sarre
CLiSys	Climate Data Management System
ICPR	International Commission for the Protection of the Rhine
LIST	Luxembourg Institute for Science and Technology
NAS	National Adaptation Strategy
UNFCCC	United Nations Framework Convention on Climate Change

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

Luxembourg's Council of Ministers adopted a "National Adaptation Strategy on Climate Change"¹⁰⁶⁸ (NAS) in June 2011, prioritising four sectors: biodiversity, water, agriculture and forestry.

Luxembourg's NAS is not a free-standing document. Strategic considerations on adaptation are included as a section of the 2011 "Paquet Climat" (which lists 35 priority measures)¹⁰⁶⁹. The section on adaptation, the NAS, defines adaptation priorities in the four key areas mentioned above, but practical suggestions for implementing adaptation-related activities, sources of funding, attribution of responsibility for implementation and other key elements of a NAS are missing.

The 2011 NAS is currently being revised and extended, with an update expected to be published by the end of 2018 (as per Luxembourg's 7th Communication to the UNFCCC¹⁰⁷⁰). Luxembourg's Council of Ministers agreed a draft strategy on adaptation to the effects of climate change for the Grand Duchy of Luxembourg in April 2018¹⁰⁷¹, which will now be subject to stakeholder consultation¹⁰⁷². The updated NAS is expected to tackle several topics, particularly related to precipitation and water bodies, such as drinking water and agriculture. The NAS is expected to be finalised by the end of 2018.

A2. Adaptation strategies adopted at sub-national levels

Given the small size and the nature of the administrative organisation of the country, climate adaptation policy is entirely driven at national level. There is no self-governing sub-national level in Luxembourg. While there is currently no mechanism for coordinating action on climate adaptation, municipalities (or communes in French) are involved in climate mitigation policy through a Climate Pact between the State and the communes, which entered into force in January 2013¹⁰⁷³. All 102 communes of Luxembourg are engaged under the Pact. Under

¹⁰⁶⁸ Europaforum, 2011, Claude Wiseler et Marco Schank ont présenté le "paquet climat" luxembourgeois qui doit permettre d'atteindre l'objectif européen de réduction de 20 % des émissions de CO2 d'ici 2020, URL: <http://www.europaforum.public.lu/fr/actualites/2011/05/parteneriat-paquet-climat/index.html> Date accessed: May 2018

¹⁰⁶⁹ Europaforum, 2011, Claude Wiseler et Marco Schank ont présenté le "paquet climat" luxembourgeois, qui doit permettre d'atteindre l'objectif européen de réduction de 20 % des émissions de CO2 d'ici 2020, URL: <http://www.europaforum.public.lu/fr/actualites/2011/05/parteneriat-paquet-climat/index.html> Date accessed: May 2018

¹⁰⁷⁰ The Government of Luxembourg: Environment, 2018, Protection du climat. URL: <http://environnement.public.lu/fr/klima-an-energie/changement-climatique.html> Date accessed: May 2018

¹⁰⁷¹ Gouvernement du Grand-Duché du Luxembourg, 2018, https://gouvernement.lu/fr/gouvernement/pierre-gramegna/actualites.gouvernement%2Bfr%2Bactualites%2Btoutes_actualites%2Bcommuniqués%2B2018%2B04-avril%2B20-conseil-gouvernement.html Date accessed: May 2018

¹⁰⁷² Personal communication with MS contact - http://environnement.public.lu/fr/actualites/2018/juin-2018/effets_changement_climatique.html Date accessed: May 2018

¹⁰⁷³ Ministère du Développement durable et des Infrastructures, undated, Pacte Climat, URL: <http://www.pacteclimat.lu/fr> Date accessed: May 2018

this Pact, the national level can financially support communes to implement mitigation and energy efficiency measures. The Pact provides an appropriate platform for future engagement of the communes on climate adaptation.

Adaptation action plans

B1. National adaptation plan

In Luxembourg, a specific national adaptation plan (NAP) has not been adopted. However, in May 2013, the Government adopted the second Climate Action Plan¹⁰⁷⁴, which focuses on mitigation measures, and refers to the 2011 NAS. The third Climate Action Plan is under development and, according to Luxembourg's 7th National Communication to the UNFCCC, is foreseen to be adopted in 2018¹⁰⁷⁵. Section 2.7 (page 34) of the second Climate Action Plan document refers to developing an adaptation strategy. However, it has a rather narrow scope, mentioning land use, and agroforestry measures and optimising carbon storage in forests and agricultural soils¹⁰⁷⁶. The aim for the third national Climate Action Plan is for it to be a strategic document, presenting Luxembourg's strategy until 2030 and beyond.

B2. Adaptation plans adopted at sub-national level

As the national adaptation policy process is at a relatively early phase of formulation, no sub-national adaptation plans have yet been formulated. This is in line with the fact that the subnational level is not relevant for Luxembourg, except for the communes.

B3. Sectoral adaptation plans

There are limited adaptation actions embedded in sectoral strategies and action plans. River basin and flood risk management plans contain adaptation actions mostly related to flood prevention and management. Luxembourg participated in the elaboration of the Adaptation Strategy for the Rhine Basin¹⁰⁷⁷ by the International Commission for the Protection of the Rhine, which was adopted in 2015. There have also been efforts by Luxembourg to develop adaptation strategies for spatial planning¹⁰⁷⁸. Furthermore, Luxembourg has in place a sectoral

¹⁰⁷⁴ Ministère du Développement durable et des Infrastructures, 2013, 2. Nationaler Aktionsplan Klimaschutz, URL: http://www.developpement-durable-infrastructures.public.lu/fr/actualites/articles/2013/05/presentation_plan_action_climat/2_Nationaler-Aktionsplan-Klimaschutz.pdf Date accessed: May 2018

¹⁰⁷⁵ Gouvernement du Grand-Duché de Luxembourg, 2014, Programme gouvernemental, URL: <http://environnement.public.lu/fr/klima-an-energie/changement-climatique.html> Date accessed: May 2018

¹⁰⁷⁶ Ministère du Développement durable et des Infrastructures, 2013, 2. Nationaler Aktionsplan Klimaschutz, URL: http://www.developpement-durable-infrastructures.public.lu/fr/actualites/articles/2013/05/presentation_plan_action_climat/2_Nationaler-Aktionsplan-Klimaschutz.pdf Date accessed: May 2018

¹⁰⁷⁷ ICPDR, 2015, The Danube River Basin District Management Plan, URL: <https://www.icpdr.org/main/management-plans-danube-river-basin-published> Date accessed: May 2018

¹⁰⁷⁸ ESPON, 2012, Adaptation to climate change: strategies for spatial planning in Luxembourg, URL: <http://www.espon-usespon.eu/library/adaptation-to-climate-change-strategies-for-the-spatial-planning-in-luxembourg-c-change-changing-climate-changing-lives-2012> Date accessed: May 2018

strategy for international development, which includes strong support for climate adaptation efforts¹⁰⁷⁹.

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

In Luxembourg, the Ministry of Sustainable Development and Infrastructures, (Ministère du Développement durable et des Infrastructures)¹⁰⁸⁰ and within it, the Department of the Environment, is in charge of adaptation policy-making. In relation to climate change specifically, the Department of the Environment is responsible for coordinating climate change action, following international negotiations, managing the Climate and Energy Fund (Fonds climat et énergie), managing the ‘Pacte Climat’, and, adapting to climate change within the context of managing flood risk.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

There is no formal intersectoral or inter-ministerial committee currently in place for coordination of adaptation policy. Systematic coordination, including during the implementation phase of the NAS, is not yet established. However, coordination meetings and inter-ministerial consultations are held to develop the new NAS. As the NAS will define measures to be implemented for each sector, different relevant ministries will be indicated as responsible for these sectors.

In accordance with Luxembourg’s 7th National Communication to the UNFCCC (published in February 2018), the sectors covered by the NAS are: construction and housing¹⁰⁸¹, energy, forestry, infrastructure, disaster management, land planning, agriculture (including plant and cattle condition), human health, ecosystems and biodiversity, tourism, urban space, water use and water resources management, and economic activities.

¹⁰⁷⁹ The Luxembourg Government: Directorate of Development Cooperation and Humanitarian Affairs, 2014, Environnement et changement climatique, URL: <https://cooperation.gouvernement.lu/en/publications/brochure-livre/minist-affaires-etrangees-europeennes/dir-cooperation-action-humanitaire/strategies-et-orientation/strategie-environnement-et-changement-climatique.html> Date accessed: May 2018

¹⁰⁸⁰ Portail du Développement durable et des Infrastructures - Grand-Duché de Luxembourg, UR: <http://www.developpement-durable-infrastructures.public.lu/fr/index.php>, Date accessed: May 2018

¹⁰⁸¹ UNFCCC (2018). Seventh National Communication of Luxembourg under the United Nations Framework Convention on Climate Change. URL: https://unfccc.int/sites/default/files/resource/39752148_Luxembourg-NC7-1-LU_NC7_180212.pdf; https://unfccc.int/sites/default/files/resource/39752148_Luxembourg-NC7-1-LU_NC7_180212.pdf Date accessed: May 2018

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.

Yes / In progress / **No**

While there are some local-level initiatives on climate change and the Pacte Climat ensures governance at lower levels of administration (municipality), there is no evidence of a vertical coordination mechanism within the governance system for adaptation policy.

Luxembourg has no signatories to the Covenant of Mayors for Climate and Energy with regard to adaptation.

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / **No**

There was no stakeholder consultation during the development of the 2011 NAS. However, a public consultation and stakeholder involvement is foreseen during the ongoing revision of the NAS. In February 2018, Luxembourg's 7th National Communication to the UNFCCC was published, suggesting that the new NAS would be finalised in 2018. In April 2018, the Luxembourgish Council of Ministers approved the draft updated NAS and announced that stakeholders would be consulted¹⁰⁸².

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

Transboundary cooperation addresses common challenges with neighbouring countries (Belgium, France and Germany). Cooperation is mainly in the framework of the international bodies for the Rhine¹⁰⁸³, Moselle and Sarre¹⁰⁸⁴ and Meuse¹⁰⁸⁵ river basins. As an example, Luxembourg took part in the development of the Adaptation Strategy for the Rhine Basin. Moreover, within the framework of the BENELUX cooperation, working groups dedicated to climate change and transboundary impacts take place¹⁰⁸⁶, in addition to the exercises simulating different scenarios¹⁰⁸⁷.

¹⁰⁸² Personal communication with MS contact.

¹⁰⁸³ International Commission for the Protection of the Rhine, URL: <http://www.iksr.org>, Date accessed: May 2018

¹⁰⁸⁴ International Commission for the Protection of the Rhine, URL: <http://iksms-cipms.org>, Date accessed: May 2018

¹⁰⁸⁵ La Commission Internationale de la Meuse, URL: <http://www.cipm-icbm.be>, Date accessed: May 2018

¹⁰⁸⁶ BENELUX, Adaptation au changement climatique au sein du Benelux, URL: <http://www.benelux.int/fr/publications/publications/adaptation-au-changement-climatique-au-sein-du-benelux>, Date accessed: May 2018

¹⁰⁸⁷ Personal communication with MS contact.

The 2011 NAS mentioned transboundary measures (e.g. monitoring of animal diseases due to transboundary movement of animals, management of transboundary ecological corridors). The NAS also referred to the transboundary work undertaken by the international river commissions – the International Commission for the Protection of the Rhine (ICPR), Commission Internationale de la Meuse (CIM) and Commissions Internationales pour la Protection de la Moselle et de la Sarre (CIPMS).

Step B: Assessing risks and vulnerabilities to climate change

3 Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / **In progress** / No

MeteoLux, the national weather service in Luxembourg, is a department of the Aviation Administration of the Ministry of Sustainable Development and Infrastructures. MeteoLux operates one meteorological synoptic station and one aeronautical meteorological station, both located at Luxembourg airport. Climate data is recorded by MeteoLux from the Administration de la Navigation Aérienne du Luxembourg, using data collection from the Findel/Airport meteorological station (WMO ID = 06590). The station has collected all relevant meteorological variables, such as air temperature, relative humidity, precipitation, wind speed, wind direction and various radiation variables, since 1947. Further climate data is obtained through collaboration, as Luxembourg is a member of the European National Meteorological Services Network and the European Space Agency.

In addition, Luxembourg has its own hydro-climatic monitoring network, with stations maintained by the Water Agency, the Civil Defence Service and the Agriculture Technical Services Administration. This monitoring is used, for instance, to help inform the design of flood protection measures.

MeteoLux publishes monthly summaries of the weather, using as a reference period 1981-2010. Annual climate reports compare annual data to the 1961-1990 reference period and note “extremes and peculiarities”, such as the heat wave in August 2016. The Climate Data Management System (CLiSys) has been implemented by MeteoLux since 2011, allowing the import of historical data and time series.

Extreme winter flooding has been recorded for January 1993, January 2003 and January 2011. The Luxembourg Institute of Science and Technology (LIST) has also been active in researching hydrological behaviour of waterways. Furthermore, according to the 7th National Communication to the UNFCCC, the Water Agency provides flood forecasts for all Luxembourgish water courses and in cases of alert, the flood-risk website is updated every 15 minutes (including a flood report where needed)¹⁰⁸⁸. The Water Agency is responsible for all hydrometric monitoring in Luxembourg.

¹⁰⁸⁸ Flood prediction centre Luxembourg, 2018, URL: www.inondations.lu, Date accessed: May 2018

Impacts of extreme climatic events are not systematically monitored. Information on the amount of material and financial loss is only partially collected by some authorities. During environmental disasters, the Ministry of the Family sets up a Social Relief Commission ("Commission de secours sociaux demandés à la suite de catastrophes naturelles") to help victims. In the same way, the insurance commissioner has some information about the number of people compensated. However, not all affected persons make use of the Social Relief Commission or the insurance companies. The information collected, therefore, only concerns the persons who contact these two different institutions. Consequently, as not all data is being kept (e.g., on casualties or financial losses), this indicator is assessed as being 'in progress'.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / **In progress** / No

Scenarios and projections are presented in the 7th National Communication to the UNFCCC using a combination of Global and Regional Climate Models. Impacts are analysed based on the FP6 ENSEMBLES project¹⁰⁸⁹. In addition, the Luxembourg Institute of Science and Technology (LIST, previously the Centre de Recherche Public Gabriel Lippmann) is working on the detailed analysis of the high-resolution COSMO-CLM¹⁰⁹⁰ projections for Luxembourg, including for rainfall and extreme flooding. It is also intended to include data provided by the CORDEX project¹⁰⁹¹ in the analyses.

These scenarios and projections are only used to assess the environmental impacts of climate change (see Indicator 3c for references). An assessment of economic and social impacts of climate change remains to be done.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / **No**

Luxembourg's 6th National Communication to the UNFCCC (2014) mentions that "a thorough vulnerability assessment has not been done yet". The 7th Communication states that sector-based vulnerability assessments were completed through a water lens, with some cases (e.g. vegetation vulnerability) relying on models, such as used in the ENSEMBLES project. The 7th Communication also includes some vulnerability assessments focusing on human health, agriculture and forestry. Preliminary sectoral vulnerability analyses were completed for agriculture, forestry, biodiversity, drought, human health, infrastructure and economy on the basis of expert judgement. The vulnerability analysis for water and floods is more

¹⁰⁸⁹ Ministère du Développement durable et des Infrastructures, 2018, 7th National Communication of Luxembourg under the United Nations Framework Convention on Climate Change, URL: https://unfccc.int/sites/default/files/resource/39752148_Luxembourg-NC7-1-LU_NC7_180212.pdf Date accessed: May 2018

¹⁰⁹⁰ Climate Limited-area Modelling Community (2018). URL: <https://www.clm-community.eu> Date accessed: May 2018

¹⁰⁹¹ Coordinated Regional Climate Downscaling Experiment, URL: <http://www.cordex.org/> Date accessed: May 2018

sophisticated and based on monitoring data and projections from the International Commission for the Protection of the Rhine (ICPR) and the International Commission for the Protection of the Moselle and the Saar (ICPMS). A more robust climate risk and vulnerability assessment is expected in updating the NAS. The four sectors prioritised in the 2011 NAS received most attention in the vulnerability and impact assessments led at national level by the observatory for climate and environment at the Luxembourg Institute for Science and Technology (LIST)¹⁰⁹².

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

Transboundary risks have been taken into account in the water and floods sector (see Indicator 2b). Whether other sectors have considered transboundary risks remains unclear.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / In progress / **No**

Climate adaptation is a relatively new topic for the environment and climate action discourse in Luxembourg. As such, there appears to be a lack of discourse between the key stakeholders (research/science, administration, private sector) on the research priorities with regards to adaptation. Nevertheless, the 7th Communication to the UNFCCC and the ongoing update of the NAS indicate a comprehensive assessment of existing knowledge and related gaps on climate change and climate adaptation is now underway.

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / In progress / **No**

Luxembourg does not appear to have a source of information dedicated to adaptation. The Centre for Ecological Learning in Luxembourg (founded in 2010), in collaboration with Transition Luxembourg and under the umbrella of the Pacte Climat, promotes citizen participation in climate change issues. However, the focus of this effort is on raising awareness and education to achieve reduced emissions through encouraging behavioural change rather than explicitly on adaptation¹⁰⁹³.

¹⁰⁹² LIST, 2015, Observatory for climate and environment, URL: <https://www.list.lu/en/institute/rd-infrastructures/environmental-research-and-technology/observatory-for-climate-and-environment/> Date accessed: May 2018

¹⁰⁹³ Transition Network, URL: <https://transitionnetwork.org/transition-near-me/hubs/luxembourg/> Date accessed: May 2018

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / In progress / **No**

There is no evidence of regular dissemination of education and training materials specifically focused on adaptation. Nevertheless, the Centre for Ecological Learning Luxembourg (CELL) has a project focused on resilience research, indicating some consideration of climate adaptation and resilience and awareness-raising on the topic.¹⁰⁹⁴ However, systematic actions to build capacity are not carried out in a coordinated way.

Step C: Identifying adaptation options

6 Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / **No**

The 2011 NAS mentions some potential adaptation actions for the priority sectors identified: biodiversity, water, agriculture and forestry. The range and number of measures identified under each of these four sectors varies markedly. Several measures are underdeveloped or too unspecific (e.g. "conservation and restoration of wetlands"). Furthermore, it is unclear whether the measures result from risk assessments, as they appear to result from exchange of information among central administration bodies or expert groups. Nevertheless, the updated NAS expected in 2018 may improve consideration of adaptation options.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / **No**

It is not evident that the adaptation options considered have been prioritised on the basis of a robust methodology. The updated NAS expected by the end of 2018, is likely elaborate the selection of adaptation options. It is currently proposed that the new NAS will assign priority to measures according to an evaluation grid taking into account the probability of implementation as well as the degree of importance for Luxembourg¹⁰⁹⁵.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / In progress / **No**

¹⁰⁹⁴ Centre for Ecological Learning Luxembourg, URL: <https://cell.lu/all-project-list/resilience-research/>, Date accessed: May 2018

¹⁰⁹⁵ Personal communication with Member State representative.

The High Commissioner for the National Protection (HCPN) is an administration coordinating disaster risk management. It was created by a law that describes its missions¹⁰⁹⁶. However, no evidence could be found of an institutional mechanism in place to coordinate disaster risk management and climate adaptation, indicating a need for improved coherence.

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / In progress / **No**

The NAS is not backed by a specific funding allocation and commitment. No evidence could be found of adaptation-related funding for vulnerable sectors or for cross-cutting measures. While some funding for the development of green infrastructure has been made available, that is insufficient to qualify a positive assessment in relation to this indicator¹⁰⁹⁷.

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / **No**

Climate change is not mentioned in Luxembourg's 2008 law on environmental impact assessment (EIA) and strategic environmental assessment (SEA)¹⁰⁹⁸.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / No

Floods present the most significant natural disaster risk in Luxembourg. Early-warning systems are in place for flood hazards, with outreach to communities and a specific website as a communication platform¹⁰⁹⁹. The Flood Risk Management Plan (2015-2021) has taken account of climate scenarios (e.g. the COSMO-CLM 4.8 simulation)¹¹⁰⁰.

¹⁰⁹⁶ Journal Officiel du Grand-Duché de Luxembourg, 2016, Loi du 23 juillet 2016 portant création d'un Haut-Commissariat à la Protection nationale, URL: <http://data.legilux.public.lu/file/eli-etat-leg-memorial-2016-137-fr-pdf.pdf> Date accessed: May 2018

¹⁰⁹⁷ Biodiversity Information System for Europe, 2018, Green Infrastructure in Luxembourg, URL: <https://biodiversity.europa.eu/countries/gi/luxembourg> Date accessed: May 2018

¹⁰⁹⁸ Environmental legislation in Luxembourg, URL: <http://data.legilux.public.lu/file/eli-etat-leg-memorial-2008-82-fr-pdf.pdf> <http://data.legilux.public.lu/file/eli-etat-leg-memorial-2008-82-fr-pdf.pdf>, Date accessed: May 2018

¹⁰⁹⁹ URL: www.inondations.lu Date accessed: May 2018

¹¹⁰⁰ Ministry of Sustainable Development and Infrastructure, 2015, https://eau.public.lu/directive_cadre_eau/directive_inondation/1er-cycle/HWRML-PL_final/HWRM-PL_2015_final_FR_1609201.pdf Date accessed: May 2018

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / No

Formal consultations between the various government sectors take place on a regular basis, both at the ministerial level and at the level of the agents working with the various ministries. For example, government or ministry officials participate in inter-ministerial working groups in the fields of land-use planning, spatial planning and economic development. The National Nature Protection Plan was also updated in 2017, including emphasis on the multiple benefits of green infrastructure, for example, as an important measure for climate adaptation (e.g. through conservation of biodiversity and essential ecological and landscape elements to restore resilience)¹¹⁰¹. Furthermore, in 2012 a national document on spatial planning was published, which took consideration of climate change¹¹⁰².

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / In progress / No

Despite the ongoing update of the NAS, which addresses 13 different sectors¹¹⁰³, there is no indication that other national policy instruments promote adaptation at sectoral level. The Rural Development Programme 2014-2020 recognises the threats of climate change, mainly to agriculture and proposes several measures (e.g. preserve soil quality, protecting animals against heat, use resilient crops, intensification of land use). However, adaptation is not specifically addressed.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / No

No evidence could be found that adaptation is mainstreamed in insurance or alternative policy instruments to provide incentives for investments in risk prevention. However, insurance considerations are taken into account as part of the sector-based assessment in the draft updated NAS¹¹⁰⁴.

¹¹⁰¹ Biodiversity Information System for Europe, 2018, Green Infrastructure in Luxembourg, URL: <https://biodiversity.europa.eu/countries/gi/luxembourg> Date accessed: May 2018

¹¹⁰² ESPON, 2012, Adaptation to climate change – strategies for the spatial planning in Luxembourg, URL: <http://www.espon-usespon.eu/library/adaptation-to-climate-change-strategies-for-the-spatial-planning-in-luxembourg-c-change-changing-climate-changing-lives-2012> Date accessed: May 2018

¹¹⁰³ Personal communication with MS contact.

¹¹⁰⁴ Based on a preliminary check of the draft NAS, as yet unpublished.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / In progress / **No**

The second Climate Action Plan has been in place since 2013 and makes reference to the NAS. Furthermore, the third Climate Action Plan is being developed, although primarily illustrating action on from a mitigation perspective. Similarly, although the 7th National Communication to the UNFCCC presents a selection of climate change policy actions and plans at the sector level, these focus most prominently on climate mitigation.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / **No**

Systematic cooperation mechanisms for fostering adaptation at a sub-national level do not seem to be yet in place. However, cooperation at the level of local stakeholders took place in 2018 with the aim of collaboratively influencing the third Climate Action Plan, which indicates some level of local cooperation on climate change but not necessarily on adaptation¹¹⁰⁵.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / **No**

Although there are policy efforts to promote resilience through green infrastructure¹¹⁰⁶, it is unclear whether specific procedures or guidelines are available to assess potential climate impacts on the resilience of infrastructure. Nevertheless, there are funds available for investments in green infrastructure (such as in urban planning) and earmarked for the period 2017-2021, which indicate a degree of focus on its benefits for climate resilience.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / **No**

As the NAS is still being finalised, it is unclear to what extent stakeholders have been involved in the implementation of adaptation policies and measures. However, there are plans to involve stakeholders in the development of the NAS. Furthermore, there are some local-

¹¹⁰⁵ Elaboration du nouveau plan climat national: Climate Innovation Lab et "wake up" weekend le 3/4 février 2018, URL : http://environnement.public.lu/fr/actualites/2018/01/11_wakeup.html, Date accessed: May 2018

¹¹⁰⁶ Biodiversity Information System for Europe, 2018, Green Infrastructure in Luxembourg, URL: <https://biodiversity.europa.eu/countries/gi/luxembourg> Date accessed: May 2018

level organisations involved in the implementation of climate mitigation measures that could be of relevance for adaptation, e.g. Klim-Buendnis.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / **No**

Aside from the upcoming update of the NAS (see Indicator 11a), no other evidence could be found that previous NAS implementation was rigorously monitored and results disseminated.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / **No**

The legal framework and the NAS foresee the integration of climate adaptation in sectoral policies, but this is not done systematically and evidence of indicators and monitoring is not yet available.

10c. Regional, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / **No**

No evidence could be found of vertical cooperation across governance levels allowing the collection of information for monitoring adaptation action at the subnational level.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

The 2011 NAS was planned to be revised and updated for 2016 but the date was delayed until 2018. A periodic review of the NAS and action plans has not yet been established. However, the updated NAS is expected to be published by the end of 2018, which demonstrates that periodic review does in fact take place.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / **No**

While stakeholders have not yet been involved in the assessment of the NAS, they will be consulted in finalising the updated NAS¹¹⁰⁷.

¹¹⁰⁷ Personal communication with MS contact.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 <i>Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	Yes / <u>In progress</u> / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	Yes / In progress / <u>No</u>
2 <i>Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	Yes / <u>No</u>
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 <i>Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	Yes / <u>In progress</u> / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	Yes / <u>In progress</u> / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	Yes / In progress / <u>No</u>
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No
4 <i>Knowledge gaps</i>		
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	Yes / In progress / <u>No</u>

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
5	<i>Knowledge transfer</i>	
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	Yes / In progress / <u>No</u>
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	Yes / In progress / <u>No</u>
Step C: Identifying adaptation options		
6	<i>Identification of adaptation options</i>	
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	Yes / <u>No</u>
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	Yes / <u>No</u>
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	Yes / In progress / <u>No</u>
7	<i>Funding resources identified and allocated</i>	
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / In progress / <u>No</u>
Step D: Implementing adaptation action		
8	<i>Mainstreaming adaptation in planning processes</i>	
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	Yes / <u>No</u>
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	<u>Yes</u> / No
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	<u>Yes</u> / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	Yes / In progress / <u>No</u>
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 <i>Implementing adaptation</i>		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / In progress / <u>No</u>
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	Yes / <u>No</u>
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	Yes / <u>No</u>
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	Yes / <u>No</u>
Step E: Monitoring and evaluation of adaptation activities		
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
11 <i>Evaluation</i>		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	Yes / <u>No</u>

Adaptation preparedness scoreboard for Malta

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List of abbreviations

CCA	Climate Change Committee for Adaptation
CIP	Critical Infrastructure Protection
CRG	Climate Research Group
EAI	Environmental impact assessment
EDPA	Environment and Development Planning Act
ESD	Education for Sustainable Development
LCDS	Low Carbon Development Strategy
MIA	Malta International Airport
MWO	Meteorological Watch Office
NAS	National adaptation strategy
NBSAP	National Biodiversity Strategy and Action Plan
RCM	Regional climate models
RDP	Rural Development Plan
SEA	Strategic environmental assessment
SPED	Strategic Plan for the Environment and Development
UNFCCC	United Nations Framework Convention on Climate Change

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

The current national adaptation strategy (NAS)¹¹⁰⁸ was adopted in 2012, under the authority of the Ministry for Resources and Rural Affairs. The NAS outlines recommendations for climate adaptation, and indicates which government entity or authority is responsible for its implementation and the timeframes within which such policy actions should be implemented. The NAS prescribes institutional, legislative, policy, communication, research and development measures, in addition to actions related to water, agriculture, human health, tourism, financing and insurance sectors.

Malta has initiated the process of developing a national Low Carbon Development Strategy (LCDS) in accordance with requirements under the United Nations Framework Convention on Climate Change (UNFCCC), European Union legislation and the Climate Action Act, 2015 (CAP543)¹¹⁰⁹. Given, the particular specificities of the country and in view of being a vulnerable island in the Mediterranean, Malta's Low Carbon Development Strategy will also incorporate the NAS. The outcome to have the NAS within the LCDS was concluded in a scoping exercise, which was one of the phases in the process of adopting a LCDS for Malta. This is regarded as an important step in enhancing the coherence of broad policy frameworks and mainstreaming adaptation across the board. A consultation document, "Malta's Low Carbon Development Strategy: Our Vision" was published in May 2017 by the Ministry for Sustainable Development, the Environment and Climate Change¹¹¹⁰, which sets out a number of proposed broad principles for the NAS, and asks specific questions to stakeholders. While adaptation and climate resilience are mentioned in the document, they are not the focus of any of the consultation questions.

Following the publication of the vision document and public consultation in 2017, the Strategy is currently (June 2018) being developed, and to the Maltese Government anticipates that it will be finalised within two years.

A2. Adaptation strategies adopted at subnational levels

The development of adaptation strategies at subnational level is irrelevant in Malta's case.

¹¹⁰⁸ Ministry for Resources and Rural Affairs (2012), National Climate Change Adaptation Strategy, <http://msdec.gov.mt/en/Document%20Repository/Malta%20Climate%20Change%20Adaptation%20Strategy/National%20Adaptation%20Strategy.pdf>

¹¹⁰⁹ Climate Change Act, Laws of Malta Chapter 543:

<http://www.justiceservices.gov.mt/DownloadDocument.aspx?app=lom&itemid=12336&l=1>

¹¹¹⁰ MESDC (2017), Malta's Low Carbon Development Strategy: Our Vision

https://meae.gov.mt/en/Public_Consultations/MSDEC/Documents/MSDEC%20LCDS%20Vision.PDF

Adaptation action plans

B1. National adaptation plan

At the time of the development of the NAS, no separate action plan was published. Nevertheless, the NAS included measures and actions deriving from its overarching objectives. In the development of the LCDS, the addition of a specific section on national adaptation action is being considered.

B2. Adaptation plans adopted at sub-national level

Local Councils are the only sub-national level of governance. While there are 24 Local Councils from Malta shown as signatories on the Covenant of Mayors website, adaptation planning at local level is not foreseen in the NAS,

B3. Sectoral adaptation plans

The following sector documents consider adaptation issues;

- The 2nd Water Catchment Management Plan for the Maltese Islands (2016)¹¹¹¹
- The Malta National Biodiversity Strategy and Action Plan 2012-2020¹¹¹²
- The National Energy Efficiency Action Plan¹¹¹³
- The Malta's National Transport Master Plan 2025¹¹¹⁴, adopted in 2016
- The National Agricultural Policy for the Maltese Islands 2016-2025.¹¹¹⁵

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

In Malta, the Ministry for the Environment, Sustainable Development, and Climate Change is in charge of adaptation policy-making in accordance with the Climate Action Act, 2015.¹¹¹⁶ The Act stipulates that it is a duty and obligation of the Government to:

¹¹¹¹ Sustainable Energy and Water Conservation Unit Environment and Resources Authority (2016), The 2nd Water Catchment Management Plan for the Malta Water Catchment District 2015–2021: <https://energywateragency.gov.mt/en/Documents/2nd%20Water%20Catchment%20Management%20Plan%20-%20Malta.pdf>

¹¹¹² Available at: <https://www.cbd.int/doc/world/mt/mt-nbsap-01-en.pdf>

¹¹¹³ Ministry of Energy (2014), MALTA' s NATIONAL ENERGY EFFICIENCY ACTION PLAN (NEEAP), https://ec.europa.eu/energy/sites/ener/files/documents/2014_neeap_en_malta.pdf

¹¹¹⁴ Transport Malta (2016), Transport Master Plan, 2025, <http://www.transport.gov.mt/transport-strategies/strategies-policies-actions/national-transport-strategy-and-master-plan>

¹¹¹⁵ https://meae.gov.mt/en/Public_Consultations/MSDEC/Documents/National%20Agricultural%20Policy%20for%20the%20Maltese%20Islands%202018%20-%202028.pdf

¹¹¹⁶ See website at: <https://msdec.gov.mt/>

- Formulate, implement, publish and update policies regarding measures to prevent, avoid, and reduce vulnerability and enhance resilience to the adverse impacts of climate change
- To facilitate climate adaptation
- To promote research and observations of the climate system.
- To promote public awareness of climate change.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

In order to ensure coordination between the relevant authorities and stakeholders for the development of the NAS, the Climate Change Committee on adaptation was established in 2009. This committee provided the necessary consultations for the drafting of the NAS, which was then presented to the former Ministry for Resources and Rural Development. After approval and publication of the NAS, the coordination role was taken up by that Ministry. In 2013, an Inter-Ministerial Committee on Climate Change was established to provide a forum for a cross-sectoral approach on climate change issues, including adaptation. This committee is also the responsible body for the current coordination of the development of the LCDS.

Later in 2015, the Climate Action Act provided for the establishment of a Climate Action Board, composed of representatives of ministries responsible for a wide range of affected sectors. The Climate Action Board's functions are related mainly to the supervision of the implementation of the Act together with any regulations that shall be eventually issued there, including development and implementation of mitigation and adaptation policies. This provision is designed to strengthen efficient collaborative action involving all stakeholders. One of the functions of the Climate Action Board is also to consult with the Malta Council for Economic and Social Development on climate action, including adaptation.

Currently, the coordination of climate change policy development and implementation is under the responsibility of the Ministry for the Environment, Sustainable Development and Climate change, as established by the Climate Action Act, 2015. The implementation of climate adaptation measures is the responsibility of the relevant sectoral ministries.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / **In progress** / No

There is no regional level of subnational government in Malta. The process for development of the NAS involved effective consultation of local councils and other stakeholders. The Climate Change Consultative Council, which was proposed in the NAS as a forum for future coordination on adaptation and mitigation, has not been established. However, the role of the Climate Change Consultative Council was taken up by the Climate Action Board, as mandated in the Climate Action Act, 2015.

Local government is engaged in the development of adaptation-relevant policies in different sectors, for example in water catchment management. Twenty-four local councils are shown as signatories of the Covenant of Mayors on its website, representing 26 % of Malta's population.

Local government is part of the target audience for key planning tools in the water sector, particularly the National River Basin Management Plan¹¹¹⁷, which incorporates the Flood Risk Management Plan¹¹¹⁸; which was backed up with a number of direct meetings with stakeholder in which the development and implementation of water management measures were discussed.

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

The 2012 NAS was prepared by the Climate Change Committee for Adaptation (CCCA), a body constituted by the former Ministry for Resources and Rural Affairs in 2009. The Committee was composed of representatives of the relevant government departments and agencies, academics and other experts, the private sector, and NGOs. The national consultation process held between November 2010 and June 2011 and the exchange between the Committee and the Government resulted in the NAS¹¹¹⁹. The 2012 NAS proposed the establishment of the Climate Change Consultative Council, a body tasked to provide input to policy design, implementation and review of the NAS and the mitigation strategy. The role of the Climate Change Consultative Council was then taken up by the Climate Action Board, as established by the Climate Action Act in 2015. The chair and members of the Climate Action Board were announced in February 2016¹¹²⁰ and the function of the Board is in accordance with Regulation 11 of the Climate Action Act, as follows:

- a) "To supervise the implementation of this Act and, or any regulations made thereunder
- b) To monitor that Malta is in fulfilment of its obligations under the UNFCCC and its obligations as a Member State of the European Union
- c) To advise the Minister on the implementation of this Act and, or any regulations made thereunder and, or any international obligations relating to climate action which the Government may be bound to observe and, or any

¹¹¹⁷ See "2nd Water Catchment Management Plan", Environment and Resources Authority, 2016, downloaded at: <https://drive.google.com/file/d/1a50ui5yuv7RJsN-GpKK3DMIIQdklnF0b/view>

¹¹¹⁸ See: <https://www.energywateragency.gov.mt/wp-content/uploads/2017/12/Management-Plan-for-Extreme-Events.pdf>

¹¹¹⁹ CCCA (2010), National Climate Change Adaptation Strategy – Consultation Report, [http://msdec.gov.mt/en/Document%20Repository/Malta%20Climate%20Change%20Adaptation%20Strategy/National%20Climate%20Change%20Adaptation%20Strategy%20\(Consultation%20Report\).pdf](http://msdec.gov.mt/en/Document%20Repository/Malta%20Climate%20Change%20Adaptation%20Strategy/National%20Climate%20Change%20Adaptation%20Strategy%20(Consultation%20Report).pdf)

¹¹²⁰ Government Gazette No. 19,528 of 26 January 2016: <https://gov.mt/en/Government/Government%20Gazette/Government%20Notices/Pages/2016/01/Gov-Notices-2601.aspx?IsPrintPrev=1&IsPrintPrev=1&IsPrintPrev=1&IsPrintPrev=1>

obligation relating to climate action which the Government may be bound to observe as a Member State of the European Union

- d) To facilitate Government's adherence to the national low-carbon development strategy, the national adaptation strategy and any other strategy or policy which the Minister may issue in terms of this Act or any regulations made thereunder
- e) To make recommendations to the Minister on any matter relating to this Act or any regulations made thereunder or on any matter relating to climate action
- f) To annually report to the Minister on the progress being registered in the field of climate change
- g) To consult with the Malta Council for Economic and Social Development on any matters relating to this Act or any regulations made hereunder
- h) To carry out such other functions as may be assigned to it by the Minister."

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

While the 2012 NAS does not address transboundary challenges, Malta, together with neighbouring countries, participates in the main fora for regional cooperation on environmental and climate-related actions in the context of implementing the Barcelona Convention (The Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean) and the work of the Union for the Mediterranean which includes a focus on climate adaptation issues.

In April 2018, climate change, vulnerability and natural disasters were addressed in the Commonwealth¹¹²¹ Heads of Government Meeting Communique "Towards a Common Future¹¹²²," with a view to adoption of a Blue Charter, which is meant to protect the oceans from the effects of climate change, pollution and over fishing. Malta signalled the availability of the Commonwealth Small States Centre of Excellence¹¹²³ in offering opportunities for capacity building on ocean governance for small states of the Commonwealth.

Moreover, transnational cooperation with other Mediterranean countries and international cooperation in the area of climate science is developed and led by the University of Malta¹¹²⁴.

¹¹²¹ See: <http://thecommonwealth.org/media/press-release/commonwealth-leaders-statement-climate-action>

¹¹²² See more at: <http://thecommonwealth.org/media/news/leaders-applaud-commonwealth-blue-charter-ocean-action>

¹¹²³ A Commonwealth centre based in Malta.

¹¹²⁴ For instance, the Physical Oceanography Research Group participates in several pan European projects and networks, some of which relevant to climate adaption such as MedGLOSS (the Mediterranean regional subsystem of the Global Sea Level Observing System with a local station for real-time sea level, sea temperature and atmospheric pressure measurements in Portomaso),

<http://www.um.edu.mt/science/geosciences/physicaloceanography>

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / **In progress** / No

Observations and forecasts on weather and climate conditions in Malta are conducted by the Malta International Airport (MIA) Meteorological Services Office¹¹²⁵ (Met Office).

The Met Office provides meteorological services to various stakeholders. The Met Office maintains a continuous observation and forecasting service with the function of a Meteorological Watch Office (MWO). Detailed weather information is also issued by this service provider, within the airspace covering the Maltese territory. Observations are conducted on a mandatory basis and these are provided by the automatic weather stations located across the islands.

The University of Malta carries out academic research and climate observation. It feeds data to the Sea Level Station Monitoring Facility that aims to provide (i) information about the operational status of global and regional networks of real time sea-level stations, and (ii) a display service for quick inspection of the raw data stream from individual stations¹¹²⁶. The Climate Research Group (CRG) within the University of Malta, Department of Geosciences, has installed a numerical weather prediction model called WRF, which makes forecasts over the Maltese Islands, and two regional climate models (RCM) called PRECIS and RegCM4 on the super computer cluster, ALBERT, available at the University of Malta.

Climate impacts on Maltese society are not monitored yet.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / **In progress** / No

The NAS notes that it is difficult “to model climate change and adaptation scenarios on a geographical terrain as small as Malta.” The NAS relied on model runs used for the 2nd National Communication to the UNFCCC (2010). The national communication to the UNFCCC from 2014, continued to refer to these projections, while noting that there was then ongoing work at the University of Malta to adapt the modelling system to the needs of Malta with regards to projecting climate impacts¹¹²⁷. The 7th National Communication¹¹²⁸ presents

¹¹²⁵ <https://www.maltairport.com/weather/>

¹¹²⁶ See the Sea Level Station Monitoring Facility website:
<http://www.ioc-sealevelmonitoring.org/index.php>

¹¹²⁷ The Malta Resources Authority on behalf of the Ministry for Sustainable Development, Environment and Climate Change (2014), The Third, Fourth, Fifth and Sixth National Communication of Malta to the United National Framework Convention on Climate Change:
https://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/mlt_nc3,4,5,6.pdf

results based on a higher resolution RCM, although it notes that specific problems remain, including the lack of integrated sea-level rise projections.

The “Our Vision” consultation document from 2017 (see Section A1 above) refers briefly to the need “to create the appropriate governance framework through which Malta is able to react to anticipated climate change scenarios that are likely to test its resilience up to 2050”; but no information is available yet on the use of scenarios in the revised NAS currently under preparation.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / **In progress** / No

The 2014 National Communication to the UNFCCC draws relevant sectoral lessons on risk from the data available. Sectors addressed in the 7th National Communication Plan to the UNFCCC (Pages 125- 161) include the following:

- Water
- Infrastructure and land use
- Natural ecosystems
- Agriculture and fisheries
- Health
- Civil protection and vulnerable groups
- Tourism
- Migration

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / In progress / **No**

While Malta relies on projections which, because of the scale issues referred to above, cover a broader Mediterranean area, there is no evidence from either the NAS or the National Communications to the UNFCCC that this has led to a more in-depth analysis or action regarding transboundary sectoral impacts. Malta’s relative geographic isolation is likely to mean that this is a low priority for early action.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / In progress / No

¹¹²⁸ 7th National Communication of Malta under the UNFCCC, Malta Resources Authority, 2017: http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/42967815_malta-nc7-1-nc7_malta_2017_final.pdf

The NAS prescribed specific measures for research and identifies relevant stakeholders for addressing them. The 2014 National Research and Innovation Strategy 2020 reaffirms the importance of research on climate change which should also 'valorise the findings and recommendations contained in Malta's Climate Change Adaptation Strategy of 2012'.

The University of Malta has an important role in generating knowledge about climate change through local and international research projects.

The University of Malta is engaged in promoting social sustainability and conducting interdisciplinary research in areas related to sustainable development and climate change, including mitigation and adaptation through the Institute for Climate Change and Sustainable Development. The Institute's main focus is to conduct research that enhances Malta's quality of life.

The Climate Change Platform was established by the Small Island States Institute of the University of Malta. Its main objectives are to facilitate collaboration between University of Malta entities and individual University of Malta academics interested in climate change issues and to promote research and teaching initiatives relating to climate change.¹¹²⁹

The "Our Vision" consultation document from 2017 (see Section A1 above) contains several references to areas where further research is seen as a priority by the Government, including desalination of water supply, and building design.

To bridge gaps in data knowledge, Malta is taking part in several projects, such as the Horizon 2020 project SOCLIMPACT¹¹³⁰. The SoClimPact project aims at modelling and assessing downscaled climate impacts and low carbon transition pathways in European islands and archipelagos, complementing current available projections for Europe, and nourishing actual economic models with non-market assessment. The project will develop a thorough understanding of potential climate impacts on the EU islands located in different regions (Cyprus and Malta; Baltic Islands, Balearic Islands, Sicilia, Sardinia, Corsica, Crete, Azores, Madeira, Canary Islands and French West Indies). The project is focused on four Blue Economy sectors: tourism, marine energy, aquaculture and marine transportation. The project is divided into eight work packages. Two of the work packages take into account climate vulnerability assessments and adaptation strategies. Once the project is completed, the recommendations should help islands in the future to address knowledge gaps in policy areas related to tourism, marine energy, aquaculture and marine transportation.

The University of Malta has carried out a LIFE demonstration project on Green Roofs LIFEMEDGREENROOF (LIFE12 ENV/MT/000732)¹¹³¹. It provided a baseline study of green roof technology in a Mediterranean environment, which aimed to reduce the carbon footprint of buildings through insulation and to use such rooves to mitigate flooding. It provided a baseline study with a set of recommendations for urban climate adaptation.

¹¹²⁹ See the Climate Change Platform website: <https://www.um.edu.mt/islands/climate>

¹¹³⁰ See: www.soclimpact.org

¹¹³¹ See: <http://www.lifemedgreenroof.org/>

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / **In progress** / No

A brief description of climate change policies and relevant documents can be found on the website of the Ministry for the Environment, Sustainable Development and Climate Change¹¹³². In the future, a specific section of the website may be developed to serve as a platform and repository of information on climate adaptation and mitigation.

The University of Malta disseminates knowledge through online media, publications, seminars, conferences and teaching programmes to the general public while also promoting best-practices to adapt to the impacts of climate change on business operations and markets¹¹³³.

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / **In progress** / No

Capacity building on climate-related activities is an ongoing activity within the Ministry for the Environment, Sustainable Development and Climate Change where a new Directorate on Environment and Climate Change was established. Currently activities related to capacity building are in place to enhance the participation in relevant courses and seminars of department employees involved in climate policy making. Further activities may be supported in the future.

Moreover, the Ministry supports development of studies on climate change at University level, providing scholarships for students of the University of Malta. Seminars are organised by the Climate Change Platform established by the Small Island States Institute of the University of Malta, in order to facilitate collaboration between University of Malta entities and individual University of Malta academics interested in climate change¹¹³⁴.

An emerging trend in university-based research is the focus on Education for Sustainable Development (ESD), which includes themes related to climate change education.

¹¹³² See: <https://msdec.gov.mt/en/Pages/Downloads.aspx>

¹¹³³ See the Institute for Climate Change and Sustainable Development website: <https://www.um.edu.mt/iccsd>

¹¹³⁴ Further information about upcoming seminars can be found at <https://www.um.edu.mt/islands/climate/newsandevents>

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

The identification of relevant climate adaptation measures in the NAS was based on expert judgement, informed by the consultative process used for the preparation of the NAS, and by sectoral reports which were drafted by designated experts specifically for the NAS development. The further analysis included in the 2014 National Communication to the UNFCCC¹¹³⁵ also identifies options for a number of sectors, as set out in relation to Indicator 3c above, although the basis on which they have been identified is unclear.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

The adaptation options identified in the current NAS were determined on the basis of expert judgement reports and stakeholder consultation. Options were chosen also based on the requirement for “no regret” choices, which would “deliver tangible environment and sustainable development results independently of climate change considerations”. The Climate Action Act lists (Article 6) a number of considerations and criteria that the Government should take into account in its decision-making on climate policy, which would effectively equate to a multi-criteria decision-making process. These criteria provide direction for the development of climate change policies.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / In progress / **No**

While the NAS does not address disaster risk management, the Malta Critical Infrastructure Protection (CIP) Unit, within the Cabinet Office at the Office of the Prime Minister, is responsible for the coordination of all Critical Infrastructure Protection and Emergency and Disaster Management issues on a national level. Another principal responsibility is to ensure that the necessary risk assessments and the drawing up of the security (contingency) plans are carried out, maintained and exercised on an ongoing basis by their respective owners/operators. In the context of the national disaster risk assessment exercise, an extensive consultation process has been undertaken by the CIP Unit involving all relevant stakeholders,

¹¹³⁵ The Malta Resources Authority on behalf of the Ministry for Sustainable Development, Environment and Climate Change (2014), The Third, Fourth, Fifth and Sixth National Communication of Malta to the United National Framework Convention on Climate Change:
https://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/mlt_nc3,4,5,6.pdf

including the Ministry for the Environment, Sustainable Development and Climate Change, as the responsible Ministry for climate change policy.

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / **In progress** / No

The 2012 NAS assesses in general terms (e.g. “low impact”, “medium impact”, “not known”, and “cost benefit impact required”) the financial impact of each measure identified, including cross-cutting actions, but does not identify funding sources, other than in cases where the future use of European funds is considered.

Malta supports several sectoral projects related to climate change through the use of EAFRD funds¹¹³⁶. Funding is also available to increase climate resilience in water management and agriculture sectors, notably in the water management sector through implementation of Malta's River Basin Management Plan for 2009-2015, and the Water Catchment Management Plan from 2011¹¹³⁷.

The second phase of the water catchment management plan will be implemented through an integrated LIFE project (IP LIFE16 IPE/MT/000008)¹¹³⁸ with a total budget of EUR 17 million and an EU contribution of EUR 10 million. This integrated project started on the 1 January 2018 and will finish on the 31st December 2025.¹¹³⁹

Another project contributing to delivery of the second River Basin Management Plan, which complements IP LIFE16 IPE/MT/000008, is the project, ‘Enhancing National Monitoring and Public Engagement Capacity for improved Water Resources Management’. This project is funded by the Cohesion Fund and amounts to EUR 21.2million which is being implemented by the Energy and Water Agency within the Ministry for Energy and Water Management. This investment aims to optimise management of water resources in the Maltese islands. The project’s actions seek to increase knowledge of the occurrence of natural water resources in the Maltese islands, and increase appreciation of the importance of water use by stakeholders. These two complementary actions will contribute to increased appreciation of the vulnerability of water resources in the Maltese islands, and to identification of the optimal tools for protecting these resources.

¹¹³⁶ Available at: http://ec.europa.eu/contracts_grants/pa/partnership-agreement-malta-summary_en.pdf

¹¹³⁷ Available at: <https://era.org.mt/en/Pages/Water-Catchment-Management-Plan.aspx>

¹¹³⁸ Available at:

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=6523#BENEF

¹¹³⁹ The development process of the second River Basin Management Plan (RBMP) has confirmed that there are still significant challenges ahead of Malta for achieving the good status objectives of the Water Framework Directive (2000/60/EC). These challenges are mainly linked to severe water scarcity and drought conditions, high population density, high urbanisation rates, saline water intrusion, contamination, and vulnerability of coastal waters.

Malta has also benefitted from EU co-financing (ERDF, ESF) for an extensive flood management project¹¹⁴⁰.

Several projects under the Operational Programme I have been approved and implemented with the aim of developing sustainability and support actions in a number of sectors.¹¹⁴¹

The Rural Development Programme 2014-2020 is focused on five main needs for the Maltese agriculture sector with a minimum of 30% of the total Rural Development Plan (RDP) budget earmarked for actions that will contribute to the achievement of EU-wide climate change targets.¹¹⁴² The competent authority has launched schemes to fund interventions aimed at addressing non-productive investments linked to the achievement of agri-environment-climate objectives, as well as direct interventions aimed at the re-use of secondary water for agricultural purposes.

Sectoral projects and initiatives with adaptation co-benefits are also sustained by budget lines, which are not necessarily explicitly designated for climate adaptation action. For example, all of the projects that are tackling water scarcity and water waste reduction are developed by the Water and Energy Ministry and related authorities and agencies with different funding sources.

A Climate Action Fund was established under the 2015 Climate Change Act, to support *inter alia* the delivery of the Act's objectives. However, no information is available on the Ministry's website on the operation of the fund, or of activities financed under it, so it is not possible to assess its contribution to the delivery of adaptation actions.

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

One of the measures foreseen in the 2013 national environmental policy was to integrate climate change assessment into environmental impact assessment (EIA) and strategic environmental assessment (SEA) processes¹¹⁴³. The revised EIA Directive (2014/52/EU) has been transposed in Malta by Legal Notice 412 of the 2017 Environmental Impact Assessments Regulations, 2017¹¹⁴⁴ published under the Environment Protection Act (Chapter

¹¹⁴⁰ Available at: <https://investinyourfuture.gov.mt/project/waste-management-and-risk-prevention/national-flood-relief-project-nfrp-42041344>

¹¹⁴¹ Available at: https://eufunds.gov.mt/en/Operational%20Programmes/Programming%20Period%202014%20-%202020/Operational%20Programme%201/Documents/Approved%20Projects%202016/Online%20List%20of%20Beneficiaries_OPI%20ERDF%20Malta_PPCD_November_2016%20updated.pdf

¹¹⁴² Available at: <https://eufunds.gov.mt/en/EU%20Funds%20Programmes/European%20Agricultural%20Fund/Documents/RDP%202014-2020/Malta%27s%20Rural%20Development%20Programme%202014-2020.pdf>

¹¹⁴³ Available at: <https://era.org.mt/en/Pages/Strategic-Environmental-Assessment-.aspx>

¹¹⁴⁴ Available at: <http://www.justiceservices.gov.mt/DownloadDocument.aspx?app=lp&itemid=28859&l=1>

549), which require EIAs to consider climate-related disaster risk impacts and the impact of projects on climate adaptation.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / **No**

In 2011, the Malta Critical Infrastructure Protection Unit¹¹⁴⁵ within the Office of the Prime Minister was created.

The 2nd Water Catchment Management Plan was adopted in April 2016. It provides an integrated water management framework for the Malta Water Catchment District, and considers challenges emerging from extreme water management events, such as droughts and floods. It covers the expected climate impacts, including those related to water scarcity and invasive alien species¹¹⁴⁶.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / **No**

The NAS refers to the need to mainstream adaptation measures in the “structure plan and the local plans”. The Structure Plan for the Maltese Islands, dating from 1990, was the key land-use planning document for the country. It has now been replaced by the 2014 Strategic Plan for the Environment and Development, adopted under the Environment and Development Planning Act (EDPA) 2010. While its planning prescriptions are at a very high level, it contains a statement of the risks to climate resilience of inappropriate development. However, the plan provides little detail on how this broad approach is to be put into practice. The individual local plans still in force predate the 2010 Act but are in the process of being updated.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / **In progress** / No

There is good evidence of integration in high-level policy-making in some affected sectors. For example, Malta’s National Transport Master Plan 2025¹¹⁴⁷, adopted in 2016, identifies climate impacts, such as increased rainfall intensity and sea-level rise, as key threats for the transport infrastructure. The transport strategy refers specifically to the University of Malta’s research on potential impacts. Responses identified include increased permeability, and

¹¹⁴⁵ See: <http://opm.gov.mt/en/MCIP/Pages/About-Us.aspx>

¹¹⁴⁶ Sustainable Energy and Water Conservation Unit Environment and Resources Authority (2016), The 2nd Water Catchment Management Plan for the Malta Water Catchment District 2015 – 2021: <https://energywateragency.gov.mt/en/Documents/2nd%20Water%20Catchment%20Management%20Plan%20-%20Malta.pdf>

¹¹⁴⁷ Transport Malta (2016), Transport Master Plan, 2025, <http://www.transport.gov.mt/transport-strategies/strategies-policies-actions/national-transport-strategy-and-master-plan>

improved storm-water management. Incorporating climate impacts at the design stage is included as a policy measure. Implementation of the Transport Master Plan commitments will be ongoing until 2025.

The Strategic Plan for the Environment and Development (SPED), approved in 2015, sets the context for national and sectoral plans, such as, water and energy policies, guiding the solar farm planning policy, and ensuring that subsidiary development plans are climate proofed. The SPED policy framework for the coastal zone and marine areas recognises that development proposals therein should be aimed to increase resilience to climate impacts.

Another sector which addresses climate change as a key issue is agriculture¹¹⁴⁸. The National Agricultural Policy for the Maltese Islands 2016-2025 is currently at a post-consultation stage with a view to fostering sustainability of farming activities by adapting to the local geo-climatic conditions through the implementation of a set of measures addressing Malta's specificities.¹¹⁴⁹ The measures aim to address research and innovation, training, best practices, water scarcity, green infrastructure (rubble walls) and the preservation of indigenous species.

The Rural Development Programme (RDP) for Malta 2014-2020¹¹⁵⁰ focuses on three main cross-cutting objectives, namely the environment, climate and innovation. The RDP for Malta¹¹⁵¹ was amended on 01/03/2018 and is divided into seven priority areas. Priority Areas 4 and 5 address climate adaptation, with a set of measures covering investments in agricultural holdings, infrastructure related to agriculture, agri- environmental measures and organic farming.

Climate adaptation measures are also addressed in the National Biodiversity Strategy and Action Plan (NBSAP), which defines a comprehensive framework for safeguarding Malta's biodiversity over the period 2012 to 2020, as required by the National Environmental Policy. The NBSAP aims to promote sustainable and more resource-efficient choices and actions by local communities and relevant sectors in order to contribute to a significant improvement in the status of Malta's biodiversity and associated ecosystem services. Ecologically-sensitive afforestation schemes, strategically located within the landscape, and measures on green infrastructure, are strengthened to improve the ecological coherence of Natura 2000 via integration into the broader landscape. Hence, such schemes curb habitat fragmentation, improve climate adaptation and aid integrated flood management.¹¹⁵²

¹¹⁴⁸ Ministry for Sustainable Development, the Environment and Climate Change (2016), National Agricultural Policy for the Maltese Islands 2016 – 2025: Issues Paper: https://socialdialogue.gov.mt/en/Public_Consultations/MSDEC/Pages/Consultations/NationalAgriculturalPolicyfortheMalteseIslands2016-2025IssuesPaper.aspx

¹¹⁴⁹ Available at: <https://agriculture.gov.mt/en/agric/Pages/nationalAgriPolicy.aspx>

¹¹⁵⁰ Available at: <https://eufunds.gov.mt/en/EU%20Funds%20Programmes/European%20Agricultural%20Fund/Pages/Rural%20Development%20Programme%20for%20Malta%202007-2013/The-Rural-Development-Programme-for-Malta-2014---2020.aspx>

¹¹⁵¹ Available at: https://eufunds.gov.mt/en/EU%20Funds%20Programmes/European%20Agricultural%20Fund/Documents/RDP%202014-2020/Programme_2014MT06RDNP001_3_1_en.pdf

¹¹⁵² Available at: <https://www.cbd.int/doc/world/mt/mt-nbsap-01-en.pdf>

The Green Economy Action Plan (2015)¹¹⁵³ sets out the Government's vision for the green economy in Malta, focusing particularly on achieving sustainable growth, the effective use of resources, ensuring ecosystem resilience. Climate adaptation considerations are integrated throughout the document and a resilient economy to climate change is one of the six points of the Government's vision.

Other sectoral documents consider climate impacts with regard to different sectors' needs. For example, climate change is a key issue identified in Malta's strategic plan for environment and development¹¹⁵⁴. The national environmental policy (2012) also includes adaptation objectives: its sixth objective tackles long-term sustainability issues, including enhancing the capacity of Malta to adapt to climate change.

Climate adaptation was already a focus of the Water Catchment Management Plan from 2011 for the Maltese Islands. Its successor, covering the period 2015-2021¹¹⁵⁵, also addresses climate impacts on a range of outcomes. Implementation of these plans is possible through the Integrated Life Project LIFE16 IPE/MT/000008.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

Although climate change insurance is at an early stage of development in Malta. As in other countries, discussion on this topic has taken place at national level, for example, with specific seminars organised by the University of Malta's Climate Change Platform in November 2016 with the support of the Ministry for the Environment, Sustainable Development and Climate Change. The seminars sought to address linkages with the disaster risk management sector through the participation of insurance sector representatives among several other stakeholders.

Consultations in relation to the LCDS will consider incentives for investments in risk prevention in order to provide the necessary tools for the insurance sector to address climate adaptation.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In progress** / No

The review of the NAS, as well as the definition of a new coordination and implementation structure, will be undertaken in the context of the development of the LCDS.

In the meantime, there is evidence (see in particular Indicator 8d above) that, while detailed sectoral adaptation plans have not been published, climate adaptation issues are integrated in

¹¹⁵³ Available at: <https://www.gov.mt/en/Government/Press%20Releases/Documents/pr152171a.pdf>

¹¹⁵⁴ Malta Environmental & Planning Authority (2015) Strategic Plan for Environment and Development, <http://www.mepa.org.mt/Documents/FinalVersion.pdf>

¹¹⁵⁵ Available at: <https://era.org.mt/en/Pages/Water-Catchment-Management-Plan.aspx>

other policy areas, and that specific action is being undertaken. There is a systematic attempt to ensure that the full list of specific policies and measures outlined in the NAS is being pursued through the LCDS.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / **No**

The Climate Change Consultative Council's role was taken up by the Climate Action Board. However, it should be noted that vertical coordination is not a significant issue for Malta, given the national government's responsibility for most aspects of policy and implementation, with a relatively limited role for local government.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / **No**

We have not identified any specific procedures or guidelines for assessing climate impacts on major projects or programmes and for facilitating their adaptation. However, the Climate Action Act now includes an obligation on Government to ensure that "policies, programmes and projects are, to the extent possible, designed in a manner that ensures resilience to the impacts of climate change". In theory, this creates the possibility of government decisions that do not integrate climate adaptation issues to be challenged in the courts. However, there do not appear to be any "procedures or guidelines" in place on how the obligation should be implemented.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / No

The role of the Climate Change Consultative Council is currently covered by the Climate Action Board, which has the responsibility for ensuring consultation of relevant stakeholders in the implementation of the NAS and further policy actions.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / **No**

There is no evidence of systematic collection and dissemination of information on implementation of the NAS.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

There is no evidence of central monitoring of the integration of climate adaptation into sectoral policies.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / No

Given the scale of Malta as a country and the nature of the remit of local government in Malta, implementation of adaptation action by local councils is a relatively minor issue, and such implementation is generally centralised to the central government entities.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

The Climate Action Act 2015 places a duty on the Minister to “ensure that the national adaptation strategy is reviewed and updated periodically and at least every four years.” The NAS is currently under review in the context of the development of the LCDS.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / No

The Climate Action Board has been established under the Climate Action Act 2015 and has a duty under the Act to consult with environmental stakeholders. In principle, this should provide for stakeholder involvement in the Board’s role in assessing and reviewing national adaptation policy; however, as noted above, there is no information on the activities of the Board available on the Ministry’s website.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 <i>Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	Yes / <u>In progress</u> / No
2 <i>Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 <i>Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	Yes / <u>In progress</u> / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	Yes / <u>In progress</u> / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	Yes / <u>In progress</u> / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / In progress / <u>No</u>
4 <i>Knowledge gaps</i>		
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	<u>Yes</u> / In progress / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
5	<i>Knowledge transfer</i>	
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	Yes / <u>In progress</u> / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	Yes / <u>In progress</u> / No
Step C: Identifying adaptation options		
6	<i>Identification of adaptation options</i>	
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	Yes / In progress / <u>No</u>
7	<i>Funding resources identified and allocated</i>	
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / <u>In progress</u> / No
Step D: Implementing adaptation action		
8	<i>Mainstreaming adaptation in planning processes</i>	
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	Yes / <u>No</u>
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	Yes / <u>No</u>

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	Yes/ <u>In progress</u> / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 <i>Implementing adaptation</i>		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	Yes / <u>No</u>
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	Yes / <u>No</u>
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	<u>Yes</u> / No
Step E: Monitoring and evaluation of adaptation activities		
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
11 <i>Evaluation</i>		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	<u>Yes</u> / No

Adaptation preparedness scoreboard for The Netherlands

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List of abbreviations

CBS	Centraal Bureau voor de Statistiek (Statistics Netherlands)
DAW	Deltaplan Agrarisch Waterbeheer (Deltaplan Agrarian Water Management)
EIA	Environmental Impact Assessment
G32	The 32 largest municipalities in The Netherlands
GGD	Gemeentelijke Gezondheidsdienst (Municipal Health Service)
ICT	Information and Communication Technology
IenW	the Ministry of Infrastructure and Water Management
IPCC	International Panel on Climate Change
IPO	InterProvinciaal Overleg (Association of Provinces of The Netherlands)
KNMI	Koninklijk Nederlands Meteorologisch Instituut (Royal Netherlands Meteorological Institute)
LIWO	Landelijk Informatiesysteem Water en Overstromingen (National Information System Water and Floods)
LTO	Land- en Tuinbouw Organisatie (Dutch Federation of Agriculture and Horticulture)
MER	Milieu Effect Rapportage (Environmental Impact Assessment)
MIRT	Meerjarenprogramma Infrastructuur, Ruimte en Transport (Multi-Annual Programme for Infrastructure and Transport Projects)
NAS	National Adaptation Strategy
NEN	Nederlandse Norm (Netherlands Standards Institute)
NGOs	Non-Governmental Organisations
NKWK	Nationaal Kennis- en innovatieprogramma Water en Klimaat (National Water and Climate Knowledge and Innovation Programme)
PBL	Planbureau voor de Leefomgeving (Netherlands Environmental Assessment Agency)
RIVM	Rijksinstituut voor Volksgezondheid en Milieu (Dutch National Institute for Public Health and the Environment)

SMWO	Stuurgroep Management Watercrises en Overstromingen (Steering Group Management Water Crises and Floods)
TNO	Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek (Netherlands Organisation for Applied Scientific Research)
UvW	Unie van Waterschappen (Dutch Water Authorities)
VNG	Vereniging Nederlandse Gemeenten (Association of Netherlands Municipalities)
WUR	Wageningen University and Research

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

Dutch adaptation policy comprises two main elements:

- The National Climate Adaptation Strategy 2016¹¹⁵⁶ (NAS) “Adapting with Ambition”, which sets out a general policy for tackling the effects of climate change. It is the second NAS, the first one dates from 2007.
- The Delta Programme, which was initiated in 2010 and entered into force in January 2012.

The first NAS “Make Space for Climate” was published in 2007. The Netherlands Court of Audit published a report in 2012, stating that the Dutch climate adaptation policy did not address all aspects of climate change, and that its overall coordination could be improved. The Delta Programme covered a large part of climate adaptation, but not all aspects. In 2013 the Netherlands Climate Agenda announced the development of a new NAS. The decision for a revised NAS was also taken in response to the EU Adaptation Strategy in 2013, which encouraged Member States to adopt adaptation strategies and plans, with a review of progress proposed for 2017.

The NAS2016 aims at broad climate adaptation, and describes six climate impacts which are considered the most urgent to address in the Netherlands, next to water management which is covered in the Delta Programme. These six climate impacts are: heat stress; critical infrastructure, such as energy and ICT; agriculture and horticulture; nature; allergies and infections; and cascading effects.

The threat of sea-level rise combined with storm surges, coastal flooding and fluvial flooding events led to a long tradition of water management in The Netherlands. Since 1999, climate adaptation has been integral to flood resilience plans and projects in the Netherlands¹¹⁵⁷.

The Dutch Delta Programme¹¹⁵⁸ re-evaluated Dutch water management policies, land use and spatial planning in the context of a changing climate, with the aim of fully integrating climate adaptation. It focuses on three goals: flood protection, fresh water supply and resilience to heavy rainfall, drought and heat. It is built on the legal framework ‘the Delta Act on flood safety and freshwater supply’ (hereafter “the Delta Act”). The Delta Act anchors the Delta Programme, the Delta Fund and the role of the Delta Commissioner into legislation. The Delta Act entered into force on 1 January 2012.

¹¹⁵⁶ <http://ruimtelijkeadaptatie.nl/english/nas/>

¹¹⁵⁷ Haasnoot M., H. Middelkoop (2012) A history of futures: A review of scenario use in water policy studies in the Netherlands Environmental Science & Policy Volumes 19–20, May–June 2012, Pages 108-120
<https://www.sciencedirect.com/science/article/pii/S1462901112000391>

¹¹⁵⁸ Deltaprogramma <http://english.deltacommissaris.nl/>

A2. Adaptation strategies adopted at subnational levels

In 2009, the Dutch provinces signed an agreement with the national government to mainstream climate adaptation into spatial planning by 2015. Most provinces have now developed climate adaptation action programmes¹¹⁵⁹. Ten out of the twelve provinces have published key vulnerability assessments; nine have published key policy or planning documents aimed at adaptation.

A number of municipalities started to develop adaptation policies and even released local adaptation strategies, for example, the cities of Rotterdam (the Rotterdam Climate Initiative¹¹⁶⁰) and Amsterdam (Amsterdam Rainproof¹¹⁶¹). Many more examples exist, as summarised in the Spatial Adaptation portal¹¹⁶².

The National Knowledge and Innovation Programme Water and Climate (NKWK¹¹⁶³) started in 2015 and is a cooperation of governments, scientific organisations and the private sector. The partners invest in pilots, operational projects and long-term developments with the aim of adapting to climate change.

The Delta Programme, including the recently published (September 2017) Delta Plan on Spatial Adaptation, is a reflection of the close cooperation between the national government, provinces, regional water authorities and municipalities. The Association of Provinces of The Netherlands (IPO), the Association of Netherlands Municipalities (VNG) and the Dutch Water Authorities (UvW) published their Investment-Agenda¹¹⁶⁴ on 10 March 2017. This agenda contains goals, concrete objectives and actions on climate adaptation. A common priority is the mainstreaming of climate adaptation into water management, spatial planning, nature policy, agriculture and economic policy.

Adaptation action plans

B1. National adaptation plan

The implementation of the NAS is governed by a board of directors from all relevant ministries of the Dutch Government. They supervise a programme team. This programme team has delivered an implementation programme for 2018-2019¹¹⁶⁵. The programme team cooperates in networks of national, regional and local governments, NGOs, knowledge institutes and the private sector. The approach in the NAS is to provide an overview of the

¹¹⁵⁹ See for (an evaluation of 240) examples the 'quick scan climate adaptation', issued by the IPO (interprovincial assembly) on <http://www.ipo.nl/publicaties/ipo-publiceert-quick-scan-klimaatadaptatie>

¹¹⁶⁰ Rotterdam Climate Initiative <http://www.rotterdamclimateinitiative.nl/documents/2015-en-ouder/Documenten/RCI-RAS-2013-NL-LR.pdf>

¹¹⁶¹ Amsterdam Rainproof <https://www.rainproof.nl/>

¹¹⁶² Kennisportaal Ruimtelijke Adaptatie <https://ruimtelijkeadaptatie.nl/>

¹¹⁶³ The National Water and Climate Knowledge and Innovation Programme <https://waterenklimaat.nl/?lang=en>

¹¹⁶⁴ "Investeringsagenda naar een duurzaam Nederland" <https://vng.nl/onderwerpenindex/milieu-en-mobiliteit/energie-en-klimaat/nieuws/decentrale-overheden-presenteren-duurzame-investeringsagenda>

¹¹⁶⁵ Uitvoeringsprogramma 2018-2019. Nationale klimaatadaptatiestrategie (NAS), <https://www.rijksoverheid.nl/documenten/rapporten/2018/04/04/uitvoeren-met-ambitie-uitvoeringsprogramma-2018-2019-nationale-klimaatadaptatiestrategie-nas>. An English translation will be available in June/July 2018.

adaptation needs for different sectors. This approach leads to broad support from the sectors because they understand why they are expected to contribute to adaptation.

The sub-programmes¹¹⁶⁶ of the Delta Programme resulted in a set of five Delta Decisions¹¹⁶⁷ (adopted in September 2014). In autumn 2014, the Cabinet discussed the Delta Decisions further with the House of Representatives and embedded the Decisions in, among other things, the National Water Plan, the Water Act and administrative agreements with other governments.

The Delta Programme is implemented by all relevant authorities: the central government, provinces, municipalities and regional water authorities. The business community, citizens, research institutions and civil society organisations also contribute. The regional water authorities are essential for the implementation of (regional) water management and for the management and maintenance of dikes and coastal dunes. Provincial and local authorities are responsible for spatial planning, nature conservation and area development. Central government, provinces, regional water authorities and municipalities work together in the sub-programmes of the Delta Programme. Regional steering groups provide advice on decisions, strategies and measures as well as on opportunities for using an integrated approach following the common Multi-Annual Programme for Infrastructure and Transport Projects (MIRT).¹¹⁶⁸ Each year, the Delta Commissioner sends a Delta Programme to Parliament¹¹⁶⁹. This includes Delta Plans on protection against flooding and water scarcity and droughts. In September 2017, the first “Delta Plan Spatial Adaptation” was sent to Parliament.

B2. Adaptation plans adopted at sub-national level

As aforementioned, ten out of twelve provinces had published key studies and assessments of the climate impacts and vulnerabilities affecting their respective regions. The NAS2016 gave a new momentum to planning by provincial governments.¹¹⁷⁰

About half of the municipalities have published plans on climate adaptation. In many cases, groups of municipalities with similar problems work on regional (sub-provincial) adaptation plans. As a follow up to the Deltaplan Spatial Adaptation, provinces, Rijkswaterstaat, regional water authorities and municipalities will carry out an adaptation stress test and start risk dialogues in order to identify their priorities for adaptation. As of 2018, municipalities, regional water authorities and provinces are expected to cooperate in around forty regions to implement the Delta Programme Spatial Adaptation.

¹¹⁶⁶ Regionale Deltaprogramma's <http://english.deltacommissaris.nl/delta-programme/contents/regions-and-generic-topics>

¹¹⁶⁷ Vijf Deltabeslissingen <http://www.rijksoverheid.nl/onderwerpen/deltaprogramma/vijf-deltabeslissingen>

¹¹⁶⁸ Meerjarenprogramma Infrastructuur, Ruimte en Transport <https://www.mirtoverzicht.nl/mirt-overzicht-2017/het-mirt-en-duurzaamheid>

¹¹⁶⁹ Deltaprogramma 2018 <https://www.deltacommissaris.nl/deltaprogramma/deltaprogramma-2018>

¹¹⁷⁰ Deltaplan Ruimtelijke Adaptatie 2018: <https://ruimtelijkeadaptatie.nl/deltaplan-ra/>

B3. Sectoral adaptation plans

The NAS2016 incorporated the six main climate impact issues (see A1) in its implementation programme. At sectoral level, climate adaptation efforts focus on protecting vital and vulnerable functions against (future) climate impacts. Within the framework of the Delta Programme Spatial Adaptation, the programme "Vital and Vulnerable" was published and it is accompanied by a yearly progress report¹¹⁷¹. This programme focuses on the protection of vital and vulnerable functions against the consequences of flooding.

Rijkswaterstaat, the Ministry of Infrastructure and Water Management's executive arm responsible for transport infrastructure and water management, is developing a working programme for climate resilient networks: roads, waterways and water systems. As part of the programme, research to investigate the vulnerability of the highway network to climate change has been initiated. In the future, levels of acceptable risk will be established, taking into account required service levels and costs and benefits of possible measures for climate adaptation.

The Delta Plan Agrarian Water Management¹¹⁷² (DAW) was initiated by the Dutch Federation of Agriculture and Horticulture (LTO) on request of the Dutch Government. The DAW addresses water issues to support economically strong and sustainable agriculture. DAW provides for cooperation between the agricultural sector and the regional water authorities. Water-related issues addressed are: water quality, salinisation, water deficit and water surplus.

The Delta Approach Water Quality was adopted by Dutch governments, NGOs and knowledge institutes in 2016¹¹⁷³. It aims to achieve the EU Water Framework Directive's goals, and reducing water pollution.

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

In the Netherlands, the Ministry of Infrastructure and Water Management (IenW) – more specifically the Directorate General for Water and Soil¹¹⁷⁴ - is responsible for climate adaptation policy-making, including the Delta Programme. The Ministry covers the following

¹¹⁷¹ Voortgangsrapportage Vitaal en Kwetsbaar <https://www.deltacommissaris.nl/deltaprogramma/documenten/publicaties/2017/09/19/dp2018-d-derde-voortgangsrapportage-aanpak-nationale-vitale-en-kwetsbare-functies>

¹¹⁷² Deltaplan Agrarisch Waterbeheer <http://agrarischwaterbeheer.nl/content/deltaplan-agrarisch-waterbeheer>

¹¹⁷³ Delta aanpak waterkwaliteit en zoetwater <https://www.uvw.nl/publicatie/delta-aanpak-waterkwaliteit-en-zoetwater/>

¹¹⁷⁴ Climate-ADAPT country information: The Netherlands <http://climate-adapt.eea.europa.eu/countries-regions/countries/netherlands>

sectors: water and soil management, transport, infrastructure (air, road, water) and environmental protection. Furthermore, it coordinates the climate adaptation programme and communicates to the Dutch public about climate adaptation.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

As indicated above, adaptation is coordinated by the Ministry of IenW. Horizontal coordination takes place by a board of directors, representing all relevant ministries. This coordination was in place during the drafting of the NAS and is currently in place to support the implementation phase. Six other ministries were involved in the development of the NAS2016: the Ministry of Foreign Affairs, the Ministry of Justice and Security, the Ministry of the Interior and Kingdom Relations, the Ministry of Economic Affairs and Climate Policy, the Ministry of Agriculture, Nature and Food Safety and the Ministry of Health, Welfare and Sport. To support the implementation of the NAS2016, an interdepartmental support group has been formed. In addition to the various ministries, the national associations of regional and local authorities and the main research institutions, The Netherlands Environmental Assessment Agency (PBL) and The Netherlands Institute for Public Health and Environment (RIVM) are also part of the interdepartmental support group.

National climate adaptation dialogues are an important element of the NAS. Such platforms have already started, or are in preparation, on the following issues: health and heat stress, nature, insurance and climate change, built environment, and agriculture. The relevant ministries are also participating in these dialogues.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / In progress / No

Provincial governments, regional water authorities and municipalities were part of the process of formulating the NAS2016 by participating in working sessions and by commenting on draft versions of the NAS. Furthermore, representatives of the national associations of these three subnational governments IPO, UvW and VNG discussed the draft versions in meeting with the ministry and asked feedback from their members on the draft versions. The NAS2016 programme team supports the climate adaptation policy-making activities of the provinces. With this structure, vertical coordination mechanisms to support the implementation of the NAS are in place.

The VNG and IPO have brought the Covenant of Mayors to the attention of their members¹¹⁷⁵. So far 21 out of about 400 municipalities have signed up¹¹⁷⁶. A similar initiative in The Netherlands is the Climate Union (Klimaatverbond) for which 163 municipalities

¹¹⁷⁵ VNG info on Covenant of Mayors <https://vng.nl/onderwerpenindex/europa/nieuws/covenant-of-mayors-stedenbandenprogramma-klimaat>

¹¹⁷⁶ Netwerk Burgemeestersconvenant <https://www.klimaatverbond.nl/projecten/netwerk-burgemeestersconvenant>

signed up¹¹⁷⁷; this network focuses mostly on mitigation but also undertakes adaptation activities.

Municipalities follow additional initiatives to enhance climate adaptation. The Alliance of Climate Active Cities is a cooperation between the cities most actively involved in climate adaptation that has been in place for many years. This alliance shares knowledge and experiences regarding climate adaptation. The cooperation structure of the 50 largest cities of The Netherlands (G32) is active in the field of climate adaptation.¹¹⁷⁸

The Delta Programme has clear vertical coordination mechanisms. Seven regional programmes are involving regional and local governments (Rhine Estuary-Drechtsteden, Southwestern Delta, Lake IJssel region, River Rhine, River Meuse, the Coast, and the Wadden Region)¹¹⁷⁹ in flood resilience, freshwater supply and climate-resilient spatial planning. Various governance structures within the Delta Programme were established to implement the Delta Plans on Safety against Flooding, Water Supply and Spatial Adaptation.

In addition, there is a structure called the Dutch Safety Regions. These are regional platforms organising cooperation of fire brigades, police, medical services and subnational governments to respond to disasters and crises.¹¹⁸⁰ The Safety Regions cooperate closely with the Ministry of Justice and Security.

Finally, the National Knowledge network for Water and Climate change (NKWK) facilitates voluntarily cooperation between the national government, municipalities, provinces and research institutes to develop local adaptive research projects based on local and regional needs.¹¹⁸¹

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

In 2016, three national workshops were organised to support the development and adoption of the new NAS2016. In addition to the relevant ministries, the following stakeholders were closely involved in the development of the NAS2016: four provincial governments, 11 municipalities, four regional health organisations, four regional water authorities, the three associations of provinces, municipalities and regional water authorities (IPO, VNG and UvW), six research institutes (KNMI, PBL, RIVM, Deltares, WUR), 15 engineering and consultancy organisations, four NGO's, two insurance organisations, one Safety Region, and ten miscellaneous organisations among which the Dutch National Bank, Rioned (the sewerage institute) and Prorail (Railway infrastructure).

¹¹⁷⁷ Klimaatverbond leden <https://www.klimaatverbond.nl/leden/>

¹¹⁷⁸ G32 largest cities in The Netherlands <https://www.g32.nl/themagroep/duurzaamheid>

¹¹⁷⁹ Regionale Deltaprogramma's <https://english.deltacommissaris.nl/delta-programme/contents/regions-and-generic-topics>. <http://ruimtelijkeadaptatie.nl/english/nas/>

¹¹⁸⁰ Veiligheidsregio's <https://www.government.nl/documents/decrees/2010/12/17/dutch-security-regions-act-part-i>.

¹¹⁸¹ NKWK programma <http://waterenklimaat.nl/>

Furthermore, the national climate summit in October 2016 was used to consult different government levels, civil society organisations and the private sector about the new NAS. In 2017, one workshop took place and progress was published on the website of the NAS.

In the Delta Programme, stakeholders are closely involved in developing adaptation policies, both in the regional and thematic sub-programmes, as well as in the overall programme.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

The Netherlands is part of two macro-regional approaches, in which climate adaptation inter alia is addressed: the Benelux and the Wadden Sea Trilateral Cooperation.

The Benelux countries (Belgium, The Netherlands and Luxembourg) have cooperated on climate change issues since 2014¹¹⁸². In the period 2015-2016, the General Secretariat of the Benelux, in consultation with the Working Group on Climate Adaptation and other Benelux working groups, organised four exploratory workshops on climate adaptation in relation to energy, transport and mobility, public health and urban policy, and risk management. In 2017, the Benelux countries executed a joint cross-border risk analysis in the areas of transport, energy supply and/or public health. In 2018, the Benelux countries will organise ‘table top exercises’ on transboundary climate impacts.

In the context of the Trilateral Wadden Sea cooperation, Denmark, Germany and The Netherlands cooperate to protect the Wadden Sea, as an ecological unity. The guiding principle of the trilateral Wadden Sea cooperation is to achieve, as far as possible, a natural and sustainable ecosystem in which natural processes occur in an undisturbed way. Climate change and rising sea levels may seriously impact the structure, functions and biodiversity of the Wadden Sea ecosystem, as well as the safety of its inhabitants. A Task Group on Climate drafted a trilateral strategy on increasing the climate resilience of the Wadden Sea. This was adopted by the 12th Wadden Sea Conference in 2014.

Regarding cross-border nature issues, The Netherlands is involved in five Interreg projects with a focus on nature-based adaptation¹¹⁸³.

For the large rivers (Rhine, Meuse, Ems and Scheldt), international committees have existed for several decades. In these river basin committees, The Netherlands cooperates with Germany, France, Belgium, Luxemburg and Switzerland. The International Commission for the Protection of the Rhine published an adaptation strategy in 2015¹¹⁸⁴. Climate adaptation is one of the topics in the other committees; however, this is not explicitly linked to the Dutch adaptation agenda. The International Meuse Commission specifically works on adaptation to

¹¹⁸² Benelux cooperation in climate change <http://www.benelux.int/nl/nieuws/benelux-bereidt-zich-voor-op-klimaatverandering>

¹¹⁸³ One of the Interreg projects <https://www.rijkswaterstaat.nl/english/water-systems/interreg-vb-nsr-building-with-nature/index.aspx>

¹¹⁸⁴ Adaptation strategy of the International Rhine Commission http://www.iksr.org/fileadmin/user_upload/Dokumente_en/Reports/219_en.pdf

low water levels, low water quality and high-water temperatures¹¹⁸⁵. For the River Ems, Germany and The Netherlands cooperate to deliver the goals of the Water Framework Directive and the Floods Directive.¹¹⁸⁶

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / In progress / No

The Dutch meteorological institute, KNMI (Royal Netherlands Meteorological Institute), is legally obliged to provide observations on atmospheric, oceanic and terrestrial indicators; this includes data on expected extreme weather conditions. It uses red/orange/green codes to inform the general public about extreme weather events.¹¹⁸⁷

The national agency Rijkswaterstaat provides online information on water levels along the coast and in the main rivers and predicts these six hours before they occur¹¹⁸⁸.

Monitoring extreme climate events is a responsibility of the KNMI. This institute maintains long time series on, among other variables: temperature and precipitation extremes (including heatwaves and hail), and the frequency and intensity of windstorms.

The task of monitoring impacts of extreme climate events is distributed across multiple stakeholders in different sectors. In principle, the indicators can be grouped into three main categories: economic damage, damage to the environment (including nature) and to human society (including casualties). This corresponds with the PBL vulnerability assessments used in the NAS2016¹¹⁸⁹.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

The KNMI provided downscaled climate scenarios for The Netherlands in 2006 and updated 2014 scenarios for the NAS2016¹¹⁹⁰. Scenarios are available for the climatological (30-year) periods centred at 2030, 2050 and 2085. The scenarios contain a broad range of climate variables, from long-term annual average, to the frequency and intensity of climate/weather extremes. A new set of climate scenarios for The Netherlands and related products will be

¹¹⁸⁵ Meuse Commission annual report 2014, see: <http://www.meuse-maas.be/Liens/Belgique.aspx>

¹¹⁸⁶ Ems Commission <http://www.ems-eems.nl>

¹¹⁸⁷ KNMI <http://www.knmi.nl/home>

¹¹⁸⁸ Rijkswaterstaat Waterinfo: water level <http://waterinfo.rws.nl/#!/kaart/waterhoogte-t-o-v-nap/>

¹¹⁸⁹ PBL report Adaptation to climate change in the Netherlands - Studying related risks and opportunities <http://ruimtelijkeadaptatie.nl/english/nas/> and <http://www.pbl.nl/en/publications/adaptation-to-climate-change-in-the-netherlands>

¹¹⁹⁰ KNMI Klimaatscenario's <http://www.climatescenarios.nl/>

published in 2021, aligned with the sixth assessment cycle of the Intergovernmental Governmental Panel on Climate Change (IPCC) in order to deliver state-of-the-art climate information. Attention will be paid to observed trends, projection of sea-level rise, extreme precipitation, future weather and urban climate information.

The KNMI climate models are quite elaborate, especially from a geographical point of view¹¹⁹¹. In-depth description of specifications and justification of the construction of the latest scenarios can be found in the KNMI library.¹¹⁹²

Climate impacts are elaborated in the Dutch Climate Effect Atlas, which has been updated and published in September 2017¹¹⁹³. Municipalities and other actors use the Atlas to make a first assessment of possible consequences of climate change through a stress test¹¹⁹⁴.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

Vulnerability assessments are generally realised through national studies and European research projects. The most important national efforts include reports from the Delta Programme, The Netherlands Environmental Assessment Agency (PBL) and the Knowledge for Climate programme.

In 2011 a report was published on the vulnerability of vital infrastructure at national level. This resulted in a ‘dashboard’ table for the Ministry of Infrastructure and Water Management to initiate and monitor actions for the following vulnerable infrastructures: energy, telecom, drinking water, waste water treatment, health institutes, transport, chemical and nuclear facilities¹¹⁹⁵. This dashboard resulted in the programme Vitaal en Kwetsbaar (Vital and Vulnerable)¹¹⁹⁶.

PBL published a broad climate impact report in 2012 (Dutch)/2013 (English)¹¹⁹⁷, assessing the observed and projected change in climate and the impacts on about 40 indicators. This included impacts on flood safety, freshwater availability and quality, nature, agriculture, human health and tourism in The Netherlands. In 2014, PBL and its partners published a report ‘Small chances, big consequences’ on the consequences of flooding in The Netherlands

¹¹⁹¹ Climate-ADAPT country information The Netherlands <http://climate-adapt.eea.europa.eu/countries-regions/countries/netherlands>

¹¹⁹² KNMI klimaatscenario's 2014

http://www.klimaatscenarios.nl/brochures/images/KNMI14_Klimaatscenarios_folder_EN_2015.pdf

¹¹⁹³ Kennisportaal Ruimtelijke Adaptatie <http://ruimtelijkeadaptatie.nl/english/>

¹¹⁹⁴ Climate adaptation stress test:

<https://ruimtelijkeadaptatie.nl/handreiking/handreiking/weten/kwetsbaarheid/stresstest/>

¹¹⁹⁵ Kennisportaal Ruimtelijke Adaptatie dashboards

<https://ruimtelijkeadaptatie.nl/bibliotheek/@158286/dashboards> (2014)

¹¹⁹⁶ Deltaprogramma voortgangsrapportage 2018

<https://www.deltacommissaris.nl/deltaprogramma/documenten/publicaties/2017/09/19/dp2018-d-derde-voortgangsrapportage-aanpak-nationale-vitale-en-kwetsbare-functies>

¹¹⁹⁷ PBL rapport Klimaatverandering in Nederland 2012 <http://www.pbl.nl/en/publications/the-effects-of-climate-change-in-the-netherlands-2012>

to guide investments in new water infrastructure¹¹⁹⁸. In 2015 this was followed by a PBL report on climate impacts other than flooding: ‘Adaptation to climate change in The Netherlands - Studying related risks and opportunities’¹¹⁹⁹. The vulnerability of The Netherlands was assessed in the PBL report and the most urgent issues were identified. The basis for this vulnerability assessment was sectoral vulnerability studies, prepared by multiple universities and institutes across The Netherlands¹²⁰⁰. The sectors covered in the PBL report are transport and infrastructure, the power supply system, ICT networks, public health, nature, agriculture, and fishery. Prioritisation was achieved by comparing impacts and opportunities according to their probability of occurrence in the coming decades and their potential impact on economy, society and nature¹²⁰¹. These priority impacts were addressed in the NAS2016.

Decisions in the Delta Programme are underpinned by a cost-benefit analysis.

The NAS2016 is built on a three-step analysis: an effect analysis; a risk analysis; and an urgency analysis¹²⁰². Following a coordinated bottom-up process, some key actors in vulnerable sectors, such as Rijkswaterstaat (on transport infrastructure¹²⁰³) and the Ministry of Agriculture, Nature and Food Safety are initiating action on assessing climate vulnerabilities and risks in cooperation with project groups involved in drafting and carrying out the NAS.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

In 2015, the PBL summarised the worldwide climate effects and their risks and opportunities for The Netherlands¹²⁰⁴. The NAS2016 mentions the following transboundary risks: electricity infrastructure, ICT, financial systems, food production and natural ecosystems. The effects of climate change worldwide are also covered in the NAS2016. Under the heading ‘International context’ (p7) the NAS proposes several actions: export of knowledge, contributing to a European nature network, and climate-relevant investments in developing countries. Cross-border effects on nature (moving climate zones) have been investigated but are not integrated in nature policy. An adaptation dialogue on nature issues started in 2017.

The Delta Programme takes upstream effects for the River Rhine into account by assuming an expected future maximum discharge of 18,000 m³ per second at the entrance point to The Netherlands. However, it does not look at potential measures in the upstream German or Swiss parts of the river. Transnational cooperation in river floods has been taken up in the

¹¹⁹⁸ PBL rapport Kleine kansen grote gevolgen http://www.pbl.nl/sites/default/files/cms/PBL_2014_Kleine-kansen-grote-gevolgen_1031.pdf

¹¹⁹⁹ PBL rapport Adaptatie aan klimaatverandering in Nederland <http://www.pbl.nl/en/publications/adaptation-to-climate-change-in-the-netherlands>

¹²⁰⁰ Bouwstenen NAS <http://kennisvoorklimaat.nl/bouwstenenNAS>

¹²⁰¹ PBL report Adaptatie aan klimaatverandering in Nederland <http://www.pbl.nl/en/publications/adaptation-to-climate-change-in-the-netherlands>

¹²⁰² National Adaptation Strategy <https://ruimtelijkeadaptatie.nl/nas/>

¹²⁰³ See ROADAPT project <https://climate-adapt.eea.europa.eu/metadata/guidances/roadapt-guidelines-for-adaptation-of-road-infrastructure-to-climate-change>

¹²⁰⁴ PBL report Worldwide climate effects - Risks and opportunities for the Netherlands <http://www.pbl.nl/en/publications/worldwide-climate-effects-risks-and-opportunities-for-the-netherlands>

implementation of the Floods Directive, establishing hydraulic boundary conditions for the Rhine and sharing models in the Meuse and Scheldt. The international river commissions are closely involved in this issue.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / In progress / No

Two large knowledge programmes ran between 2007 and 2014: the Adaptation Programme 'Ruimte voor Klimaat'¹²⁰⁵ and 'Knowledge for Climate'¹²⁰⁶. These programmes provided a broad knowledge base for all later adaptation activities. In 2015, NKWK¹²⁰⁷ started a network in which the national government, municipalities, regional water authorities, provinces, consultancies and research institutes set up small-scale innovative projects.

Many KNMI and PBL publications (see Indicator 3c), and sectoral studies that were the basis of some PBL studies, provide the scientific underpinning to the NAS2016.¹²⁰⁸ In 2016, three national workshops on adaptation action, including identification of knowledge gaps, were attended by sectoral stakeholders from: health, security, water quality and quantity, finance, urban planning and construction, nature, insurance, agriculture, transport, and fisheries (next to many local and regional governments and research organisations). In 2017, an additional workshop was held in preparation of the NAS Implementation Plan 2018-2019. Further knowledge development is coordinated between the NAS programme team, NKWK and the Delta programme.

The Delta Programme has funding for research on flood prevention (1% of its total contribution of EUR 1 billion per year).¹²⁰⁹ The Delta Programme Spatial Adaptation continuously evaluates the existing knowledge gaps.

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / In progress / No

Since 2014, the Spatial Adaptation portal¹²¹⁰ has provided information from the Climate Effect Atlas in an accessible way to dedicated experts and professionals. Recently, information from the NAS and the Delta Programme Spatial Adaptation has been included in the portal.

¹²⁰⁵ Klimaat voor Ruimte publications [http://www.klimaatvooruimte.nl/dossiers/adaptatieprogramma-ruimte-en-klimaat-\(ARK\)](http://www.klimaatvooruimte.nl/dossiers/adaptatieprogramma-ruimte-en-klimaat-(ARK))

¹²⁰⁶ Knowledge for Climate publications <http://www.knowledgeforclimate.nl/>

¹²⁰⁷ NKWK website <http://waterenklimaat.nl/>

¹²⁰⁸ Like for example <http://kennisvoorklimaat.nl/bouwstenenNAS>

¹²⁰⁹ Climate-ADAPT country information - The Netherlands <http://climate-adapt.eea.europa.eu/countries-regions/countries/netherlands>

¹²¹⁰ Kennisportaal Ruimtelijke Adaptatie <http://ruimtelijkeadaptatie.nl/english/>

The results of the research programmes Adaptation Programme, ‘Climate changes Spatial Planning¹²¹¹’, and Knowledge for Climate¹²¹² are available from their website libraries. In addition, the Climate NL LinkedIn group (Knowledge for Climate initiative) is still active with over 1,000 members.

In 2014, the *overstroomik.nl* website¹²¹³ and an application were developed to prepare citizens for flooding by informing them what water levels to expect. Since its launch up to February 2018, the website and the app have had around 1,6 million unique visitors and more than 250,000 downloads.

The KNMI established a webpage¹²¹⁴ to provide climate information to different users. RIVM has provided information on climate adaptation on its website for several years.¹²¹⁵ A future aim is to cooperate more in the information provision in order to create a better overview for knowledge users.

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / In progress / No

There are systematic capacity-building activities, some of which are coordinated through the NAS2016, while others are included in the NAS Implementation Programme. The Climate Adaptation Services foundation, assigned by the Ministry of Infrastructure and Water Management, provides workshops for regional water authorities, provincial and local governments based on the recently updated Climate Effect Atlas¹²¹⁶. Sectors like transport (road, water, air), energy, nature protection, agriculture, cultural heritage are involved.

One example of capacity building can be found within the Delta Programme Spatial Adaptation, which contributes to curriculum development together with the universities of applied sciences¹²¹⁷.

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

¹²¹¹ Klimaat voor Ruimte programma [http://www.klimaatvoorruijnte.nl/dossiers/adaptatieprogramma-ruimte-en-klimaat-\(ARK\)](http://www.klimaatvoorruijnte.nl/dossiers/adaptatieprogramma-ruimte-en-klimaat-(ARK))

¹²¹² Kennis voor Klimaat programma <http://www.knowledgeforclimate.nl/>

¹²¹³ Overstroomik.nl (Will I flood.nl) <http://overstroomik.nl/>

¹²¹⁴ KNMI kennis en datacentrum <http://www.knmi.nl/kennis-en-datacentrum>

¹²¹⁵ RIVM klimaatverandering <http://www.rivm.nl/Onderwerpen/K/Klimaatverandering>

¹²¹⁶ Klimateffectatlas <http://www.climateadaptationservices.com/en/klimateffectatlas>

¹²¹⁷ HBO netwerk Ruimtelijke Adaptatie <https://ruimtelijkeadaptatie.nl/actueel/actueel/nieuws/2017/teach-the-teacher/>

The emphasis of the NAS2016 is to ‘build on ten years of adaptation to climate change’ in The Netherlands and to progress towards implementation of adaptation measures. In general, reports from the past are consistently used in policy making. The NAS aims at bottom up input so that all adaptation measures will be tailor-made for specific regional and local characteristics.

The Delta programme uses the following method: problem analysis > range of solutions > preferred solutions > strategic choices. The Delta Programme divided The Netherlands into six regions, which each have specific geographic characteristics: the Wadden Sea area; the western coast, the large rivers, the south-western delta (mainly the Province of Zeeland), Rijnmond-Drechtsteden, the high sandy areas (southern and eastern part of The Netherlands) and IJssel Lake. Nowadays the River Rhine and the River Meuse are the subjects of separate programmes¹²¹⁸. Solutions have been identified for the main priority hazards and sectors.

Both the NAS2016 and the Delta Programme Spatial Adaptation address examples of adaptation options in additional priority sectors. The website on spatial adaptation offers good examples on a map¹²¹⁹.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

The Dutch NAS2016 explains the decision-making process in relation to adaptation policies. The method in the NAS was 1) Climate impact analysis, 2) Risk analysis 3) Urgency analysis (to decide which risks were to be addressed first). During stakeholder workshops with many parties (including institutes like KNMI, RIVM, TNO, Wageningen Research and PBL) multiple adaptation options were compared¹²²⁰.

For four years, the Delta programme used the following method: problem analysis > range of solutions > preferred solutions > strategic choices. The Delta programme has its own extensive body of research to decide on priorities. New flood resilience norms entered into force on 1 January 2017, which are explicitly based on economic analysis of assets that need protection¹²²¹.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / In progress /No

The Dutch Safety Regions have a mandate to address disaster risk management on a regional level. They build their activities around organising regional platforms of fire brigades, police, medical services and sub-national governments to respond to disasters and crises. Their

¹²¹⁸ Regions addressed in the Delta program: see menu on <https://www.deltacommissaris.nl/>

¹²¹⁹ Good examples of spatial adaptation <https://ruimtelijkeadaptatie.nl/voorbeelden/>

¹²²⁰ NAS2016 <https://www.rijksoverheid.nl/documenten/rapporten/2016/12/02/nationale-klimaatadaptatiestrategie-2016-nas>

¹²²¹ Nieuwe Normering <http://www.hoogwaterbeschermingsprogramma.nl/Nieuwe+normering/default.aspx>

mandate is laid down in a decree¹²²², but this act does not mention climate adaptation. Nevertheless, structural cooperation between the Ministry of Infrastructure and Water Management and the Ministry of Justice and Security is in place. The Steering Group National Security is the ex officio decision-making level on the approach of the Dutch central government to policies on vital critical infrastructure. The Ministry of Infrastructure and Water Management participates in the Steering Group National Safety, as well as in different projects under this steering group.

In 2015, the programme ‘Water and Evacuation’ began with the aim to improve the preparedness of the Dutch Safety Regions to the consequences of floods due to climate change.¹²²³ Between 2015 and 2017, instruments were developed to assist the Safety Regions in their preparedness for water-related disasters, including floods. The instruments are now available.¹²²⁴ The programme is monitored by the Steering Group Management Water Crises and Floods (SMWO, Stuurgroep Management Watercrises en Overstromingen). The SMWO is part of the governance structure under the Steering Group National Security in which Dutch Safety Regions, the Ministry of Justice and Security, the Ministry of Infrastructure and Water Management and the Dutch Water Authorities, KNMI and the Ministry of Defence take part. The programme links to other programmes, such as ‘National Vital and Vulnerable Critical Infrastructure’¹²²⁵.

In addition to the cooperation described above, the Ministry of Justice and Security participated in the formulation and implementation of the NAS2016.

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / **In progress** /No

The NAS2016 does not have an implementation budget. The NAS states that funding for adaptation must be found by all partners involved in practical adaptation projects from their own budgets.

The Ministry of IenW provides funding for the KNMI scenarios, the Climate Adaptation Services foundation¹²²⁶ and the Spatial Adaptation website¹²²⁷ but it is undecided how much and for how long.

The Delta Programme is funded through the Delta Act which has made a reservation of around EUR 1 billion per year, mainly for investments and maintenance of water

¹²²² Dutch Safety Regions Act <https://www.government.nl/documents/decrees/2010/12/17/dutch-security-regions-act-part-i>

¹²²³ Programma water en evacuatie <http://www.strategische-agenda.nl/project/water-en-evacuatie/> See for the action plan: http://www.strategische-agenda.nl/wp-content/uploads/2016/01/Samenvatting_projectplan_Water_en_Evacuatie.pdf

¹²²⁴ Flood preparedness tools <http://onswater.ifv/>

¹²²⁵ Vitaal en kwetsbaar pilots See: <https://ruimtelijkeadaptatie.nl/overheden/vitaal-kwetsbaar/pilots-vitaal/> and https://www.nctv.nl/organisatie/nationale_veiligheid/vitale_infrastructuur/index.aspx

¹²²⁶ Klimateffectatlas <http://www.climateadaptationservices.com/en/klimateffectatlas>

¹²²⁷ Knowledge portal Spatial Adaptation <http://www.spatialadaptation.com/>

infrastructure, such as the reinforcement of dikes and levees and freshwater supply.¹²²⁸ A budget for climate investments under the Delta Programme has been published¹²²⁹, indicating the estimated costs of investments in adaptation measures in the identified priority fields. Recent publications shed more light on the expected expenditure of the fund, indicating that adaptation in water management related fields will cost in the order of EUR 26 billion (with a broad margin).¹²³⁰

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

The Dutch Commission on EIA (Commission MER) indicates that consideration of climate change is advisable while working on an EIA¹²³¹. The Commission MER website refers to different tests and tools with which a proper assessment can be linked to climate adaptation, such as the stress test and the Climate App, however, it is not an obligatory part of an EIA.

SEA is formally integrated in Dutch legislation but is not used much in The Netherlands¹²³².

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / No

Between 2014 and 2016, a National Information System Water and Floods (LIWO, Landelijk Informatiesysteem Water en Overstromingen)¹²³³ was developed, which provides the Dutch Safety Regions¹²³⁴ and all other stakeholders with up-to-date information on flood risk. Data sources are, amongst others, the database on floods administered by the Dutch Provinces (IPO), in accordance with the European Floods Directive.

The Steering Group Management Water Crises and Floods (Stuurgroep Management Watercrises en Overstromingen: SMWO) fosters a coordinated approach between Safety

¹²²⁸ Deltawet <https://www.rijksoverheid.nl/onderwerpen/deltaprogramma/inhoud/deltawet-deltacommissaris-en-deltafonds>.

¹²²⁹ <https://deltaprogramma2018.deltacommissaris.nl/viewer/paragraaf/1/2-deltaprogramma-/chapter/voortgang-op-basis-van-meten-weten-handelen/paragraaf/1-financiele-borging-van-het-deltaprogramma>

¹²³⁰ Financiële borging van het Deltaprogramma <https://deltaprogramma2018.deltacommissaris.nl/viewer/paragraaf/1/2-deltaprogramma-/chapter/voortgang-op-basis-van-meten-weten-handelen/paragraaf/1-financiele-borging-van-het-deltaprogramma>

¹²³¹ Integrating climate into EIA <http://www.commissiemer.nl/themas/klimaat/stand-van-zaken>

¹²³² EIA and SEA [http://www.eia.nl/en/countries/eu/netherlands+\(the\)/sea](http://www.eia.nl/en/countries/eu/netherlands+(the)/sea)

¹²³³ Landelijk Informatiesysteem Water en Overstromingen <https://professional.basisinformatie-overstromingen.nl/liwo/#> and for background information:

<https://www.helppdeskwater.nl/onderwerpen/applicaties-modellen/applicaties-per/watermanagement/watermanagement/liwo/>

¹²³⁴ Dutch Safety Regions are a cooperation of emergency services like fire brigade, police and ambulances, organized in regional teams.

Regions and regional water authorities. The Dutch Safety Regions base their plans on climate projections.

Partners in the Delta Programme (national government, provinces, municipalities and regional water authorities) and partners in the structure of the Steering Group for National Security base their plans on climate projections. Dutch climate projections are regularly updated by KNMI.

In the framework of the Delta Programme a stress test was developed to assess the resilience of municipalities against climate risks (flooding, heavy rainfall, drought and heatwaves). In 2018, all municipalities are expected to conduct the test for which they can use the Climate Effect Atlas that shows local climate projections. The result is a local risk profile that must be followed by a local adaptation policy (including safety and disaster plans)¹²³⁵.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / **No**

At the beginning of 2017, the first part of the ‘Nationale Omgevingsvisie’ was published, which includes the issue of climate change and more specifically climate adaptation. The Environment Act (Omgevingswet) is a recent law that regulates all physical activities in the environment, including economic development, transport, nature, and protection of cultural heritage. Existing laws on environmental quality, water, and spatial planning will merge into the new Act. The implementation of the new law, including the new visions by the national, regional and local authorities, will be elaborated over the next few years.

Part of the new Environment Act (and the old Spatial Planning Law) is the Water Assessment (Watertoets). In the Water Assessment, regional water authorities assess the impact of spatial plans and urban development on the water system and provide the planning authorities with advice on how to build while avoiding problems for the water system.¹²³⁶ Climate adaptation and long-term development issues are generally discussed in this Water Assessment; however, it is not an obligation to follow the advice.

There are no regulations regarding climate resilience for urban planning as yet (e.g. in relation to urban heat problems). Only pilots exist in which present ideas are implemented. However, according to the Delta Programme, Dutch municipalities are expected to execute adaptation stress tests by 2019.

There is no legal structure for maritime planning and no obligation to take climate change into account. However, in the development of policy documents for the North Sea, the expected climate impacts are taken into consideration.

¹²³⁵ De stresstest is aangekondigd in het Deltaplan RA. Zie <https://ruimtelijkeadaptatie.nl/deltaplan-ra/>. Deltaplan RA is H7 van Deltaprogramma 2018, Doorwerken aan een duurzame en veilige delta

¹²³⁶ Watertoets <https://www.rijksoverheid.nl/documenten/rapporten/2009/12/01/handreiking-watertoetsproces-3-samenwerken-aan-water-in-ruimtelijke-plannen>

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / **In progress** / No

Climate change is an important consideration in water legislation through the Delta Act, however, it is not mentioned yet in other Dutch legislation or policy. The NAS2016 states that legislative action will be discussed and prepared for 2020. Dialogues have been initiated with multiple sectors like insurance, health and nature and this may result in legislation that takes account of the need for adaptation.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

In the context of floods and dike failure, insurers studied the effect of climate change in cooperation with KNMI¹²³⁷, which led to the conclusion that premiums would become more expensive and insurers should aim at prevention measures among their clients. Although the government is bound by law to compensate damages caused by large-scale disastrous events, no evidence was found that this compensation is accompanied by incentives for adaptation on the local level.¹²³⁸

In February 14, 2017 a first adaptation dialogue with the insurance sector took place with more than 50 participants. This dialogue was organised by the Union of Insurance Companies, the Dutch National Bank (De Nederlandsche Bank) and the NAS2016 team. Participants discussed intense rainfall, flooding from rivers or the sea, hail and windstorms. The NAS Implementation Programme 2018-2019¹²³⁹ summarises the results of the adaptation dialogue with the insurance sector. Insurers and KNMI came to the conclusion that climate change may result in additional damage claims worth EUR 0.25 billion per year. Some of the follow-up actions are new insurance products, additional research, such as more precise monitoring of hail together with KNMI, and a website with climate information provided by the Union of Insurance Companies.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In progress** / No

¹²³⁷ Klimaatverandering en schadelast <https://www.verzekeraars.nl/media/1873/klimaatverandering-en-schadelast.pdf>

¹²³⁸ Wet tegemoetkoming schade bij rampen <http://wetten.overheid.nl/BWBR0009637/2016-01-01>.

¹²³⁹ Uitvoeringsprogramma 2018-2019. Nationale klimaatadaptatiestrategie (NAS), page 28-29 <https://www.rijksverheid.nl/documenten/rapporten/2018/04/04/uitvoeren-met-ambitie-uitvoeringsprogramma-2018-2019-nationale-klimaatadaptatiestrategie-nas>

The previous NAS of 2007 focused on initiating adaptation research. This led to research programmes, as described under Indicator 4, and sometimes to small pilot projects, such as the Water Square in Rotterdam¹²⁴⁰ and the spatial plan for Zuidplaspolder¹²⁴¹.

The NAS2016 was followed by an implementation plan 2018-2019 in March 2018. Priorities in the plan are: heat stress; infrastructure; agriculture; nature; and the built environment. Furthermore, the national government aims to cooperate with provincial and municipal governments towards a comprehensive set of provincial and regional adaptation strategies. The provinces of Overijssel and Noord-Brabant drafted implementation plans and are active with implementation.

Progress is reported in Annex 1 of the NAS implementation plan. Actions mostly consist of organising dialogues with sectors and lower governments (e.g. the insurance sector, municipalities that have experienced a flooding, the health sector, railways, the energy sector, etc.). The dialogues aim at formulating solutions together, for example, new insurance options or reconstructing vulnerable parts of the railway infrastructure.

In the health and wellbeing sector, a National Heat Plan of 2007 was updated in 2015¹²⁴². This plan has been used every year since 2007 and informs regional health organisations (GGDs and the Red Cross) when and how to put preventive measures in action in care homes and hospitals. KNMI and RIVM have a warning system in place with threshold values that indicate a heatwave. When a heatwave is expected all Dutch care institutions receive a warning¹²⁴³.

In the NKWK programme municipalities and regional water authorities cooperate with research institutes and consultancies in implementing innovative pilots for climate adaptation. The programme works on fourteen topics for innovation¹²⁴⁴. These pilots could be regarded as autonomous adaptation because they are initiated in a bottom up process by actors who are interested in adaptation and who finance the implementation by themselves.

In the water sector, identifying weak spots in the flood protection system and reconstructing these is an ongoing process. Climate scenarios (e.g., for 2050) have played a role in that process since 1999. For the Delta Programme, implementation formally started in 2012 and updated Delta programmes are sent to Parliament every year¹²⁴⁵.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / No

¹²⁴⁰ Water Square Rotterdam <http://www.urbanisten.nl/wp/?portfolio=waterplein-benthemplein>

¹²⁴¹ Spatial plan Zuidplaspolder <http://www.climatechangesspatialplanning.nl/research-themes/adaptation/A14>

¹²⁴² RIVM Nationaal Hitteplan 2015 <https://www.rivm.nl/dsresource?objectid=a3dd7434-836f-4d79-8a7d-4741545171ad&type=org&disposition=inline>

¹²⁴³ KNMI Nationaal Hitteplan <https://www.knmi.nl/producten-en-diensten/verhalen/Nationaal-Hitteplan-als-warm-weer-een-risico-is>

¹²⁴⁴ NKWK programma onderzoeklijnen <https://waterenklimaat.nl/onderzoeklijnen/>

¹²⁴⁵ Delta programma 2018 <https://www.deltacommissaris.nl/deltaprogramma/deltaprogramma-2018>

The NAS programme team organises national adaptation dialogues on the following issues: health and heat stress, nature, insurance and climate change, built environment, and agriculture. The ministries, other governments and other stakeholders participate in these dialogues.

The Delta Programme Spatial Adaptation organises municipalities into regions. The stress test for municipalities adds to the implementation of specific actions in a coordinated approach.

The Delta Programme works with eight regional sub-programmes: the Wadden Sea area; the western coast, the south-western delta (mainly the Province of Zeeland), the high sandy areas (Eastern part of The Netherlands), IJssel Lake, the River Rhine and the River Meuse, and the region Rijnmond-Drechtsteden (including Rotterdam). Regional partners, such as provinces, regional water authorities and municipalities, are involved in those sub-programmes.

The NKWK network is a programme where national government, municipalities, provinces and knowledge providers can voluntarily meet to develop local projects.¹²⁴⁶

Other network organisations have been established with regard to climate adaptation, such as the G32 working group on climate adaptation, the Klimaatbestendige Stad and the City Deal Climate Adaptation. They have links with national operating programmes, such as the Delta Programme.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / **No**

Presently the number of guidelines is limited. In 2013, the Manifest Climate-Adaptive Construction (Manifest Klimaatbestendige Stad) was published¹²⁴⁷. In February 2017, the Dutch association of municipalities VNG published a position paper on climate-resilient municipalities¹²⁴⁸. The NAS2016 announced that Rijkswaterstaat would investigate if guidelines for roads needed to be updated (page 26) and the same was said for RIVM about guidelines for new vectors of diseases (p28). The Dutch Standards Institute (NEN) has started to look at guidelines recently¹²⁴⁹

For the water infrastructure, new norms are under development, which not only take the water system into account but also the economic value that needs to be protected. The new norms were adopted by Parliament and senate in 2016¹²⁵⁰ and are now implemented in practice.

¹²⁴⁶ NKWK projects <http://waterenklimaat.nl/> and <http://climate-adapt.eea.europa.eu/countries-regions/countries/netherlands>

¹²⁴⁷ Manifest Klimaatbestendige Stad http://bouwenmetgroen.nl/wp-content/uploads/manifest_kbs_DEF.pdf

¹²⁴⁸ VNG position paper Klimaatbestendige gemeenten <https://vng.nl/files/vng/publicaties/2017/20170217-klimaatbestendige-gemeenten.pdf>

¹²⁴⁹ NEN institute is looking at climate adaptation <https://www.nen.nl/Standardization/Adaptation-to-Climate-Change.htm>

¹²⁵⁰ Nieuwe normering in de Eerste Kamer https://www.eerstekamer.nl/wetsvoorstel/34436_nieuwe_normering_primair

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / No

The NAS2016 programme team organises national adaptation dialogues on the following issues: health and heat stress, nature, insurance and climate change, built environment, and agriculture. The ministries, other governments and other stakeholders participate in these dialogues. The dialogues are part of the NAS2016 and of the implementation plan 2018-2019. They are an important tool because the implementation budget has to be found through these dialogues.

Stakeholder involvement has been a crucial aspect of the Delta Programme since it was first established in 2012.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / **No**

No monitoring reports have been published on the implementation of the NAS2016. In 2015 PBL published a report on how to monitor climate adaptation¹²⁵¹. The plan is for the NAS to build upon this proposal. In 2017, a plan of action on monitoring was drafted.

In addition, the Delta Programme developed a monitoring system for following its own progress¹²⁵². The system has been applied to the Delta Programme Spatial Adaptation¹²⁵³. A more comprehensive system is currently under development to also assess the progress and effectiveness of the programme. Its point of departure was a 2016 PBL report on reflexive monitoring and evaluation¹²⁵⁴.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

¹²⁵¹ PBL Ontwerp voor een nationale adaptatie monitor
<http://www.pbl.nl/sites/default/files/cms/publicaties/PBL-2015-Ontwerp-voor-een-nationale-adaptatiemonitor-1640.pdf>

¹²⁵² Deltaprogramma Systematiek Meten-weten-handelen
<https://deltaprogramma2017.deltacommissaris.nl/viewer/paragraaf/1/1-deltaprogramma-/chapter/deltabeslissingen-en-voorkeursstrategieen/paragraaf/-eerste-uitwerking-van-de-systematiek-meten-weten-handelen>

¹²⁵³ Deltaprogramma Ruimtelijke Adaptatie monitoring <https://www.deltares.nl/app/uploads/2017/02/170131-Eindrapport-Tussentijdse-Evaluatie-DBRA.pdf> zie ook het Deltares rapport uit 2015 “Resultaten van de Monitor Ruimtelijke Adaptatie” op www.ruimtelijkeadaptatie.nl

¹²⁵⁴ PBL report Keeping track of adaptation in the Dutch Delta
<http://www.pbl.nl/sites/default/files/cms/publicaties/pbl-2016-keeping-track-of-adaptation-in-the-dutch-delta-2557.pdf>

The NAS2016 has announced a monitoring system but it has not materialised as yet.

At the same time, progress reports on the implementation of the Delta Programme are being implemented, so progress on adaptation actions in the water sector is being reported.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / **No**

In 2015, PBL published a report on how to monitor climate adaptation¹²⁵⁵. The plan is for the NAS to build upon this proposal. It is not clear how sub-national adaptation will be included.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / **No**

Progress reports on the implementation of the NAS2016 will be available as of 2019. It is not decided if and with what frequency revisions of the NAS will take place.

At the same time, under the Delta Programme annual programmes have been offered to the Parliament since 2010. Delta Programme 2018 has been published, and a Delta Programme 2019 is foreseen.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / **No**

Monitoring of the NAS2016 is not yet in place and it is unclear if involving stakeholders in the processes is foreseen.

For the Delta Programme, monitoring is still under development and, although a number of expert organisations is involved in the process (such as KNMI, Deltares and CBS), these are not a reflection of the wide range of stakeholders that are affected by the Delta Programme.

¹²⁵⁵ PBL Ontwerp voor een nationale adaptatie monitor
<http://www.pbl.nl/sites/default/files/cms/publicaties/PBL-2015-Ontwerp-voor-een-nationale-adaptatiemonitor-1640.pdf>

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
<i>1 Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In Progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	<u>Yes</u> / In Progress / No
<i>2 Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
<i>3 Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	<u>Yes</u> / In progress / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No
<i>4 Knowledge gaps</i>		
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	<u>Yes</u> / In progress / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
5 <i>Knowledge transfer</i>		
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	<u>Yes</u> / In progress / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	<u>Yes</u> / In progress / No
Step C: Identifying adaptation options		
6 <i>Identification of adaptation options</i>		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	<u>Yes</u> / In Progress / No
7 <i>Funding resources identified and allocated</i>		
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / <u>In Progress</u> / No
Step D: Implementing adaptation action		
8 <i>Mainstreaming adaptation in planning processes</i>		
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	<u>Yes</u> / No
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	Yes / <u>No</u>

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	Yes / <u>In Progress</u> / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
<i>9 Implementing adaptation</i>		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In Progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	<u>Yes</u> / No
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	Yes / <u>No</u>
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	<u>Yes</u> / No
Step E: Monitoring and evaluation of adaptation activities		
<i>10 Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
<i>11 Evaluation</i>		
11a	A periodic review of the national adaptation strategy and action plans is planned	Yes / <u>No</u>
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	Yes / <u>No</u>

Adaptation preparedness scoreboard for Poland

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List of abbreviations

CF	Cohesion Fund
EAFRD	European Agricultural Fund for Rural Development
EEA	European Economic Area
EMFF	European Maritime and Fisheries Fund
ERDF	European Regional Development Fund
ESF	European Social Fund
ESIF	European Structural and Investment Funds
HELCOM	Baltic Marine Environment Protection Commission - Helsinki Commission
IMGW	Institute of Meteorology and Water Management
IOŚ-PIB	Instytut Ochrony Środowiska – Państwowy Instytut Badawczy
ISOK	System of Protection Against Extreme Hazards
MPA	Miejskie Plany Adaptacji do Zmian Klimatu (urban climate adaptation plans)
NAS	National Adaptation Strategy
OP	Operational Programme

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

The “Polish National Strategy for Adaptation to Climate Change by 2020 with the perspective by 2030” (NAS 2020)¹²⁵⁶ was adopted by the Polish Government in October 2013. Its main goal is to ensure the sustainable development of Poland in a changing climate. It links directly to the EU Adaptation Strategy. The NAS 2020 sets out strategic goals for adaptation action in several sectors considered to be particularly vulnerable to climate change in Poland, namely: water management, agriculture, forestry, biodiversity and protected areas, health, energy, building industry, transport, mountain areas, coastal zone, spatial development and urban areas. It includes legislative, organisational and information actions, as well as research programmes.

The NAS 2020, provides the high-level framework that is referred to when planning adaptation action at national, regional and local level.

Many other strategic documents, at national, regional and local levels, highlight the importance of climate adaptation in Poland (e.g. the Strategy for Responsible Development for the period up to 2020, including the perspective up to 2030¹²⁵⁷; the National Environmental Policy 2030¹²⁵⁸, and the Energy Security and Environment Strategy – perspective up to 2020¹²⁵⁹). Many of these documents were created before the adoption of the NAS 2020 in 2013 (e.g. Strategy for “Sustainable development of the countryside, agriculture and fisheries in 2012-2020”¹²⁶⁰, which explicitly mentions adaptation in rural areas as part of its five core objectives).

A2. Adaptation strategies adopted at subnational levels

The local and regional (voivodeship) authorities are free to shape their adaptation policies. The Ministry of Environment has published a guidance document concerning the preparation of urban adaptation plans in 2014. Adaptation strategies at a local level are being developed in the framework of a project conducted by the Ministry of Environment: “Development of Urban Adaptation Plans for cities with more than 100,000 inhabitants in Poland” (MPA),

¹²⁵⁶ Ministry of Environment, 2013, Polish National Strategy for Adaptation to Climate Change (NAS 2020), https://klimada.mos.gov.pl/wp-content/uploads/2014/12/ENG_SPA2020_final.pdf

¹²⁵⁷ MIIR, 2017, Strategia na rzecz Odpowiedzialnego Rozwoju do roku 2020 (z perspektywą do 2030 r.) URL: <https://www.miiir.gov.pl/media/48672/SOR.pdf>

¹²⁵⁸ Under preparation. Personal contact with MS contact.

¹²⁵⁹ According to the website of the Polish Ministry of Energy, this strategy is expected to remain in place until the end of 2018 when it will be replaced by two separate strategic documents covering Polish Energy Policy and the National Environmental Policy 2030. The new documents being prepared will be aligned with the The Strategy for Responsible Development, URL: <http://www.me.gov.pl/Energetyka/Strategia+Bezpieczenstwo+Energetyczne+i+Srodowisko>, Accessed: 16/05/2018

¹²⁶⁰ Ministry of Agriculture and Rural Development, 2012, Strategia zrównoważonego rozwoju wsi, rolnictwa i rybactwa na lata 2012-2020, URL: <http://www.minrol.gov.pl/Informacje-branzowe/Strategia-zrownowazonego-rozwoju-wsi-rolnictwa-i-rybactwa-na-lata-2012-2020/Dokumenty-analzy> The strategy is being updated.

which covers 44 major Polish cities, mainly over 100,000 residents. Warsaw's Climate Change Adaptation Strategy is being prepared as part of project ADAPTCITY¹²⁶¹, which is due to conclude in December 2018.

Adaptation action plans

B1. National adaptation plan

Poland has neither developed nor is it planning to develop a National Adaptation Action Plan. While working on the NAS, Poland has opted for a "soft-coordination model" for implementation, which is based on support, incentives, guidance, and soft measures.

B2. Adaptation plans adopted at sub-national level

In terms of climate adaptation action plans, the most prominent initiative is the "Development of Urban Adaptation Plans for cities with more than 100,000 inhabitants in Poland" (Miejskie Plany Adaptacji – MPA) project¹²⁶², which was launched in January 2017. The project aims to conduct a vulnerability assessment and relevant adaptation action planning for Polish cities (44 cities are currently covered by the project). It aims to assess the vulnerability and risks of each city to climate change, and to plan adaptation solutions, including soft and hard measures with respect to the identified hazards. All urban adaptation plans will be developed in accordance with a single methodology. The project is expected to contribute to improving the safety and quality of citizens' lives, and to support the local authorities in accessing financial resources for the investments. Urban adaptation plans will have a dynamic and open character, so it is expected to be easy to update or reshape assumptions moving forward. The project is coordinated by the Ministry of Environment, delivered by a consortium including state and private entities, and co-funded from the Cohesion Fund under the Infrastructure and Environment Operational Programme (OP) 2014-2020. The project consortium is led by the governmental research body: Institute of Environmental Protection – the National Research Institute which was in charge of NAS 2020 preparation. The project is due to end in January 2019.

Another example of adaptation policy implementation at a sub-national level is CLIMCITIES¹²⁶³ - "CLIMATE change adaptation in small and medium size CITIES"¹²⁶⁴. The project provides training to local authorities and local leaders from NGOs, media, universities and other interested stakeholders in Polish cities and towns (with population from 50,000 to 99,000 inhabitants). The training sessions are complemented by e-learning platform and an on-line library. The project started in 2017 and is supported by the European Economic Area (EEA) Grants, with a contribution from Poland's state budget. It complements the MPA project, which is dedicated to preparation of climate adaptation strategies for larger cities.

¹²⁶¹ ADAPTCITY, URL: <http://adaptcity.pl/english/about/>, Accessed: 16/05/2018

¹²⁶² MPA, URL: <http://44mpa.pl/>, Accessed: 16/05/2018

¹²⁶³ CLIMCITIES, URL: <http://climcities.ios.gov.pl/>, Accessed 16/05/2018

¹²⁶⁴ Contact with MS contact

B3. Sectoral adaptation plans

In 2015, the Polish Government amended the 2003 law on the Coastal Protection Programme¹²⁶⁵. The amendment reflected the NAS 2020 vulnerability assessment with regard to Polish coastal zones, and amplified protection of Polish coast against, among other risks, floods, erosion, and cliff degradation. Programme implementation is coordinated by the Ministry of Marine Economy.

The “Development of drought impacts prevention plans for the river basins” project¹²⁶⁶ is carried out under the Infrastructure and Environment OP 2014-2020 (Priority Axis 2.2: Environmental protection including adaptation to climate change) and co-funded by the Cohesion Fund (PLN 13,600,000 out of the total project budget of PLN 16,000,000, ca. EUR 4,000,000). The project is coordinated by the National Water Management Authority and will run between 2016 and 2020. The drought impacts prevention plans are developed by regional water management authorities. Flood risk management plans were adopted in October 2016 for three river basin districts in Poland (i.e. Odra River Basin, Vistula River Basin and Pregola River Basin¹²⁶⁷).

PKP Polskie Linie Kolejowe S.A., a company with majority stock held by the State Treasury, commissioned a study to prepare a climate adaptation plan for the Polish rail infrastructure¹²⁶⁸. The document will identify possible actions needed for good line maintenance, efficient running of trains and areas for future investment. It will cover the planning, execution, operation and maintenance of the railway lines. Impacts to be analysed will include: heavy rains and storms, strong winds, high and low temperatures, floods and landslides. The work will analyse: satellite imagery, meteorological and climatic data, existing climate scenarios up to a minimum of 2070, including IPCC scenarios. The project is expected to end in 2018.

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

¹²⁶⁵ ISAP, Ustawa z dnia 25 września 2015 r. o zmianie ustawy o ustanowieniu programu wieloletniego "Program ochrony brzegów morskich", URL:

<http://prawo.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20150001700>, Accessed: 16/05/2018

¹²⁶⁶ KZGW, URL: <http://www.kzgw.gov.pl/index.php/pl/materialy-informacyjne/opracowanie-planow-przeciwdzialania-skutkom-suszy-na-obszarach-dorzeczy>, and dedicated project website:

<http://stopsuszy.pl/en/http://stopsuszy.pl/en/>, Accessed: 16/05/2018

¹²⁶⁷ KZGW, URL: <http://www.kzgw.gov.pl/index.php/pl/materialy-informacyjne/plany-zarzadzania-ryzykiem-powodziowym> Accessed: 16/05/2018

¹²⁶⁸ Polskie Linie Kolejowe, URL: , Accessed: 16/05/2018 Polskie Linie Kolejowe, URL: <https://www.plk-sa.pl/biuro-prasowe/informacje-prasowe/przygotowanie-sieci-kolejowej-do-zmian-klimatu-3472>/<https://www.plk-sa.pl/biuro-prasowe/informacje-prasowe/przygotowanie-sieci-kolejowej-do-zmian-klimatu-3472/>, Accessed: 16/05/2018

The Ministry of Environment¹²⁶⁹ has prepared the NAS (that was subsequently adopted by the Polish Government) and is a *de facto* coordinator of adaptation action in Poland. Its role arises from its competencies in environmental protection. The Ministry of Environment prepares adaptation strategies, feeds into the Climate-ADAPT website, reports to the EC and UNFCCC, and supports adaptation initiatives, such as CLIMCITIES¹²⁷⁰, building capacity among regional and local policy makers. The Ministry fulfils most of its adaptation action through a state research institute: IOŚ-PIB (in Polish Instytut Ochrony Środowiska – Państwowy Instytut Badawczy).

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / **In progress** / No

The NAS 2020 states that in line with the multi-level governance rule and, given the horizontal character of adaptation measures, the creation of new institutions dedicated to coordination of the implementation of the NAS is not envisaged. No evidence has been identified of horizontal coordination within the governance system during the drafting of the NAS 2020.

Since June 2015, multi-level and cross-sectoral governance has been supported by a Working Group on Climate Change Adaptation¹²⁷¹. The group aims to:

- Support the implementation of the NAS 2020 and mainstreaming of adaptation at regional level by indicating directions of adaptation action to be included in the regional strategic documents that will further be reflected in the local adaptation plans
- Facilitate knowledge sharing between the levels of governance,
- Support monitoring and reporting of adaptation action at regional and local levels
- Create a cooperation and experience exchange platform between national, regional, and local stakeholders and an international cooperation platform, and
- Support implementation of the MPA project, which is dedicated to adaptation action in Polish cities (greater than 100 thousand inhabitants).

The Working Group has been created as part of a project supporting the activities of the “Partnership: Environment for growth” network, which brings together the environmental protection institutions and the EU fund-managing authorities¹²⁷². The Working Group received support under the Technical Assistance OP 2007-2013 (co-funded from the Cohesion Fund), which continues in the current programming period (2014-2020).

¹²⁶⁹ MOS, URL: <https://www.mos.gov.pl/en/>, Accessed: 16/05/2018

¹²⁷⁰ CLIMCITIES, URL: <http://climcities.ios.gov.pl/>, Accessed: 16/05/2018

¹²⁷¹ Partnerstwo Środowisko dla Rozwoju, URL: <http://sdr.gdos.gov.pl/SitePages/ZmianyKlimatu.aspx>, Accessed: 16/05/2018

¹²⁷² GDOS, URL: <http://www.gdos.gov.pl/ruszyła-grupa-robocza-ds-adaptacji-do-zmian-klimatu>, Accessed: 16/05/2018

During the preparation of strategic documents in other policy areas, the Ministry of Environment is consulted upon the potential interactions with climate adaptation policies and actions¹²⁷³.

While progress is being made on horizontal coordination the lack of clarity regarding systematic coordination and division of responsibilities means that a ‘yes’ score is not yet justified.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.

Yes / **In progress** / No

No evidence has been identified of vertical coordination within the governance system during drafting of the NAS 2020. One of the aims of the Working Group on Climate Change Adaptation (see Indicator 1b) is to support coordination between different levels of governance. The local and regional (voivodeship) authorities are free to shape their adaptation policies, so long as they are in line with national legislation. The Ministry of Environment has published a guidance document on the preparation of urban adaptation plans in 2014¹²⁷⁴ and is supporting local administration and government by coordinating preparation of adaptation plans in 44 cities through the MPA project¹²⁷⁵.

No evidence has been found of national or regional coordination of cities under the framework of the Covenant of Mayors.

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / **No**

No evidence of significant and systematic stakeholder involvement could be found with respect to the preparation of the NAS 2020. As a result of the state-run project KLIMADA, the NAS 2020 was created by staff members of the IOŚ-PIB, a governmental research institute working on environmental protection issues, and affiliated experts. The KLIMADA project website was created only after the NAS 2020 was adopted. The website’s “public dialogue” feature calls for stakeholder contributions including sharing of best practices.

Some ad-hoc stakeholder involvement is in place in the preparation of adaptation policies (see below).

¹²⁷³ Personal communication with MS contact.

¹²⁷⁴ Ministry of Environment (2014), Podręcznik adaptacji dla miast - wytyczne do przygotowania Miejskiego Planu Adaptacji do zmian klimatu. https://www.mos.gov.pl/fileadmin/user_upload/Podrecznik-adaptacji-dla-miast.pdf

¹²⁷⁵ MPA, URL: <http://44mpa.pl/miejskie-plany-adaptacji/>, Accessed: 16/05/2018

The abovementioned Working Group on Climate Change Adaptation can be seen as a stakeholder involvement platform even if limited in scope. The Working Group's meetings are, in principle, open to participants who are not registered in the network. However, their participation has to be approved beforehand by the chair of the Working Group. External participants join the sessions "very rarely". By the end of April 2017, six sessions of the Working Group had taken place, with only three formal interventions from non-public authorities: the floor was open to one university, one private company (presenting experience from an urban adaptation project in Radom), and a foundation dedicated to sustainable development¹²⁷⁶.

There are sporadic cases of structured stakeholder engagement, such as the ongoing public consultation of the Warsaw's Climate Change Adaptation Strategy¹²⁷⁷. The city encourages a wide range of inputs, including voices on possible individual actions, under the headline of "IDEAS for CLIMATE" and organises dozens of consultation meetings. The consultation is a part of a wider ADAPTCITY project, co-founded by LIFE+ and the National Fund for Environmental Protection and Water Management¹²⁷⁸.

At the local level, as part of the project CLIMICITIES, training has been provided to local authorities covering current knowledge on climate change and adaptation, preparation of city adaptation plans and how to involve inhabitants in the climate adaptation actions¹²⁷⁹. Guidance on the preparation of urban adaptation plans, issued by the Ministry of Environment alongside the NAS, highlights the importance of involvement of all relevant stakeholders during preparation and implementation of the urban adaptation plans¹²⁸⁰.

Since 2015, under the actions of the ENEA network working group on Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA), a series of training courses has taken place for stakeholders on considering climate change in investment projects¹²⁸¹.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

There is no apparent cross-border cooperation on climate adaptation in Poland and the NAS includes only national components. However, in the area of flood protection Poland

¹²⁷⁶ GDOS, URL: <http://sdr.gdos.gov.pl/SitePages/ZmianyKlimatu.aspx>, Accessed: 16/05/2018

¹²⁷⁷ UM Warszawa, URL: <http://konsultacje.um.warszawa.pl/konsultacja/pomysl-na-klimat-strategia-adaptacji-do-zmian-klimatu-dla-mst-warszawy>, Accessed: 16/05/2018

¹²⁷⁸ ADAPTCITY, URL: <http://adaptcity.pl/>, Accessed: 16/05/2018

¹²⁷⁹ ZIELONA INFRASTRUKTURA, URL: <http://zielonainfrastruktura.pl/projekt-adaptacji-do-zmian-klimatu-w-malych-i-srednich-miastach/>, Accessed: 16/05/2018

¹²⁸⁰ MOS, https://www.mos.gov.pl/fileadmin/user_upload/Podrecznik-adaptacji-dla-miast.pdf, Accessed: 16/05/2018

¹²⁸¹ Personal communication with MS contact,

cooperates on a regular basis with its neighbours: Slovakia, Czech Republic, Germany, Lithuania, and Ukraine¹²⁸².

Notably, Poland is not a partner in the Baltadapt project, which aims to exchange knowledge and “develop a climate change adaptation strategy and a framework for its implementation” in the Baltic Sea region¹²⁸³. It is, however, a member of HELCOM (Baltic Marine Environment Protection Commission - Helsinki Commission) for which “adaptation to climate change is a central question”. HELCOM defines adaptation as “adjustment and development of the necessary new measures to protect the Baltic Sea marine environment to allow for reaching the vision of a healthy Baltic Sea even in a changing climate.”¹²⁸⁴. Poland is involved in the EU Strategy for the Baltic Sea Region¹²⁸⁵ that includes “climate change adaptation, risk prevention and management” among its objectives¹²⁸⁶.

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / **In progress** / No

The Institute of Meteorology and Water Management (IMGW, a national research institute) oversees climate change monitoring and maintains a log of extreme climate events. A dedicated unit within the IMGW in charge of collecting data on the state of the atmosphere and the hydrosphere uses a complex technical infrastructure, including systems for a) observing-measurement, b) Tele-information and communication, and c) data processing, forecasting and warning. Additionally, monitoring of selected climate variables is carried out by a number of research institutes and universities in Poland. Apart from monitoring, the IMGW oversees preparation and dissemination of forecasts and warnings for the general public, as well as for state defence.

Ensuring an effective system for protecting the country against extraordinary threats is particularly important due to the growing number of such events and the increasing scale of their economic and social impacts. As it is becoming increasingly important to improve the effectiveness of flood risk management, an IT system has been developed for the Country’s Protection Against Extreme Hazards (ISOK). It contains the widest collection of expertise and information about water management in Poland¹²⁸⁷.

¹²⁸² National Water Management Authority, URL: <http://www.kzgw.gov.pl/pl/Wspolpraca-z-Republika-Federalna-Niemiec.html>, Accessed: 16/05/2018

¹²⁸³ BALTADAPT, URL: <http://www.baltadapt.eu/index.php>, Accessed: 16/05/2018

¹²⁸⁴ HELCOM (2013), Climate change in the Baltic Sea Area HELCOM thematic assessment in 2013, <http://www.helcom.fi/Lists/Publications/BSEP137.pdf>

¹²⁸⁵ EUSBSR (2009), URL: http://ec.europa.eu/regional_policy/sources/cooperate/baltic/pdf/2010_baltic.pdf

¹²⁸⁶ EC (2017), European Union Strategy for the Baltic Sea Region ACTION PLAN, COM(2009) 248

¹²⁸⁷ Personal communication with MS contact

There is no open database for data on whirlwinds, hurricanes, droughts, heat waves or precipitation. Data on extreme events are available at the Ministry of the Interior and Administration and The Institute of Meteorology and Water Management – National Research Institute (IMGW-PIB).

The impacts of extreme weather events, such as financial losses, are not assessed in the context of adaptation policies¹²⁸⁸. However, such assessments may be prepared for emergency response and risk management activities¹²⁸⁹. In such cases, these are prepared by regional authorities.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / **In progress** / No

In the projects KLIMADA and KLIMAT (assessing “Impact of the climate change on environment, economy and society”)¹²⁹⁰, a series of scenarios and projections have been produced. The KLIMADA website refers to simulations undertaken for the EU project ENSEMBLES, which used the SRES A1B emission scenario from IPCC 2000¹²⁹¹. Scenarios and projections in the KLIMAT project were prepared for the years 2011-2030 using a model supporting calculations for the IPCC’s Fourth Assessment Report (the reference scenario used experiment 20C3M and projections used scenarios SRES A2, A1B and B1)¹²⁹². Geographic specificities were considered in the modelling work.

Between 2011 and 2015, the Institute of Soil Science and Plant Cultivation (a state research institute) developed an information system on climate change impacts for agriculture and adaptation methods¹²⁹³. The project outcome fine-tuned the available climate change models to the Polish agricultural sector’s needs.

¹²⁸⁸ Personal communication with MS contact

¹²⁸⁹ Example of financial loss assessment following a severe weather event in Poland in 2017 can be found here: <https://pomorskie.eu/documents/39036/1691913/Raport+straty+po+nawa%C5%82nicy/2bca1fc0-a68d-44fd-8eea-b14294de6144>

¹²⁹⁰ KLIMAT project website: <http://klimat.imgw.pl/>

¹²⁹¹ IPCC, URL: <http://www.ipcc.ch/ipccreports/sres/emission/index.php?idp=0> , Accessed: 16/05/2018

¹²⁹² KLIMAT, 2012, Warunki klimatyczne i oceanograficzne w Polsce i na bałtyku południowym, URL: <http://klimat.imgw.pl/wp-content/uploads/2013/01/tom1.pdf?edmc=>

¹²⁹³ IUNG “System informacji o wpływie zmian klimatycznych na rolnictwo oraz metodach adaptacji” official website, <http://www.klimat.iung.pulawy.pl/o-systemie>

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

Climate risk and vulnerability assessments for selected sectors were completed by the KLIMADA¹²⁹⁴ project (delivered between 2011 and 2013), which led to adoption of the NAS 2020.

The following sectors have been covered in the risk assessments: agriculture, forestry, biodiversity, human health, water, coastal areas, mountain areas, transport, energy, built environment, spatial planning/urban planning. The ministries responsible for a given sector coordinated the risk assessment for their sector. Moreover, the KLIMAT project developed by the IMGW has assessed the long-term climatic pressures on agriculture and forestry, water management, energy security, as well as broader socio-economic conditions. The assessment is based on different datasets that will soon become outdated as the most recent only provide data to 2010.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

Transboundary risks are taken into account in the collaborative effort undertaken by Poland and its neighbouring countries with regards to flood prevention and flood-related damage mitigation¹²⁹⁵ (see Indicator 2b). The NAS 2020 explicitly mentions that legislative and organisational adaptation actions should “take into account the cross-border aspects”. There are relatively few signs, however, of transboundary risks being systematically considered.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / **In progress** / No

The NAS 2020 notes that reinforcement of research in the area of adaptation is important and there is a need to create programmes and finance adaptation research in: energy, construction, geology, transport, agriculture and forestry management, water and maritime management. The NAS states that research in the area of climate change and adaptation aligns with the national research programme, which was published in 2011. No more recent publications regarding priorities for research in Poland were identified. The NAS does neither mentions any processes to tackle knowledge gaps periodically nor suggests how such gaps should be identified. It includes a recommendation, however, that research should cover:

- Setting up an information exchange and securing funding for research and implementation of techniques facilitating adaptation

¹²⁹⁴ KLIMADA, URL: <http://klimada.mos.gov.pl/en/about-project/>. Accessed: 16/05/2018

¹²⁹⁵ National Water Management Authority, URL:: <http://www.kzgw.gov.pl/index.php/pl/wspolpraca-miedzynarodowa/wspolpraca-z-republika-federalna-niemiec>, Accessed: 16/05/2018

- Establishment of research programmes in the areas of energy, construction, geology, transport, agriculture and forestry and water management
- Assessment of environmental valuation techniques including valuation of ecosystem services
- Assessment and implementation of new quality standards for equipment which could prevent or limit negative impacts of extreme weather conditions.

The OP Infrastructure and Environment 2014-2020 provides funding for climate change and adaptation initiatives, including activities related to improving the knowledge base and increasing competency in climate mitigation and adaptation (Action 9)¹²⁹⁶. Among others, the OP is financing a new project aimed at providing improved knowledge about climate change and climate adaptation, which will be launched by the Institute of Environmental Protection - National Research Institute in June 2018¹²⁹⁷. It will establish a "Knowledge base on climate change and adaptation to their effects and channels of its dissemination in the context of increasing resilience of the economy, environment and society to climate change and counteracting and minimizing the effects of extraordinary threats". The study is co-financed by the OP Infrastructure and Environment 2014-2020 and aims to provide:

- Updated climate scenarios – projections of change of temperature and precipitation up to 2100, with special focus on year 2050
- An interactive tool providing information about climate risks and adaptation actions for decision makers at various governance levels
- A website dedicated to the knowledge of climate change, collecting information about the consequences of extreme weather events.

While progress in being made, a ‘yes’ score would require the knowledge gaps in the NAS and the research priorities pursued (e.g. through KLIMADA2) to be aligned either by the revision of the NAS or the revision of the research programmes.

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / **In progress** / No

The KLIMADA website, created when the NAS 2020 was prepared, is regularly updated with information about adaptation activities in Poland and the EU. As a source of information on climate adaptation, it is far from comprehensive. It provides some data and updates about climate change and adaptation activities but the information presented lacks detail and does not identify the sources from which it was taken. Another source of information is the

¹²⁹⁶ MIIR, 2018, Szczegółowy opis osi priorytetowych Programu Operacyjnego Infrastruktura i Środowisko 2014-2020, URL: https://www.pois.gov.pl/media/55204/SzOOP_POIS_6.pdf

¹²⁹⁷ Instytut Ochrony Środowiska, URL: <http://ios.edu.pl/brak-kategorii/konferencja-baza-wiedzy-o-zmianach-klimatu-i-adaptacji-do-ich-skutkow/>, Accessed: 16/05/2018

IMGW¹²⁹⁸ KLIMAT website, which includes publications prepared as part of the research study “Impacts of climate change on economy, environment and society”.

The website created for the project “Development of Urban Adaptation Plans for cities with more than 100,000 inhabitants in Poland”¹²⁹⁹ is another official source of information available to all stakeholders. More detailed information on the adaptation of cities will be published on the website, as the project progresses¹³⁰⁰.

The new project led by the Institute of Environmental Protection – National Research Institute, concerning the "Knowledge base on climate change and adaptation to their effects" (see Indicator 4a) aims to provide the necessary knowledge, in the field of climate change and its impact, to improve the effectiveness and efficiency of adaptation activities in sectors and areas vulnerable to climate change¹³⁰¹. The project is nationwide and is directed at decision makers in the central administration who should take actions related to the selection and implementation of climate adaptation activities and measures.

Every document or tool developed by the Ministry of the Environment is published and has an open-source character¹³⁰².

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / In progress / No

There are some actions on capacity building for urban areas that are not driven by the NAS. A promising attempt to share adaptation knowledge among stakeholders is the CLIMCITIES (“CLIMate change adaptation in small and medium size CITIES”)¹³⁰³ project, which provides training to local authorities and local leaders from NGOs, media, universities, as well as other interested stakeholders in Polish cities and towns (with populations from 50,000 to 99,000 inhabitants). The training sessions are complemented by an e-learning platform and an online library. The project started in 2017 and is supported by EEA Grants, with a contribution from Poland’s state budget. It complements the MPA and ADAPTCITY projects dedicated to preparation of climate adaptation strategies for larger cities. The “Knowledge base” project, KLIMADA2, soon to be launched by the Institute of Environmental Protection - National Research Institute, will further contribute to capacity building.

The Ministry of Environment also published two guidance documents relevant to adaptation: “Guidance on preparing investment that considers climate change mitigation and adaptation including resilience to natural disasters”¹³⁰⁴, and the “City Adaptation Handbook – guidance

¹²⁹⁸ IMGW, URL: <http://klimat.imgw.pl/>, Accessed: 16/05/2018

¹²⁹⁹ MPA, URL: <http://44mpa.pl/>, Accessed: 16/05/2018

¹³⁰⁰ Personal communication with MS contact

¹³⁰¹ Personal communication with MS contact

¹³⁰² Personal communication with MS contact

¹³⁰³ CLIMCITIES, URL: <http://climcities.ios.gov.pl/rekrutacja>, Accessed: 16/05/2018

¹³⁰⁴ Ministry of Environment, 2015, Poradnik przygotowania inwestycji z uwzględnieniem zmian klimatu, ich łagodzenia i przystosowania do tych zmian oraz odporności na klęski żywiołowe, URL: http://klimada.mos.gov.pl/blog/2015/10/30/poradnik_przygotowania_inwestycji/

on preparation of Urban Adaptation Plans”¹³⁰⁵. It has also released a “Guide to investment preparation respecting climate change mitigation and adaptation as well as resilience to natural disasters”¹³⁰⁶, which describes how to take climate change into consideration during the process of EIA. Since 2015, under the actions of the ENEA network and the Ministry of the Environment, a series of training courses have taken place on consideration of climate change in investment projects¹³⁰⁷.

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

The NAS 2020 identifies adaptation options based on a climate risk and vulnerability assessment completed by the KLIMADA project for selected sectors (water management, agriculture, forestry, biodiversity and protected areas, health, energy, building industry, transport, mountain areas, coastal zone, spatial development and urban areas), which take into account geographical specificities. The assessment was based on climate scenarios developed at the Interdisciplinary Centre for Mathematical and Computational Modelling of the Warsaw University. The scenarios cover the period 2001-2030 divided into two-time slices: 2001-2010 and 2021-2030. The KLIMADA project methodologies include modelling (atmosphere and hydrodynamics), expert judgment, and desk research¹³⁰⁸.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

The NAS 2020 identifies climate risks and a range of relevant adaptation options. Three general principles established by the NAS 2020 were that adaptation options selected should:

- Reduce vulnerability to climate risk by taking it into account at the investment planning stage
- Provide rapid response plans in the event of climate disasters (floods, droughts, heat waves)

¹³⁰⁵ Ministry of Environment, 2014, Podrecznik Adaptacji dla Miast, URL: https://www.mos.gov.pl/fileadmin/user_upload/Podrecznik-adaptacji-dla-miast.pdf

¹³⁰⁶ GDOS, no date, URL: https://www.gdos.gov.pl/files/artykuly/5437/Lagodzenie_zmian_klimatu_i_adaptacja_do_zmian_klimatu_w_ochronie_oddzialywania_na_srodowisko.pdf Accessed: 16/05/2018

¹³⁰⁷ Personal communication with MS contact

¹³⁰⁸ Ministry of Environment, 2015, Pordadnik przygotowania inwestycji z uwzględnieniem zmian klimatu, ich łagodzenia i przystosowania do tych zmian oraz odporności na klęski żywiołowe,

- Be prioritised based on their cost-effectiveness in addressing threats to human health and lives and permanent loss and damage.

The adaptation options are divided into four categories: legislation, organisation, information, and research. They are formulated to match the overarching NAS 2020 objectives:

- Objective 1: Ensuring the energy security and good environmental status
- Objective 2: Efficient adaptation to climate change in rural areas
- Objective 3: Development of transport in the conditions of climate change
- Objective 4: Ensuring the sustainable regional and local development with consideration to climate change
- Objective 5: Stimulating innovations conducive to adaptation to climate change
- Objective 6: Development of social behaviour conducive to adaptation to climate change.

Preparing the list of adaptation option and matching them to the NAS 2020 objectives was a multi-stage process based on expert assessments. The preliminary list of adaptation options was assessed and complemented by the relevant ministries. The outcome was compared with the directions set out in the Government's strategies and submitted to experts for reassessment.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / In progress / **No**

No evidence was found of an established mechanism for coordinating disaster risk management and climate adaptation, or of methods to include climate projections in disaster risk management and vice versa.

NAS 2020 does not list improvements to disaster risk management as one of its goals or priority actions. It recognises, however, that the Polish strategy for growth, which was valid when the NAS 2020 was prepared, already included adaptation measures regarding disaster risk management.

The Ministry of the Environment cooperates with the institutions responsible for the disaster risk management but does not have a coordination function for this process¹³⁰⁹. The Government Centre for Security is responsible for the coordination of activities related to monitoring, prevention and counteracting threats, as well as launching procedures related to crisis management.

The National Plan for Crisis Management¹³¹⁰ does not state whether climate impacts and projections have been considered when planning disaster risk management.

¹³⁰⁹ Personal communication with MS contact

¹³¹⁰ RCB, 2017, Krajowy Plan Zarządzania Kryzysowego, URL: <http://rcb.gov.pl/wp-content/uploads/RCB-KPZK-cz%C4%99%C5%9B%C4%87-A.pdf>

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / **In progress** / No

The NAS 2020 provides an overview of funds available for climate adaptation in the 2014-2020 period, including domestic, EU and international sources of finance. Domestic funds include the National and Regional Funds for Environmental Protection and Water Management, which comprise funds from the Green Investment Scheme (income from sale of Annual Allocation Units under the Kyoto Protocol), local and regional governments' budgets, and the state budget.

While EU funds, particularly European Structural and Investment Funds (ESIF), play an important role in financing adaptation actions in Poland, the overview in the NAS 2020 of EU funds available for climate adaptation is very limited and general (referring broadly to “national and regional operational programmes”). The NAS 2020 mentions LIFE but fails to name the main sources of funds, namely the European Fund for Regional Development, the Cohesion Fund, and the European Social Fund. Among international sources of funding the NAS 2020 lists the World Bank and the International Monetary Fund. The NAS 2020 does not provide any details of any of the sources of funding that it mentions or any evidence of disbursements under those funds. An attempt to provide an overview of EU funds available for adaptation has been published on the KLIMADA website¹³¹¹ but it is an incomplete list of possible sources.

In 2014 a Partnership Agreement¹³¹² was signed by the European Commission and Poland to set out plans on the use of ESIF in Poland over the 2014-2020 period. The agreement refers to the NAS 2020 in several instances, and includes an estimate that EUR 1.2 billion will be dedicated to all of the adaptation actions listed in the NAS 2020, including around 35% of the adaptation investment needs in the water sector. Furthermore, the Partnership Agreement includes a commitment to take a horizontal approach to adaptation action framed by the NAS 2020 by considering it in relation to each sector and thematic objective that is co-funded by ESIF. While this was decided after the adoption of the NAS 2020, no update was made to reflect the role of ESIF in implementing the NAS 2020, and little relevant information is available on the KLIMADA website. The availability of EU funds is, however, a major factor encouraging adaptation action in Poland.

As of January 2018, the Infrastructure and Environment OP 2014-2020 has financed 47 projects under Priority Measure 2.1. “Adaptation to climate change including with protection

¹³¹¹ GDOS, no date, URL:

https://www.gdos.gov.pl/files/artykuly/5437/Lagodzenie_zmian_klimatu_i_adaptacja_do_zmian_klimatu_w_ocienie_oddziaływania_na_srodowisko.pdf, Accessed: 16/05/2018

¹³¹² Ministry of Infrastructure and Development, 2014, Programowanie perspektywy finansowej 2014 -2020 - Umowa Partnerstwa, URL: https://ec.europa.eu/info/sites/info/files/partnership-agreement-poland-may2014_pl.pdf Accessed: 16/05/2018

and increase of resilience to disasters, in particular natural disasters and environmental monitoring”. The total amount of EU co-financing for these projects is over EUR 620 million¹³¹³.

The funding allocated to date has been directed to projects in vulnerable sectors, primarily water management and flood risk management (e.g. review and update of flood risk maps, flood risk assessment, drought management plans). There are also examples of cross-cutting actions, such as the development of the urban adaptation plans (the MPA project) and the project aimed at the development of the knowledge base on climate adaptation (see Indicator 4b).

While adaptation actions are being financed, particularly by ESIF, not all priority sectors receive consistent funding for implementation and the link between the actions included in the NAS 2020 and funding disbursed is unclear. Hence, this indicator is scored as ‘in progress’ score.

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

In 2015, the Law on EIA and SEA was updated to reflect climate adaptation needs¹³¹⁴. The law transposes the EU EIA and SEA Directives into Polish law.

In terms of EIA, the risk that a project poses in terms of major accidents or natural disasters is assessed taking into account climate change (Article 63). The EIA must include information about the risk of climate change as well as its potential contribution to climate adaptation (Article 66). The provisions regarding SEA have not been specifically amended to reflect climate adaptation needs; only general requirements related to environmental protection are included in Article 51.

The Directorate General for Environmental Protection, in charge of EIA and SEA in Poland, has issued a brochure: “Climate change mitigation and adaptation in the environmental impact assessment”¹³¹⁵. The brochure broadly explains the modalities of EIA in terms of climate adaptation.

¹³¹³ Based on the list on financed projects updated on 4 January 2018 available on the website of the Operational Programme for Infrastructure and Environment 2014-2020, URL: <http://www.pois.gov.pl/strony/o-programie/projekty/lista-beneficjentow/>, Accessed: 16/05/2018

¹³¹⁴ Ustawa z dnia 3 października 2008 r. o udostępnianiu informacji o środowisku i jego ochronie, udziale społeczeństwa w ochronie środowiska oraz o ocenach oddziaływania na środowisko, URL: <http://isap.sejm.gov.pl/Download.jsessionid=FB3ECA4E089934F164109A10995E20A5?id=WDU20081991227&type=3>, Accessed: 16/05/2018

¹³¹⁵ GDOS, no date, https://www.gdos.gov.pl/files/artykuly/5437/Lagodzenie_zmian_klimatu_i_adaptacja_do_zmian_klimatu_w_ocenie_oddziaływania_na_srodowisko.pdf

In 2015 the Ministry of Environment published “Guidance on preparing investment that takes into account climate change mitigation and adaptation including resilience to natural disasters”¹³¹⁶. The guidance supports potential beneficiaries of EU co-funding in the 2014-2020 programming period.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / **No**

Projections of future climate impacts, and the extent to which climate change is currently affecting climate risks, are not incorporated in the Polish National Risk Management Plan¹³¹⁷.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / **No**

According to the National Spatial Development Concept 2030¹³¹⁸ (NSDC) adopted in 2015, Polish spatial policy should be “striving to increase space capacity to adapt to climate change impacts”. This is a national level document, covering spatial, urban and maritime areas. It notes that “expected climate change until 2030 will have only moderate impact on spatial planning in Poland”. The impacts are foreseen in settlement networks, agriculture, and several other sectors in the coastal areas, river valleys and mountain areas. According to the NSDC, indirect impacts of climate change are expected to arise from legislative and regulatory changes, including increased spending on water management infrastructure and recovery from extreme climatic events. Implementation of the NSDC is coordinated by the Ministry of Development¹³¹⁹ but the progress of implementation is unclear with regard to adaptation to climate change.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / **In progress** / No

NAS 2020 recognises the need to mainstream climate adaptation into national policies as specified in the EU White Paper. NAS 2020 includes specific objectives for sectors such as water management, coastal zone management, energy, biodiversity and forest management, spatial development and construction, health protection and rural areas. These objectives have

¹³¹⁶ Ministry of Environment, 2015, Poradnik przygotowania inwestycji z uwzględnieniem zmian klimatu, ich łagodzenia i przystosowania do tych zmian oraz odporności na klęski żywiołowe, URL: http://klimada.mos.gov.pl/blog/2015/10/30/poradnik_przygotowania_inwestycji/

¹³¹⁷ RCB, 2017, Krajowy Plan Zarządzania Kryzysowego, URL: <http://rcb.gov.pl/wp-content/uploads/RCB-KPZK-cz%20C4%99%20C5%9B%20C4%87-A.pdf>

¹³¹⁸ Ministry of Development (2011), Koncepcja przestrzennego Zagospodarowania Kraju, Uchwała Nr 239 Rady Ministrów z dnia 13 grudnia 2011 r. w sprawie przyjęcia Koncepcji Przestrzennego Zagospodarowania Kraju 203, URL: <http://isap.sejm.gov.pl/DetailsServlet?id=WMP20120000252&min=1>
<http://isap.sejm.gov.pl/DetailsServlet?id=WMP20120000252&min=1>

¹³¹⁹ BIP, URL: http://mr.bip.gov.pl/strategie-rozwoj-regionalny/17847_strategie.html, Accessed: 16/05/2018

been defined in line with the national development strategy and relevant integrated development strategies.

At sectoral level adaptation is promoted by one central instrument: the Partnership Agreement between the EU and Poland for the period 2014-2020¹³²⁰ adopted in May 2014. Most recently, integration of adaptation into sectoral policy making has further been confirmed in a horizontal strategy (“Strategy for Responsible Growth”¹³²¹) adopted by the Polish government in February 2017.

The Partnership Agreement for Poland covers the European Regional Development Fund (ERDF), the Cohesion Fund (CF), the European Social Fund (ESF), the European Agricultural Fund for Rural Development (EAFRD) and the European Maritime and Fisheries Fund (EMFF). This was a key driver of climate adaptation inclusion in the sectoral policies in Poland; as most of them are delivered through or significantly affected by the OPs disbursing EU funds. The partnership priorities focus on business environment, entrepreneurship and innovation, social cohesion, active labour market participation, network infrastructure, environment and resource efficiency. Adaptation action is promoted mainly through environment and resource efficiency priority action but it is mainstreamed to some extent through all of them. According to some experts, it is the regional OPs that play the key role in NAS 2020 implementation¹³²².

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

Priority Action 6.2.1. of the NAS 2020 aims to increase uptake of insurance policies in territories at high risk of natural disasters. No evidence was found of adaptation being mainstreamed in insurance or alternative policy instruments in Poland.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In progress** / No

The NAS 2020 is the national level document. In addition, the local and regional (voivodeship) authorities are free to shape their adaptation policies in line with the national policy. There is no national adaptation plan in Poland in addition to the NAS 2020 and no dedicated sectoral plans have been identified. Sixteen regional OPs (2014-2020) developed at voivodship level may include measures aimed at climate adaptation, however no dedicated

¹³²⁰ EC, 2014, Partnership agreement with Poland, URL: https://ec.europa.eu/info/publications/partnership-agreement-poland-2014-20_en

¹³²¹ Ministry of Development, 2017, Strategia na rzecz Odpowiedzialnego Rozwoju, URL: https://www.nr.gov.pl/media/35716/SOR_2017_maly_internet03_2017.pdf

¹³²² Wisniewska, M, 2014, Adaptacja do zmian klimatu, URL: <http://www.reo.pl/assets/dokumenty/wiadomosci/lipsiewrz14/raport-adaptacja.pdf><http://www.reo.pl/assets/dokumenty/wiadomosci/lipsiewrz14/raport-adaptacja.pdf>

regional climate adaptation plans have been identified. NAS 2020 includes an indicator for monitoring the implementation of the Strategy, concerning urban adaptation plans developed for cities above 100,000 inhabitants. This is now being realised through the MPA project.

Both horizontal and sector specific actions are being implemented however at the time of preparation of the scoreboard there were no published reports summarising progress in implementation of the NAS 2020¹³²³ (this data was being collected from the regional authorities by the Ministry of Environment).

Polish authorities engage in a range of adaptation actions that are in line with the NAS 2020, mainly through European Structural and Investment Funds. A non-comprehensive list of on-going adaptation measures in Poland includes:

- Developing and adopting flood and drought prevention plans for the river basins by the national and regional water management authorities
- Capacity building
 - “Good climate for Counties” project, supported by LIFE + financial instrument was running between 2010 and 2015 engaging local actors in a series of climate adaptation actions including creating of County Network for Climate and Network of Local Civil Society Initiators, signing declarations, organising debates and conferences¹³²⁴
 - CLIMCITIES project¹³²⁵
- Guidelines for Urban Adaptation Plans preparation
- Developing adaptation action plans for cities (MPA project¹³²⁶)
- Fostering research and innovation e.g. PREPARED project in the area of waste water management¹³²⁷, projects supported by the National Science Centre¹³²⁸
- Changes in legislation relative to EIA, coastal management, rain water collection
- "Guide to investment preparation respecting climate change mitigation and adaptation as well as resilience to natural disasters" developed by the Ministry of Environment in 2015 (see Indicator 8a.)
- Creating of an information system on climate change impacts for agriculture and adaptation methods¹³²⁹ by the Institute of Soil Science and Plant Cultivation

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / No

¹³²³ Personal communication with MS contact

¹³²⁴ Project official website, URL:

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=3773, Accessed: 16/05/2018

¹³²⁵ CLIMCITIES, URL: <http://climcities.ios.gov.pl/>, Accessed: 16/05/2018

¹³²⁶ KLIMADA, URL: <http://klimada.mos.gov.pl/projekt-mpa/> Accessed: 16/05/2018

¹³²⁷ PWIK Gliwice, URL: <http://pwik.gliwice.pl/7-program-ramowy-prepared.html>, Accessed: 16/05/2018

¹³²⁸ For example: NCN, URL: <https://www.ncn.gov.pl/finansowanie-nauki/przyklady-projektow/oleksyn> , Accessed: 16/05/2018

¹³²⁹ IUNG, URL: <http://www.klimat.iung.pulawy.pl/o-systemie> , Accessed: 16/05/2018

In terms of supporting adaptation at subnational level, the most prominent initiative is the MPA project, launched in January 2017. It aims at vulnerability assessment and relevant adaptation action planning for Polish cities (around 44 cities are currently covered by the project). The project is coordinated by the Ministry of Environment, delivered by a consortium including state and private entities, and co-funded from the Cohesion Fund under the Infrastructure and Environment OP 2014-2020. The project consortium is led by the governmental research body: Institute of Environmental Protection – National Research Institute that oversaw preparation of the NAS 2020. The estimated duration of the project is 20 months for each of the 44 cities.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / No

The NAS 2020 does not include a specific action on publication or application of such guidelines or procedures. However, guidelines assessing the potential impact of climate change on projects are included in "Guide to investment preparation respecting climate change mitigation and adaptation as well as resilience to natural disasters". It describes, analyses and gives instructions, including methodologies, on how to take into consideration climate adaptation and mitigation during project preparation and development, including in EIA and SEA analysis and procedures.

The aim of the guide is to provide methodologies and hints concerning the way in which climate issues should be integrated into the process of developing investments and projects at the stage of:

- SEA and EIA in relation to: climate mitigation, climate adaptation and resilience, including ecosystem-based approaches
- Cost - benefit analysis, including calculation of shadow costs and external costs of GHG emissions, carbon footprint analysis, sensitivity and vulnerability analysis of projects in relation to climate changes and natural disasters
- Risk analysis, including climate-related risks
- Climate options analysis and assessment, including climate impact on projects and projects impacts on climate.

The guide addresses:

- EU funds beneficiaries under 2014-2020 financial perspective
- Managing, intermediary and implementing authorities (responsible for appraisal of the applications and projects submitted under EU funding)
- State and local budget beneficiaries
- Relevant government authorities issuing or consulting decisions and consents

It is a requirement to follow the guide when preparing applications for funding in the 2014-2020 financial period, thus, the guide is applied in practice ¹³³⁰.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / **No**

No evidence has been identified on the involvement of non-public administration stakeholders in the implementation of adaptation actions. However, the public consultation preceding adoption of the Warsaw's Climate Change Adaptation Strategy¹³³¹ is an encouraging signal that the civil society and wide range of non-public administration stakeholders gets to be engaged in adaptation action planning and delivery.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / **No**

Monitoring and evaluation of the implementation of the NAS 2020 started in December 2017 and is coordinated by the Ministry of the Environment. Information collected about climate issues and extreme weather events will include actions at national, regional and local levels. Different sectoral ministries, marshal offices and provincial governors received a request to summarize the effects of implementing the NAS 2020 in a dedicated questionnaire. Individual parts of the questionnaire relate to specific measures identified in the NAS 2020 document. The evaluation will be completed by the end of the third quarter of 2018, so progress reports have not yet been published.

At the same time, a comprehensive monitoring system for adaptation policy is currently being developed relating to the work on National Environment Policy 2030 and will be implemented with the adoption of the document at the turn of 2018/2019. The document will contain adaptation and mitigation components and it will be implemented and coordinated in line with the NAS 2020.

The NAS 2020, alongside the strategic objectives, sets out several relevant monitoring indicators. Some adaptation-relevant monitoring data can be found on the STRATEG website managed by the Polish Statistical Office¹³³².

¹³³⁰ Personal communication with MS contact

¹³³¹ UM Warszawa, URL: <http://konsultacje.um.warszawa.pl/konsultacja/pomysl-na-klimat-strategia-adaptacji-do-zmian-klimatu-dla-mst-warszawy>, Accessed: 16/05/2018

¹³³² STRATEG, URL: <http://strateg.stat.gov.pl/> Accessed: 16/05/2018

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / **No**

Monitoring and evaluation of sectoral policies is the responsibility of the associated ministries and institutions. As noted under Indicator 10a, at the end of 2017, the Ministry of the Environment had prepared and forwarded to other sectoral ministries a questionnaire about implementation of the NAS 2020 in accordance with the commitments and thematic scope of actions and measures from the NAS 2020¹³³³. As indicated above, the evaluation process will be carried out by the end of the first half of 2018, so progress reports have not been published yet.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / **No**

As noted under Indicator 10a, monitoring of the implementation of the NAS 2020 by the Ministry of the Environment started at the end of 2017 and is conducted at the level of marshals and provincial governors. Information and data on the tasks carried out in the regions consider the climate adaptation and resilience to natural disasters¹³³⁴. However, no reports have been published yet.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

Only one review of the NAS 2020 is planned; data collection supporting the review started in 2017. Further adaptation measures and actions will be included in the document “National Environmental Policy 2030”, which is currently being prepared by the Ministry of the Environment. The new policy document will include a separate implementation system¹³³⁵.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / **No**

As noted under Indicator 10a, the Ministry of Environment has circulated a questionnaire to the sectoral ministries and sub-national authorities to feed into the assessment of the NAS 2020 but there has been no further active stakeholder involvement.¹³³⁶

¹³³³ Personal communication with MS contact

¹³³⁴ Personal communication with MS contact

¹³³⁵ Personal communication with MS contact

¹³³⁶ Personal communication with MS contact

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 <i>Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	Yes / <u>In progress</u> / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	Yes / <u>In progress</u> / No
2 <i>Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	Yes / <u>No</u>
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 <i>Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	Yes / <u>In progress</u> / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	Yes / <u>In progress</u> / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No
4 Knowledge gaps		
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	Yes / <u>In progress</u> / No
5 Knowledge transfer		
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	Yes / <u>In progress</u> / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	<u>Yes</u> / In progress / No
Step C: Identifying adaptation options		
6 Identification of adaptation options		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	Yes/In progress / <u>No</u>
7 Funding resources identified and allocated		
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / <u>In progress</u> / No
Step D: Implementing adaptation action		

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
8 <i>Mainstreaming adaptation in planning processes</i>		
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	Yes / <u>No</u>
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	Yes / <u>No</u>
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	Yes / <u>In progress</u> / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 <i>Implementing adaptation</i>		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	<u>Yes</u> / No
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	<u>Yes</u> / No
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	Yes / <u>No</u>
Step E: Monitoring and evaluation of adaptation activities		

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
11 <i>Evaluation</i>		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	Yes / <u>No</u>

Adaptation preparedness scoreboard for Portugal

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List of abbreviations

ANACOM	Autoridade Nacional de Comunicações (National Authority for Communications)
ANMP	Associação Nacional De Municípios Portugueses (National Association of Portuguese Municipalities)
ANPC	Autoridade Nacional de Proteção Civil (National Authority for Civil Protection)
ANQIP	Associação Nacional para a Qualidade nas Instalações Prediais (National Association for Quality in Building Services)
APA	Agência Portuguesa do Ambiente (Portuguese Environment Agency)
APS	Associação Portuguesa de Seguradores (Portuguese Association of Insurers)
CFD	Critical factor for decision-making
CIAAC	Comissão Interministerial do Ar e das Alterações Climáticas (Inter-Ministerial Commission on Air and Climate Change)
CIRAC	Risco de Inundações em Cenários de Alterações Climáticas (Flood Maps and Risk in Climate Change Scenarios)
CLIMAAT	Clima e Meteorologia dos Arquipélagos Atlânticos (Climate and Meteorology of the Atlantic Archipelagos)
DGADR	Direção-Geral de Agricultura e Desenvolvimento Rural (Directorate General for Agriculture and Rural Development)
DGAE	Direção-Geral das Atividades Económicas (General Directorate of Economic Activities)
DGEG	Direção-Geral da Energia e Geologia (Directorate General for Energy and Geology)
DGPM	Direção-Geral de Política do Mar (Directorate General for Maritime Policy)
DGS	Direção-Geral da Saúde (General Directorate of Health)
DGT	Direção-Geral do Território (Directorate General for Spatial Planning)
EEA	European Economic Area
EIA	Environmental Impact Assessment

EN AAC	Estratégia Nacional de Adaptação à Alterações Climáticas (National Adaptation Strategy)
ER AAC	Estratégia Regional de Adaptação às Alterações Climáticas (Regional Strategy for Climate Change)
EU AS	EU's Strategy for Adaptation to Climate Change
FCT	Foundation for Science and Technology
FFCUL	Fundação da Faculdade de Ciências da Universidade de Lisboa (Foundation of the Faculty of Science, University of Lisbon)
GPP	Gabinete de Planeamento, Políticas e Administração Geral (Directorate of Planning and Policies)
HadCM3	Hadley Centre Coupled Model, version 3
HFA	Hyogo Framework for Action
ICNF	Instituto da Conservação da Natureza e das Florestas (Institute for Nature Conservation and Forests)
IMTT	Instituto da Mobilidade e dos Transportes (Institute of Mobility and Transports)
IPCC	Intergovernmental Panel on Climate Change
IPMA	Instituto Português do Mar e da Atmosfera (Portuguese Institute of Sea and Atmosphere)
MS	Member State
NAP	National Adaptation Plan
NAS	National Adaptation Strategy
PALOP	Portuguese Speaking African Countries (Países Africanos de Língua Oficial Portuguesa)
PAPVL	Plano de Ação de Proteção e Valorização do Litoral (Action Plan for the Protection and Enhancement of the Shore)
PNAC	Programa Nacional para as Alterações Climáticas (National Programme for Climate Change)
PNPOT	Programa Nacional da Política de Ordenamento do Território (National Spatial Planning Policy)
PO SEUR	Programa Operacional Sustentabilidade e Eficiência no Uso de Recursos (Operational Programme for Sustainability and Efficient Use of

Resources)

QEPiC	Quadro Estratégico para a Política Climática (Strategic Framework for Climate Policy)
RCM	Resolution of the Council of Ministers
SEA	Strategic Environmental Assessment
SIAM	Climate Change in Portugal: Scenarios, Impacts, and Adaptation Measures
SNIAmb	Sistema Nacional de Informação de Ambiente (National System of Environmental Information)
UNCCD	UN Convention to Combat Desertification

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

A Strategic Framework for Climate Policy (Quadro Estratégico para a Política Climática - QEPiC) was adopted by the Portuguese Government on 30th July 2015¹³³⁷. The QEPiC includes the National Programme for Climate Change 2020/2030 (Programa Nacional para as Alterações Climáticas 2020/2030 - PNAC)¹³³⁸, addressing mitigation goals and action, and the follow-up of the National Adaptation Strategy (Estratégia Nacional de Adaptação às Alterações Climáticas 2020 - ENAAC 2020, which revises the earlier ENAAC 2010). It sets out the vision and objectives of national climate policy, reinforcing the commitment to develop a competitive, resilient and low-carbon economy, contributing to a new development paradigm for Portugal.

The ENAAC 2020 has as its vision for 2020: “A country adapted to the effects of climate change, through the continuous implementation of solutions based on technical-scientific knowledge and good practice.” The three main goals that guide ENAAC 2020 are to:

1. Improve the level of knowledge about climate change. Update, develop and promote knowledge on climate change and potential impacts, risks and consequences, including those related to extreme weather events
2. Implement adaptation measures. Evaluate the current capacity to adapt and prioritize the implementation of options and adaptation measures that moderate future negative impacts and/or help to take advantage of opportunities arising from climate change
3. Promote mainstreaming of adaptation into sectoral policies. Promote integration and monitoring of adaptation to climate change in priority public and sectoral policies and in the main instruments of spatial planning at national, regional and local level.

A2. Adaptation strategies adopted at subnational levels

The National Adaptation Strategy (NAS - ENAAC 2020) is the main instrument of adaptation policy at a national scale, and sets out the guidelines for the development of subnational (municipal and inter-municipal) strategies and plans.¹³³⁹ In addition, as Autonomous Regions have autonomy to define their own adaptation policy¹³⁴⁰, Madeira¹³⁴¹ and Azores¹³⁴² have developed Regional Adaptation Strategies.

¹³³⁷ Conselho de Ministros, (2015). *Resolução do Conselho de Ministros n.º 56/2015*. URL: <https://dre.pt/web/guest/pesquisa/-/search/69905665/details/normal?l=1>, Date accessed 18/04/18

¹³³⁸ Agência Portuguesa do Ambiente. (2018). *Programa Nacional para as Alterações Climáticas 2020/2030 (PNAC 2020/2030)*. URL:

<https://www.apambiente.pt/index.php?ref=16&subref=81&sub2ref=117&sub3ref=1376>, Date accessed 18/04/18

¹³³⁹ Personal communication with MS contact

¹³⁴⁰ Personal communication with MS contact

¹³⁴¹ Observatorio do Clima Madeira, (2018). *Adaptação*, URL: <http://clima-madeira.pt/pt/sectores/adaptacao>, Date accessed 18/04/18

Three municipalities stand out with their early adoption of local climate adaptation strategic plans: Almada, Cascais and Sintra.

Two programmes, in particular, have supported the development of adaptation strategies. First, the project ClimAdaPT.Local¹³⁴³, under the European Economic Area (EEA) Grants Programme AdaPT¹³⁴⁴, where local officers were trained on vulnerability assessment, and development of adaptation options. The project led to the development of 27 local adaptation strategies¹³⁴⁵ and to mainstreaming adaptation into local planning. The second is the Operational Programme for Sustainability and Efficient Use of Resources (Programa Operacional Sustentabilidade e Eficiência no Uso de Recursos - PO SEUR), using EU Cohesion Fund funding. This drew on the capacity built by the ClimAdaPT.Local project which produced guiding manuals to standardise the further development of strategies at the subnational level.

Other municipalities are developing their adaptation plans within the scope of international networks, such as the UN campaign: 'Making Cities Resilient: My City is getting ready'¹³⁴⁶ and the 'Covenant of Mayors for Energy and Climate'¹³⁴⁷. More than 126 Portuguese cities have signed up to the Covenant of Mayors on Energy and Climate so far (although only 22 with adaptation commitments).

The Autonomous Region of the Azores has developed a targeted approach to their particular vulnerabilities through their Regional Strategy for Climate Change (Estratégia Regional de Adaptação às Alterações Climáticas - ERAAC), which was approved by the Government of Azores in October 2011.¹³⁴⁸ The Strategy of Adaptation to Climate Change of the

¹³⁴² Conselho do Governo dos Açores, (2011). *Resolução do Conselho do Governo n.º 123/2011, de 19 de Outubro*, URL: <http://servicos-sraa.azores.gov.pt/grastore/SRAM/Resolu%C3%A7ao%20-%20estrat%C3%A9gia%20para%20as%20altera%C3%A7%C3%B5es%20clim%C3%A1ticas.pdf>, Date accessed on 18/04/18

¹³⁴⁵ <http://climadapt-local.pt/en/municipal-strategies/>

¹³⁴⁶ Throughout 2010-2020 and beyond, the United Nations Office for Disaster Risk Reduction (UNISDR) Making Cities Resilient Campaign (MCRC), together with partners, aim to support sustainable urban development by promoting resilience activities and increasing local level understanding of disaster risk. See more on the campaign here: UNISDR, (2018). *Making Cities Resilient: My City is Getting Ready*. URL: <http://www.unisdr.org/campaign/resilientcities/home>, Date accessed on 18/04/18 and details on Portugal's participation here: Autoridade Nacional de Proteção Civil, *Cidades Resilientes em Portugal Resilient Cities In Portugal 2016*. URL: http://www.prociv.pt/bk/RISCOSPREV/REDRISCOCATASTROFE/Documents/Cidades_Resilientes_em_Portugal_2016_PNRRC.pdf, Date accessed on 18/04/18

¹³⁴⁷ *Global Covenant of Mayors for Climate and Energy* URL: <https://www.globalcovenantofmayors.org/>, Date accessed on 19/04/2018.

¹³⁴⁸ Conselho do Governo dos Açores, (2011). *Resolução do Conselho do Governo n.º 123/2011, de 19 de Outubro*, URL: <http://servicos-sraa.azores.gov.pt/grastore/SRAM/Resolu%C3%A7ao%20-%20estrat%C3%A9gia%20para%20as%20altera%C3%A7%C3%B5es%20clim%C3%A1ticas.pdf>, Date accessed on 18/04/18

Autonomous Region of Madeira was adopted through a Resolution of the Regional Government of Madeira¹³⁴⁹, after being published in September 2015¹³⁵⁰.

Adaptation action plans

B1. National adaptation plan

The National Programme for Action on Adaptation to Climate Change (P-3AC), which corresponds to the National Adaptation Plan (NAP), is under development. It is currently undergoing internal consultation, and is expected to be submitted shortly for policy validation and public consultation.¹³⁵¹

The priority measures identified in subnational adaptation plans as well as the work at sectoral level are being taken into account in the development of the NAP. In addition, they informed the preparation of a EUR 1,000,000 funding programme under the national Environmental Fund launched in February 2018 and dedicated to the implementation of these measures.¹³⁵²

B2. Adaptation plans adopted at subnational level

As mentioned above, the adaptation plans at municipal and inter-municipal levels have been developed using NAS (ENAAC 2020) guidance, which defined the work developed under the ClimAdaPT.Local and PO SEUR programmes. At the regional level, plans have been developed with greater autonomy. At present, plans at the subnational level, covering around 80% of the national territory, are under development using PO SEUR funding.¹³⁵³

Most municipalities with adaptation policy instruments have either an adaptation strategy or a plan, and the majority of plans are still under development, principally using PO SEUR funding. Almost all of the inter-municipal regions in Portugal received PO SEUR financing for designing adaptation plans, these were: Alto Minho, Cávado, Ave, Alto Tâmega, Área Metropolitana do Porto, Tâmega e Sousa, Douro, Viseu Dão Lafões, Beiras e Serra da Estrela, Região de Coimbra, Médio Tejo, Oeste, Lezíria do Tejo, Área Metropolitana de Lisboa, Alentejo Central, Baixo Alentejo, Algarve. Furthermore, two of the six regions of the inter-municipal communities not included on this list are also developing adaptation policy instruments under PO SEUR financing but with a different geographical scope. These are: the two municipalities associations Terra Quente Transmontana and Terra Fria do Nordeste Transmontano (which together cover the inter-municipal region of Terras de Trás-os-Montes), and the Regional Coordination and Development Commission of Alentejo (which covers the

¹³⁴⁹ Governo Região Autónoma da Madeira, (2015). *Resolução n.º 1062/2015*. URL: <http://joram.madeira.gov.pt/joram/1serie/Ano%20de%202015/ISerie-188-2015-12-02.pdf> [Date accessed 18/04/18]

¹³⁵⁰ Governo Região Autónoma da Madeira, (2015). *Estratégia Clima- Madeira – Estrategia de Adaptação às Alterações Climáticas da Região Autónoma da Madeira*. URL: http://clima-madeira.pt/uploads/public/estr_clima_web.pdf, Date accessed 18/04/18

¹³⁵¹ Personal communication with MS contact

¹³⁵² Personal communication with MS contact

¹³⁵³ Personal communication with MS contact

inter-municipal regions of Alto Alentejo, Alentejo Central, Alentejo Litoral and Baixo Alentejo)¹³⁵⁴.

In addition, the ClimAdaPT.Local project has created a network of municipalities working on adaptation planning (Rede de Municípios para a Adaptação Local às Alterações Climáticas). Some municipalities are ahead and have already finalised their plans (e.g. Cascais, Leiria, Ílhavo).¹³⁵⁵

The Azores strategy will be operationalized through a Regional Plan for Climate Change, which will integrate the measures and actions considered relevant to each sector, particularly those that are already underway. The plan was finalised in November 2017¹³⁵⁶. It has been subject to public consultation and is awaiting approval and publication at this time¹³⁵⁷.

No regional action plan is currently being prepared for Madeira.

B3. Sectoral adaptation plans

The ENAAC 2020 governance is structured in nine sectoral working groups and six cross-cutting “thematic area” working groups.¹³⁵⁸ Regarding the sectoral work, by 2013 initial plans had been developed for the agriculture and forestry; biodiversity; energy and industry; city and territory management; health; insurance of people and goods; water resources and coastal zones.¹³⁵⁹

Since then, as the interim update report on the implementation of the ENAAC 2020 explains, the working groups have been undertaking a number of actions to meet the specified objectives of the NAS. Among these is the objective of implementing adaptation measures, which entails identifying and implementing adaptation actions within the working group’s remit.¹³⁶⁰ These measures are being taken into consideration in the development of the NAP.

¹³⁵⁴ Calls: POSEUR-08-2016-46; POSEUR-08-2016-57; POSEUR-08-2016-74;

<https://poseur.portugal2020.pt/pt/candidaturas/avisos/?v=all&s=Expired&ai=84&an=AxisII>

¹³⁵⁵ Personal communication with MS contact

¹³⁵⁶ Governo dos Açores, (2017). *Plano Regional para as Alterações Climáticas em conferência final a 16 de novembro*, URL:

<http://www.azores.gov.pt/Portal/pt/novidades/Plano+Regional+para+as+Alter%C3%A7%C3%B5es+Clim%C3%A1ticas+em+confer%C3%A2ncia+final+a+16+de+novembro.htm?lang=pt&area=ct> , Date accessed on 23/04/18

¹³⁵⁷ Personal communication with MS contact

¹³⁵⁸ Agência Portuguesa do Ambiente, (2013). Relatório de Progresso Estratégia Nacional de Adaptação às Alterações Climáticas

¹³⁵⁹ Agência Portuguesa do Ambiente, (2013). Relatório de Progresso Estratégia Nacional de Adaptação às Alterações Climáticas

¹³⁶⁰ Agência Portuguesa do Ambiente, (2016). *Estratégia Nacional de Adaptação às Alterações Climáticas - RELATÓRIO INTERCALAR #1 - 2015-2016*

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

In Portugal, the Environment Agency (Agência Portuguesa do Ambiente - APA) is in charge of national adaptation policy coordination, under the political approval of the Ministry of Environment and with the decision-making process submitted to the Inter-ministerial Commission for Air and Climate Change¹³⁶¹, created under QEPiC.¹³⁶²

The implementation of the ENAAC 2020 is supported by a coordination group chaired by the APA and composed of the coordinators of the thematic areas and of the sectoral working groups, as well as the representatives of the Autonomous Regions of Azores and Madeira and of the National Association of Portuguese Municipalities. In this way, the coordination group brings together the central administration bodies, which in turn engage their specific stakeholders.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

The development of the first NAS (ENAAC) between 2007 and 2010 was coordinated by the Climate Change Commission and was the result of a process of inter-ministerial consultation and analysis, including preliminary studies by the former Environment Institute. In 2009, an inter-ministerial working group was formed, composed of representatives of about 30 public bodies. Bases for the ENAAC proposal were presented to the Forum on Climate Change in 2009 and a Strategy proposal, approved by the Commission, was the subject of a Public Consultation. The ENAAC was adopted as Resolution of the Council of Ministers no. 24/2010 on 1 April 2010.¹³⁶³

Since the first ENAAC, sectoral working groups have been defined. Presently, each working group is coordinated or chaired by the relevant central body (or bodies) of the central administration, which ensures the involvement of the various sectoral agents:

- Agriculture - Directorate of Planning and Policies (Gabinete de Planeamento, Políticas e Administração Geral- GPP); Directorate General for Agriculture and Rural Development (Direção-Geral de Agricultura e Desenvolvimento Rural - DGADR)

¹³⁶¹ Presently also including Circular Economy.

¹³⁶² See <http://www.apambiente.pt/index.php?ref=16&subref=81&sub2ref=118&sub3ref=955>

¹³⁶³ Agência Portuguesa do Ambiente, Estratégia Nacional de Adaptação às Alterações Climáticas - Fase 1, URL: <https://www.apambiente.pt/index.php?ref=16&subref=81&sub2ref=118&sub3ref=391>, Date accessed on 15/05/18

- Biodiversity - Institute for Nature Conservation and Forests (Instituto da Conservação da Natureza e das Florestas - ICNF)
- Economy - General Directorate of Economic Activities (Direção-Geral das Atividades Económicas - DGAE)
- Energy - Directorate General for Energy and Geology (Direção-Geral da Energia e Geologia - DGEG)
- Forests - ICNF
- Health - General Directorate of Health (Direção-Geral da Saúde - DGS)
- Safety of people and assets – National Authority for Civil Protection (Autoridade Nacional de Proteção Civil - ANPC)
- Transports and communications – Institute of Mobility and Transports (Instituto da Mobilidade e dos Transportes - IMTT); National Authority for Communications (Autoridade Nacional de Comunicações - ANACOM)
- Coastal areas and sea - APA; Directorate General for Maritime Policy (Direção-Geral de Política do Mar -DGPM)

Lessons from the implementation of the first NAS were taken into consideration in developing the second NAS, the ENAAC 2020. The ENAAC 2020 was adopted as Resolution of the Council of Ministers no. 56/2015 on 30 July.¹³⁶⁴ In addition to the sectoral working groups defined above, six cross-cutting “thematic area” working groups were created (all coordinated by the APA and the competent authority in the area, where applicable):

1. Research and innovation (co-coordination by Foundation for Science and Technology - FCT)
2. Financing adaptation
3. International cooperation (co-coordination by Camões – Institute for Cooperation and Portuguese Language)
4. Communication and promotion (co-coordination by Portuguese Met Office – IPMA)
5. Integrating adaptation into spatial planning policy (co-coordination by Directorate General for Spatial Planning and Portuguese Municipalities Association)
6. Integrating adaptation in water management

Taking into account the ENAAC 2020's vision, objectives and thematic areas, each working group has the following competencies:

- a. Identify impacts, vulnerabilities and adaptation measures
- b. Integrate adaptation into sectoral policies
- c. Identify knowledge needs and failures
- d. Promote sectoral studies, identify funding sources and monitoring mechanisms
- e. Prepare plan and activity report
- f. Contribute to the work of the thematic areas

¹³⁶⁴ Agência Portuguesa do Ambiente, A Estratégia Nacional de Adaptação às Alterações Climáticas 2020, URL: <https://www.apambiente.pt/index.php?ref=16&subref=81&sub2ref=118&sub3ref=955>, Date accessed on 15/05/18

g. Articulate, when necessary, with other working groups.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / In progress / No

Vertical coordination mechanisms were/are present within the governance systems for the drafting and implementation of the first and second NAS.

The governance structures include the Autonomous Regions of Azores and Madeira, and the National Association of Portuguese Municipalities (Associação Nacional De Municípios Portugueses - ANMP) under the Coordination Group. During the drafting of the first NAS, vertical coordination was assured through the Climate Change Commission, which included representatives of the Autonomous Regions of Azores and Madeira¹³⁶⁵. The Coordination Group of the first NAS (EN AAC) supported the revision of the Strategy that led to the second NAS (EN AAC 2020).

Vertical coordination is currently also assured in NAS implementation focused on the work programme of Thematic Area 5 (“Integrating adaptation into spatial planning policy), which identifies relevant work for mainstreaming adaptation into all territorial scales and instruments (see more information in Indicator 8c.).

Under the Regional Strategy for Climate Change, the Autonomous region of Azores has created a specific governance structure related to climate change, the Climate Change Commission for the Autonomous Region of the Azores¹³⁶⁶, gathering entities responsible for health, agriculture, forestry, civil protection, transport, spatial planning, coastal protection, and climate experts.

For the purposes of implementing the regional strategy, Madeira has established an adaptation community, which includes a coordination structure and a stakeholders panel; the latter includes private as well as public entities.

The ANMP promotes Covenant of Mayors for Energy and Climate initiatives at national level and also articulation between municipalities, enhancing their participation in this framework, as established in a partnership agreement between ANMP and the Commission.¹³⁶⁷ As of May 2018, over 126 Portuguese cities are signatories, the largest of which are: Almada, Barcelos, Braga, Cascais, Funchal, Guimarães, Leiria, Lisboa, Loures, Matosinhos, Oeiras, Porto, Setúbal, Sintra, Vila Nova de Famalicão, Vila Nova de Gaia, Viseu.¹³⁶⁸ The EN AAC 2020

¹³⁶⁵ As stated in the Council of Ministers resolution no. 72/1998, of 29th June

¹³⁶⁶ Governo dos Açores, Azores will have commission for climate change

<http://www.azores.gov.pt/Portal/en/entidades/sraf/noticias/Azores+will+have+commission+for+climate+change.htm?WBCMODE=ybtaemgtvxscpta> Date accessed: 05/06/2018

¹³⁶⁷ Associação Nacional Municípios Portuguese, URL: <http://www.anmp.pt/index.php/a-anmp/117> Date accessed: 05/06/2018

¹³⁶⁸ See: *Global Covenant of Mayors for Climate and Energy* URL: <https://www.globalcovenantofmayors.org/>, Date accessed on 19/04/2018.

also promoted the ClimAdaPT.Local project, which led to the development of 27 municipal adaptation strategies and to mainstreaming adaptation into local planning.

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

The consultative process during the first stage of the ENAAC (2010-2013) involved stakeholders and experts in defining and working on research priorities for each of the sectors. This often resulted in an exhaustive collection of key action areas and adaptation measures published in sectoral reports.

The revision of the strategy (EN AAC 2020) was submitted to public consultation during 2015. The process for revising the Strategy followed the principle of stakeholder involvement in policy development and was widely discussed within its coordination group, and by the respective coordinators and chairs of the sectoral working groups.

The EN AAC 2020 reiterates the importance of engaging a large number of stakeholders in the definition of adaptation policies and planning. The organisational structure consists of nine sectoral working groups and six cross-cutting “thematic area” working groups, as shown in Table 1.¹³⁶⁹

Table 1 – Working groups in the EN AAC 2020

Thematic areas (cross-cutting) working groups	Sectoral working groups
1. Research and innovation	1. Agriculture
2. Financing adaptation	2. Biodiversity
3. International cooperation	3. Economy
4. Communication and promotion	4. Energy
5. Integrating adaptation into spatial planning policy	5. Forest
6. Integrating adaptation in water management	6. Health
	7. Safety of people and assets
	8. Transport and Communications
	9. Coastal zones

Each of these groups has responsibility for involving and consulting with stakeholders, who provided important contributions for the sectoral strategies and reports. Universities, academics, NGOs, relevant associations, the private sector and social partners were actively involved in the review and planning process at the sector level.

¹³⁶⁹ Agência Portuguesa do Ambiente, (2013). Relatório de Progresso Estratégia Nacional de Adaptação às Alterações Climáticas

Stakeholder consultation is supported by two other structures: a scientific panel and the Inter-Ministerial Commission on Air and Climate Change (Comissão Interministerial do Ar e das Alterações Climáticas - CIAAC). The scientific panel guarantees the engagement of the scientific community and can provide knowledge-based support to the ENAAC's coordination group. The CIAAC¹³⁷⁰ guarantees political support.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

One of the cross-cutting thematic areas of the ENAAC 2020 is 'International Cooperation'. The objectives of the thematic area are to enable collaboration with other countries, where necessary, to implement the ENAAC 2020¹³⁷¹. The main responsibilities include to:

- Identify priority areas for international collaboration, and ensuring coherence with Portugal's wider foreign affair priorities
- Establish an Iberian cooperation system for adaptation to support implementation of strategies, an integrated intervention in border regions, and to streamline the current mechanisms for water resources management of river basins shared by both countries
- Participate in international networks with a focus on climate adaptation, promoting knowledge exchange and the establishment of project development partnerships.

According to the 2015-2016 interim progress report on the implementation of the ENAAC 2020¹³⁷², particular progress has been made with the establishment of an Iberian cooperation system. This was due to the launch of the LIFE SHARA project (Sharing Awareness and Governance of Adaptation to Climate Change in Spain), which is co-financed by the EU and aims to strengthen climate adaptation governance in Spain and Portugal, and thereby increase resilience to climate impacts. It includes an action dedicated to establishing a framework for Iberian cooperation to identify common risks, vulnerabilities, priorities and actions. Other specific objectives include holding an Iberian conference on adaptation. The LIFE SHARA project began in September 2016 and will last until February 2021. A number of information-exchange workshops are being organised on a routine basis.

Historically, Spain has been Portugal's key partner for transboundary cooperation. Spain and Portugal share five important river basins, with two-thirds of their borders delineated by these rivers or their tributaries, the Miño/Minho, Lima/Lima, Duero/Douro, Tajo/Tejo, and Guadiana. Cooperation with Spain is longstanding, including an agreement on water management. In 1998, the Albufeira Convention on Cooperation for the Protection and Sustainable Use of the Waters of the Portuguese-Spanish River Basins was signed.

¹³⁷⁰ CIAAC was created for the monitoring of climate policy and sectoral policies impacting on national air quality and climate goals and presently includes also Circular Economy.

¹³⁷¹ Agência Portuguesa do Ambiente, (2015). *Estratégia Nacional de Adaptação às Alterações Climáticas (ENAAAC 2020)*

¹³⁷² Agência Portuguesa do Ambiente, (2016). *Estratégia Nacional de Adaptação às Alterações Climáticas - RELATÓRIO INTERCALAR #1 - 2015-2016*

Moreover, the interim progress report also states the intention of the International Cooperation Thematic Area to continue supporting traditional partners of Portuguese cooperation (Portuguese-speaking African countries) on matters of climate adaptation in the period 2017-2020.

Further global transboundary cooperation takes place under the UN Convention to Combat Desertification (UNCCD). Portugal participates in joint actions with several countries of the Mediterranean basin (including non-European ones), contributing to knowledge sharing and knowledge transfer on climate adaptation. Finally, under the UNFCCC commitments, Portugal has also supported several adaptation projects meeting priority targets of the Portuguese Cooperation Policy, i.e. Portuguese Speaking African Countries (Países Africanos de Língua Oficial Portuguesa - PALOP) and East Timor. Annual reporting of these actions take place under Article 16 of the EU's Mechanism for Monitoring and Reporting (MMR).

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / In progress / No

There are observation systems in place to monitor climate change, extreme climate events and their impacts in Portugal. The Portuguese Institute of Sea and Atmosphere (Instituto Português do Mar e da Atmosfera - IPMA¹³⁷³) is the body responsible for carrying out observations for meteorological and climatological purposes. These activities mainly concern availability and quality of long-term climate data series. These data are essential for studies of climate change, particularly in terms of trends and extreme temperatures. Furthermore, IPMA is managing the project “MeteoGlobal”¹³⁷⁴ that allows any citizen to report, in almost real-time, the occurrence of severe weather events.

IPMA is also responsible for monitoring extreme events, such as droughts, heatwaves, heavy rainfall and strong winds. It has established several indicators for climate modelling, which are available at Portugal's Climate Portal¹³⁷⁵, including aridity, drought, fire risk, evapotranspiration and heatwave duration.

Apart from the Climate Portal, there are two other related national databases focusing on extreme weather-related events:

¹³⁷³ Instituto Português do Mar e da Atmosfera, URL: <http://www.ipma.pt/pt/index.html> Date accessed: 05/06/2018

¹³⁷⁴ MeteoGlobal, URL: <http://meteoglobal.ipma.pt/> Date accessed: 05/06/2018

¹³⁷⁵ Portal do Clima, URL: <http://portaldoclima.pt/en/> Date accessed: 05/06/2018

- Since 2006, the National Authority of Civil Protection (ANPC)¹³⁷⁶ has maintained a national database on disaster response and losses and publishes this information in the yearbooks of civil protection events
- The APA keeps the records of the historical marks of floods and of its network of meteorological and hydrological monitoring stations. These data are available on the National System of Environmental Information (*Sistema Nacional de Informação de Ambiente* - SNIAmb)¹³⁷⁷.

Finally, Portugal participates in several European and international weather monitoring projects.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / **In progress** / No

The "Climate Change in Portugal: Scenarios, Impacts, and Adaptation Measures" (SIAM)¹³⁷⁸ projects are the most comprehensive and integrated assessments on the impacts and vulnerabilities associated with climate on mainland Portugal, Azores and Madeira. The first report was published in 2001 (SIAM I) for mainland Portugal, and was updated with information on Azores and Madeira in 2006 (SIAM II). The studies were based on future climate scenarios and associated effects on a number of socio-economic sectors and biophysical systems, including hydrological resources, coastal areas, energy, forests and biodiversity, fishing, agriculture and health. A sociological analysis of climate change in Portugal was also performed. Although there is no overall assessment of climate impacts on the economy, annual costs associated with forest fires (not counting the recent huge fires of 2017) are estimated at EUR 60-140 million. The estimated costs of droughts are around EUR 290 million for 2005, more than EUR 200 million for 2012, mainly due impacts on agricultural production, and a similar figure for the most recent drought in 2017-18.

The 'Strategic Plans in the face of Climate Change' of Sintra¹³⁷⁹ and Cascais¹³⁸⁰ drew upon two multi-sectoral studies aimed at characterizing impacts and opportunities at the municipal level in an integrated way. Socio-economic and climate scenarios were published for those municipalities in 2009 and 2010 using the Temez climate model and Hadley Centre Coupled Model – Version 3 (HadCM3) respectively. Despite these projects not being very recent, they remain as reference points for climate scenarios and impacts in Portugal and are still consistently used to support adaptation projects. In order to improve the quality and access to

¹³⁷⁶ Autoridade Nacional de Proteção Civil, <http://www.prociv.pt/en-us/Pages/default.aspx> Date accessed: 05/06/2018

¹³⁷⁷ Sistema Nacional de Informação de Ambiente, URL: <http://sniamb.apambiente.pt> Date accessed: 05/06/2018

¹³⁷⁸ In the SIAM project, phase 1 (2003) and phase 2 (2006), a series of scenarios and models were considered, including the IPCC 2002 SRES Scenarios, Global Climate Models and Hadley Centre regional climate models.

¹³⁷⁹ Camara Municipal Sintra, Planos Municipais Adaptação Climática, URL http://www.cm-sintra.pt/index.php?option=com_phocadownload&view=category&download=500:plano-estrategico-do-csnt-face-as-alteracoes-climaticas&id=74:planos-municipais, Date accessed: 05/06/2018

¹³⁸⁰ Plano Estrategico de Cascaise Face às Alterações Climáticas, URL: <http://cciam.fc.ul.pt/prj/pecac/>, Date accessed: 05/06/2018

this kind of information, the Climate Portal was developed by IPMA under the Programme AdaPT. It has become an easy access platform¹³⁸¹ with data from the historical time series, climate projections and sectoral climatic indicators for mainland Portugal.

Furthermore, within ClimAdaPT.Local, 27 local adaptation strategies were developed and published in 2016, with the involvement of municipalities. These strategies used scenarios and climate projections to identify current and future geographical vulnerabilities as well as adaptation options, including their evaluation and integration in territorial management instruments.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

The main impacts and risks identified in the SIAM projects (see Indicator 3b above) include:

- Changes in flood and drought regimes, as well as changes in the quality and availability of water
- Loss of land in coastal areas
- A significant increase in the risk of fire hazards
- A considerable increase in air pollution levels and ecological disturbances, which may lead to significant changes in the dynamics of infectious disease transmission, as well as regional variations in agricultural productivity
- An increase in erosion processes and consequently of flooded areas
- An increase in irrigation water requirements and in water stress in dryland crops.

The SIAM and Climate and Meteorology of the Atlantic Archipelagos (Clima e Meteorología dos Arquipélagos Atlânticos – CLIMAAT, see Indicator 3d below) projects constitute an initial light pre-screening that identified priority sectors and some potential adaptation measures.

Sound climate risk and vulnerability assessments for priority vulnerable sectors have been produced as part of the Sectoral Strategies under Phase 1 of the ENAAC¹³⁸², covering the sectors under all of the ENAAC's sectoral working groups, except economy and transport. These activities were coordinated under the ENAAC coordination group led by the executive committee for climate change. There was also a progress report produced by the Environment Agency in September 2013¹³⁸³, which included key outcomes of each of the studies below. Furthermore, it included an Annex, prepared by the Directorate General of Territories and Urban Areas, with a number of international case studies covering climate change risks, governance of adaptation, financing and adaptation measures identified.¹³⁸⁴

¹³⁸¹ Portal do Clima, URL: <http://portaldoclima.pt/en/> Date accessed: 05/06/2018

¹³⁸² Agência Portuguesa do Ambiente, Estratégia Nacional de Adaptação às Alterações Climáticas - Fase 1, URL: <https://www.apambiente.pt/index.php?ref=16&subref=81&sub2ref=118&sub3ref=391>, Date accessed on 15/05/18

¹³⁸³ Agência Portuguesa do Ambiente, (2013). Relatório de Progresso Estratégia Nacional de Adaptação às Alterações Climáticas

¹³⁸⁴ Direcção Geral do Ordenamento do Território e Desenvolvimento Urbano, (2013). Análise de Estratégias Internacionais no âmbito das Alterações Climáticas, URL:

Table 2 - Details of risks/vulnerability assessments studies produced by each working group

Sectoral working groups	Details of risk and vulnerability assessments
Agriculture	A study on adaptation in agriculture and forests was produced by the Ministry of Agriculture. Another report was published in April 2013, ¹³⁸⁵ which covers evolution in climate, sectoral characterisation, potential impacts and adaptive capacity, and proposed adaptive measures.
Forestry	In January 2013, a study was produced by the ICNF on adaptation in forests, ¹³⁸⁶ which covers characterisation of the forestry sector, future scenarios, impacts and potential response capacity, forest fires, and a synthesis.
Biodiversity	In February 2013, a study was produced by the ICNF on adaptation in forests, ¹³⁸⁷ which covers the legal framework for biodiversity, conservation of biodiversity in Portugal, forestry sector characterisation, future scenarios, impacts of climate change on biodiversity, adaptation measures, and financing mechanisms.
Energy	A study was produced by the Portuguese Directorate General for Energy and Geology on adaptation in the energy sector in December 2012 ¹³⁸⁸ covering the vulnerabilities of the energy sector, recommended adaptation measures and barriers to adaptation.
Water resources and coastal areas	In August 2012, a study was produced by the APA ¹³⁸⁹ covering climate impacts and associated adaptation strategies, including in water management and usage. Relevant sectors include those included in this table plus tourism and coastal zones.

https://www.apambiente.pt/_zdata/Politicass/AlteracoesClimaticas/Adaptacao/ENAAC/RelatDetalhados/Relat_Sector_ENAAC_Ordenamento_do_Territorio.pdf, Date accessed on 16/05/2018.

¹³⁸⁵ Ministério da Agricultura, do Mar, do Ambiente e do Ordenamento do Território, (2013). Estratégia De Adaptação Da Agricultura E Das Florestas Às Alterações Climáticas. URL:

https://www.apambiente.pt/_zdata/Politicass/AlteracoesClimaticas/Adaptacao/ENAAC/RelatDetalhados/Relat_Sector_ENAAC_Agricultura.pdf, Date accessed on 16/05/2018.

¹³⁸⁶ Instituto da Conservação da Natureza e das Florestas, (2013), Adaptação Das Florestas às Alterações Climáticas, URL:

https://www.apambiente.pt/_zdata/Politicass/AlteracoesClimaticas/Adaptacao/ENAAC/RelatDetalhados/Relat_Sector_ENAAC_Florestas.pdf, Date accessed on 16/05/2018.

¹³⁸⁷ Instituto da Conservação da Natureza e das Florestas, (2013), Estratégia Nacional De Adaptação às Alterações Climáticas - Sector Da Biodiversidade -URL:

https://www.apambiente.pt/_zdata/Politicass/AlteracoesClimaticas/Adaptacao/ENAAC/RelatDetalhados/Relat_Sector_ENAAC_Biodiversidade.pdf, Date accessed on 16/05/2018.

¹³⁸⁸ Direção-Geral de Energia e Geologia (2012), Estratégia Nacional de Adaptação às Alterações Climáticas Medidas e Ações de Adaptação do Setor Energético, URL:

https://www.apambiente.pt/_zdata/Politicass/AlteracoesClimaticas/Adaptacao/ENAAC/RelatDetalhados/Relat_Sector_ENAAC_Energia.pdf, Date accessed on 16/05/2018.

¹³⁸⁹ Agência Portuguesa do Ambiente, (2013), Estratégia Setorial De Adaptação Aos Impactos Das Alterações Climáticas Relacionados Com Os Recursos Hídricos. URL:

https://www.apambiente.pt/_zdata/Politicass/AlteracoesClimaticas/Adaptacao/ENAAC/RelatDetalhados/Relat_Sector_ENAAC_Recursos_Hidricos.pdf, Date accessed on 16/05/2018.

Health	In July 2011, a study ¹³⁹⁰ was produced by the Directorate General of Health on the implications for health of climate impacts on extreme thermal events, water, air, disease transmission vectors, food, and extreme hydrological events.
Safety of people and assets	In December 2012, a study was produced by the Ministry of Internal Administration on climate impacts on the safety of people and assets ¹³⁹¹ , covering key vulnerabilities, forest-fire and flooding scenarios, and adaptation measures.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / In progress / No

Climate impacts on the coastal area of Spain bordering Portugal are briefly mentioned in SIAM I (2003) and then examined in SIAM II (2006). The need for cooperation to avoid increased damage is underlined as an outcome of the project.

In the 2003 CLIMAAT project¹³⁹², a consortium of several institutions of the Azores and Canary Islands, which included Madeira in 2006 (under the CLIMAAT II Interreg IIIB Project) sought to improve methodologies and knowledge in the field of meteorology and climatology, including climate change, with a focus on those islands' environments. From this initiative some significant common climate impacts on the Atlantic Archipelagos were identified.

Ongoing revisions to river basin management plans are making use of climate scenarios that include data from the common river basins shared between Spain and Portugal. The data was collected by IPMA through the EURO-CORDEX programme¹³⁹³.

The Transnational Operational Programme for Madeira-Azores-Canary Islands (MAC 2014-2020)¹³⁹⁴ is a further example of transboundary cooperation involving regional authorities from Madeira, Azores and the Canary Islands: (Portugal and Spain).

Moreover, it is the responsibility of the NAS (ENAAAC 2020) 'International Cooperation' Thematic Area to take such transboundary risks into consideration, as described in Indicator 2b.

¹³⁹⁰ Direção Geral da Saude, (2011), Alterações Climáticas E Saúde Humana 'Estado Da Arte'. URL: https://www.apambiente.pt/_zdata/Politicas/AlteracoesClimaticas/Adaptacao/ENAAAC/RelatDetalhados/Relat_Sector_ENAAAC_Saude.pdf, Date accessed on 16/05/2018.

¹³⁹¹ Ministerio da Admninstraçao Interna, (2012). Alterações Climáticas. URL: https://www.apambiente.pt/_zdata/Politicas/AlteracoesClimaticas/Adaptacao/ENAAAC/RelatDetalhados/Relat_Sector_ENAAAC_Saude.pdf, Date accessed on 16/05/2018.

¹³⁹² Centro do Clima, meteorologia, e mudanças globais da universidade dos Açores, Projectos CLIMAAT e CLIMARCOST, URL: <http://www.clima.azores.gov.pt/>, Date accessed: 15/06/2018

¹³⁹³ EURO-CORDEX - Coordinated Downscaling Experiment - European Domain, URL: <http://www.euro-cordex.net/>, Date accessed: 15/06/2018

¹³⁹⁴ Governo dos Açores, Açores 2020, URL: <http://poa.azores.gov.pt/en/noticias/azores-and-the-european-territorial-cooperation-2020-new-challenges-and-opportunity/> Date accessed: 15/06/2018

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / In progress / No

In the 2013 ENAAC's Progress Report, specific knowledge gaps were identified at sector level, particularly for the agriculture, water and spatial planning sectors. Furthermore, the report highlighted the need for a dedicated research programme on climate change for Portugal. This gap was first addressed through adaptation-focused research programmes within CIRCLE-2, under the EU's Seventh Framework Programme for research (FP7). CIRCLE-2 is a European network of 34 institutions from 23 countries that funds research, shares knowledge on climate adaptation, and promotes long-term cooperation among national and regional climate change programmes.

The second NAS (ENAAAC 2020) has a specific overarching objective to “Improve the level of knowledge about climate change” and has created a dedicated cross-cutting thematic area on “Research and Innovation”. As a part of the implementation of the NAS, the Research and Innovation Working Group and sectoral working groups must report progress against the aforementioned objective. The first such progress report covers the period 2015-2016, with further iterations in 2018 and 2020. In the first report, each sectoral working group reported extensively on the actions taken against the objective, such as the creation of dedicated research programmes within relevant ministries (e.g. the Energy Working Group reported on the research being carried out within the Directorate General of Energy and Geology to update the vulnerabilities identified in the first NAS). In addition, the working groups had to identify knowledge gaps, and list the actions being taken to resolve these (e.g. the Agriculture Working Group has put forward a proposal to develop a prioritised national agenda on adaptation research)¹³⁹⁵.

Meanwhile, the cross-cutting Working Group on Research and Innovation focused principally on creating opportunities for Portuguese scientists to participate in national and international research projects on adaptation. This was achieved principally by disseminating knowledge about funding opportunities to the scientific community, particularly EU-level funding (H2020, LIFE, INTERREG, ERA4CS, etc.), and Portuguese institutions already participate in several relevant EU-funded research projects.¹³⁹⁶ In addition, the Working Group aimed to

¹³⁹⁵ Agência Portuguesa do Ambiente, (2016). Estratégias Nacional de Adaptação às Alterações Climáticas - *RELATÓRIO INTERCALAR #1 - 2015-2016*

¹³⁹⁶ a) BRIGAIID - BRIDges the GAp for Innovations in Disaster resilience (ongoing project); b) CERES (ongoing project) - Climate change and European aquatic RESources; c) HYDRALAB+ (ongoing project) Adapting to climate change; d) PLACARD (ongoing project) - PLATform for Climate Adaptation and Risk reduction; e) RESCCUE (ongoing project) - RESilience to cope with Climate Change in Urban arEas - a multisectorial approach focusing on water; f) BINGO (ongoing project) - Bringing INnovation to onGOing water management – A better future under climate change; g) KNOWHOW (closed project) - Knowledge production, communication and negotiation for coastal governance under climate change; h) ERA4CS (ongoing project) - European Research Area for Climate Services; i) MATRIX (closed project) - New Multi-HAZard and MulTi-RiSk Assessment MethodS for Europe; j) CIRCLE-2 (closed project) - Climate Impact Research & Response Coordination for a Larger Europe - 2nd Generation ERA-Net -Science meets Policy; k) BASE (closed project) - Bottom-up Climate Adaptation Strategies towards a Sustainable Europe; l) BRIDGE SMS (ongoing project) -

map research activities and to improve their financing. Furthermore, the scientific panel that integrates the governance of the ENAAC 2020 is presently developing a research agenda dedicated to climate change that will serve as a framework for research priorities. It is coordinated by the Foundation for Science and Technology (FCT), the Portuguese public agency that supports science, technology and innovation in all scientific domains, and receives support from the APA.

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / In progress / No

Information about adaptation policy is currently available within the APA's website.¹³⁹⁷ IPMA's project (mentioned above) has also created an easy access platform¹³⁹⁸ with data from historical time series, climate projections and sectoral climatic indicators for the geographical coverage of mainland Portugal. A project financed by Programme AdaPT consisted of a collaborative platform for the adoption of climate adaptation measures in industry and services. This platform, adaptIS¹³⁹⁹, is now a reference platform that collects adaptation measures, tools and case studies.

In addition, an ESIF application is being prepared in relation to the ENAAC 2020 to develop a national adaptation portal where all relevant information will be made available to all stakeholders, including the general public.

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / In progress / No

Capacity building is a specific objective that has been formulated in the ENAAC. Capacity building mainly takes place through delivery of project's climate adaptation objectives. Several national and regional projects and activities have taken place in Portugal to raise awareness and understanding of adaptation and to promote information sharing, including:

- INTERREG IVC project Facts! (Forms for Adapting to Climate Change through Territorial Strategies)¹⁴⁰⁰. The project exchanges good practices, and transfer knowledge about climate adaptation. Key outcomes:
 - A handbook that provides a framework to define and implement territorial integrated strategies in the context of climate adaptation in risk-prone areas.

Intelligent Bridge Assessment Maintenance and Management System; m) IMPRESSIONS (ongoing project) - Impacts and risks from higher-end scenarios: Strategies for innovative solutions; n) EnviCOP (closed project) - Environmentally Friendly Coastal Protection in a Changing Climate.

¹³⁹⁷ Agência Portuguesa do Ambiente, Adaptação, URL:

<http://www.apambiente.pt/index.php?ref=16&subref=81&sub2ref=118>, Date accessed on 15/05/18

¹³⁹⁸ Portal do Clima, URL: <http://portaldoclima.pt/en/> Date accessed: 05/06/2018

¹³⁹⁹ Adaptis, URL: <http://www.adaptis.uc.pt/>, Date Accessed: 05/06/2018

¹⁴⁰⁰ Interreg IVC, F:ACTS, URL: <http://www.interreg4c.eu/projects/project-details/index-project=66-forms-for-adapting-to-climate-change-through-territorial-strategies&.html>, Date accessed: 05/06/2018

- A pilot study on the Landscape Multi-functionality of Baixo Vouga Lagunar, which is directed to climate adaptation in a specific coastal area.
- Several events about climate adaptation through territorial strategies, including study visits, workshops to promote involvement of local stakeholders, and coaching visits from foreign partners to increase the adaptive capacity of local stakeholders.
- CLIMAAT I and II, which developed specific methodologies for studying the meteorology and climate regions of the Atlantic islands and their surroundings. The projects produced and disseminated information that spurred scientific cooperation.
- Programme AdaPT, which developed under the EEA Grants 2009-2014 programming. AdaPT focused on two main areas of activity:
 - Increasing capacity to assess vulnerability to climate change. The project ClimAdaPT.Local mentioned in Indicator 9b was a key initiative for building the capacities of municipalities on adaptation issues. The project provided local adaptation strategies for 27 participating municipalities (out of a total of 308 in Portugal) and guidelines for mainstreaming adaptation into planning for use by other municipalities in the country. Several other sectoral pilot projects were developed under the programme ClimAdaPT.Local, namely on water resources, forestry, tourism and biodiversity¹⁴⁰¹.
 - Raising awareness and education on climate change. The University of Oporto developed a project with 30 schools all over the country, with the overall objective to communicate with, train and raise the awareness of the school community on how to prevent climate impacts and implement adaptation measures¹⁴⁰².

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

Adaptation options considered are consistent with the results of sectoral risk assessments, albeit the latter are sometimes based on a light screening (e.g. SIAM projects, the ENAAC sectoral reports). Geographical issues are included, especially within the scope of local adaptation strategies and of sectors, such as biodiversity and coastal areas.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

¹⁴⁰¹ Agência Portuguesa do Ambiente, Sectoral Projects, URL: <http://apambiente.wixsite.com/adapt/sectorial-projects>, Date accessed: 05/06/2018

¹⁴⁰² Agência Portuguesa do Ambiente, Education and Climate Change, URL: <http://apambiente.wixsite.com/adapt/education-and-award-climate-change>, Date accessed: 05/06/2018

For the first phase of the ENAAC, the methods and detail for prioritising adaptation options varied from sector to sector. Actions were discussed with a large number of stakeholders (see Indicator 2a), but clear priorities were not set in most cases. For each sector a long list of measures was listed without indication of their importance, possible outputs and impacts.

Building upon the knowledge and involvement of stakeholders, a prioritised list of sectoral groups was selected that was intended to maintain the overall coherence of the ENAAC and the ENAAC 2020.

Measures are already being developed in some sectors, which either directly or indirectly contribute to the objectives of the ENAAC 2020. Similarly, regional and local level assessments of climate impacts were considered in the development of the ENAAC 2020. More work is ongoing under the ENAAC 2020 to further streamline and develop these measures, including clearer implementation, monitoring and financing. Moreover, more effective sector cooperation has been established under the thematic areas and through the coordination group to foster synergies and avoid inconsistencies. The Action Plan in development is a step in this direction.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes/ In Progress / No

The establishment of the Portuguese National Platform for Disaster Risk Reduction, in May 2010, was a key measure towards better coordination of prevention, preparedness and response activities. The Platform is chaired by the Minister for Internal Affairs and composed of delegates from other ministries and other national entities¹⁴⁰³. A consultative sub-committee of the Platform was created to promote disaster risk reduction activities. This sub-committee includes representatives from ministries and from the private sector, academic institutions, cities and professional associations (e.g. engineers, architects). The national authority for civil protection (ANPC) is liaising with the Platform about climate adaptation and is coordinating one of the sectoral working groups of the ENAAC 2020. In this way, a close cooperation and articulation between disaster risk management and climate adaptation is assured.

Under the first phase of the ENAAC, the sector working group “safety of people and assets” developed several initiatives such as:

¹⁴⁰³ Delegates of the Ministries responsible for the areas of: Defence; Justice; Economy, Transport and Communications; Public Works; Agriculture and Forests, Environment; Social Security; Health; Education and Scientific Research; The President of the National Authority for Civil Protection; Representatives of the National Association of Portuguese Municipalities, National Association of Portuguese Parishes, General Staff of the Armed Forces, National Guard, Public Security Police, Association of Professional Fire-fighters, League of Portuguese Fire-fighters (organisation representing the associations of Volunteer Fire-fighters), Judiciary Police, Security Coordination Office, Maritime and Aeronautical Authorities, National Institute for Medical Emergency, Madeira and the Azores Regional Governments.

- A Report on National Risks Assessment, including in relation to climate change, published in 2014¹⁴⁰⁴.
- Acts to support disaster reduction policy at the sectoral level, namely in forest fires, floods, climate adaptation and critical infrastructure protection.
- Good practices, including early warning systems, under adverse weather conditions, monitoring of water resources (droughts and floods), heat waves, etc.

Since then, the working group on safety of people and assets has contributed to the delivery of the ENAAC 2020 with the publication of two manuals on best practices in relation to:

- Flood risk management; and
- Risk prevention and management – resilient cities in Portugal 2016.

Another manual is being prepared about best practices for resilience within the private sector.

Portugal adopted the Hyogo Framework for Action (HFA) in 2005 and the Sendai Framework in 2015.

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / In progress /No

The development of funding mechanisms and of selection criteria for applications are some of the issues that are addressed under the thematic area “Funding and implementing adaptation” of the ENAAC 2020.

The Programme AdaPT was implemented under the EEA Grants 2009-2014¹⁴⁰⁵ with a total budget of EUR 3,529,412 (EUR 3,000,000 from EEA plus EUR 529,412 from the Portuguese Carbon Fund – FPC). AdaPT built upon the needs identified by the 2013 ENAAC progress report.

Further adaptation finance is secured by the ESIF Common Strategic Framework 2014 – 2020, as well as programmes, such as Horizon 2020, the Interreg IV-C and LIFE. Some significant programmes that implement the Common Strategic Framework at national level include:

- Several national Programmes (e.g. Portugal 2020¹⁴⁰⁶).
- The Operational Programme on Sustainability and Resource Use Efficiency (referred to as PO SEUR above), which is the most important programme for adaptation purposes in this context. It foresees funding for awareness and implementing action in

¹⁴⁰⁴ : Autoridade Nacional de Proteção Civil, *Avaliação Nacional de Risco*, 2014. URL: http://www.prociiv.pt/bk/RISCOSPREV/AVALIACAONACIONALRISCO/Documents/2016_Avaliacao_Nacional_Riscos.pdf , Date accessed: 05/06/2018

¹⁴⁰⁵ Agência Portuguesa do Ambiente, Sectoral Projects, URL: <http://apambiente.wixsite.com/adapt>, Date accessed: 05/06/2018

¹⁴⁰⁶ Portugal 2020, URL: <https://www.portugal2020.pt/Portal2020/FAQs-Tema1#3>, Date accessed 05/06/2018

adaptation – Under Axis II – "Promote climate change adaptation and risk prevention and management". Several planning instruments and tools are financed, along with specific actions, such as coastline protection and reinforcement of risk resilience, namely flood protection and forest fire risk.¹⁴⁰⁷ This funding is mainly being used to develop adaptation plans at the municipal, intermunicipal and regional level covering approximately 80% of the country.¹⁴⁰⁸

- The Rural Development Programme 2020¹⁴⁰⁹, which under Heading 3 – "Environment, Resource Efficiency Use and Climate" supports several actions on soil conservation, water efficient use in agriculture, local breeds and plant varieties, forest management and forest fire preventions, among others.
- The Transnational Operational Programme for Madeira-Azores-Canary Islands (MAC 2014-2020).

Grants from the Foundation for Science and Technology (FCT) and from the Environmental Fund (which replaced the Portuguese Carbon Fund, Decree law No.42-A/2016) are also worth mentioning as finance sources at the national level. The Environmental Fund particularly aims to support environmental policies, including climate adaptation with a special focus on actions on coastal areas and on water resources. In February 2018, the Environment Fund launched a call for funding for applications dedicated to the implementation of adaptation measures identified in strategies and plans at the municipal or intermunicipal level, and a total of EUR 1,000,000 is being made available.¹⁴¹⁰

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

The current legal framework for environmental impact assessment (EIA) in Portugal is established by Decree-Law No. 151-B/2013, amended by Decree-Law no. 152-B/2017, which transposes the EIA Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment.¹⁴¹¹

The Environment Agency provides an overview of the steps for compliance with Decree-Law no. 151-B/2013. In addition, templates and guidance documents, as well as methodological

¹⁴⁰⁷ PO SEUR, Axis II, Promote climate changes adaptation and risk prevention and management, URL: <https://poseur.portugal2020.pt/en/investment-axes/axis-ii/>, Date accessed 05/06/2018

¹⁴⁰⁸ <https://poseur.portugal2020.pt/en/applications/calls-for-applications/>

¹⁴⁰⁹ Programa de Desenvolvimento Rural 2013-2020, URL: <http://www.pdr-2020.pt/site/O-PDR2020/Arquitetura>, Date assessed 05/06/2018

¹⁴¹⁰ Fundo Ambiental Portugal, *Apoiar a Adaptação às Alterações Climáticas*, URL: <http://www.fundoambiental.pt/avisos-2018/apoiar-a-adaptacao-as-alteracoes-climaticas.aspx>, Date accessed: 17/05/2018

¹⁴¹¹ Agência Portuguesa do Ambiente, Avaliação de Impacte Ambiental > Legislação Aplicável. URL: <https://www.apambiente.pt/index.php?ref=17&subref=146&sub2ref=477>, Date accessed on 16/05/2018.

guides on the development of EIA, are easily available on the Environment Agency website.¹⁴¹²

Climate Change is considered in Strategic Environmental Assessment (SEA) at the screening stage and is frequently identified as a critical factor for decision-making (CFD) in the scoping phase. When considered a CFD, adaptation is addressed (e.g. flood risk plans/maps in the context of different land uses) at an early stage of the decision-making process.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / No

A National Risk Assessment was carried out by the National Authority for Civil Protection (ANPC) in January 2014¹⁴¹³. This identifies and characterizes likely natural, technological and hybrid risks and, where relevant, take account of how they may be accentuated or attenuated by the impact of climate change.

For each risk, the study describes the assessment methodology and data used, a prioritisation (on the basis of probability and extent of damages), and measures to reduce the risks, including climate adaptation. The report describes the different types of adaptation measures (autonomous, planned and anticipative) and indicates the need for a systematic analysis of past weather events, the development of an early warning system and the importance of building capacity to respond to climate extremes. In addition, it presents other risk reduction measures being taken within the framework of the NAS (ENAAC 2020).

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / No

One of the cross cutting thematic areas for ENAAC 2020 is dedicated to “Integrating adaptation into spatial planning policy.” Apart from coordinating with sectoral working groups covering Coastal Zones (which includes maritime planning) and Transport and Communications (which has some on spatial and urban planning), the specific objectives of this thematic area include:¹⁴¹⁴

- Promote the dissemination of information and other resources to guide the management of climate adaptation at local and regional levels
- Promote the integration of analysis and mapping of vulnerabilities and adaptation measures in territorial policy planning tools

¹⁴¹² Agência Portuguesa do Ambiente, Modelos e Documentos de Orientação. URL: <https://www.apambiente.pt/index.php?ref=17&subref=146&sub2ref=672>, and Guias Metodológicos para a Elaboração de Estudos de Impacte Ambiental URL: <https://www.apambiente.pt/index.php?ref=17&subref=146&sub2ref=673>, Date accessed on 16/05/2018.

¹⁴¹³ Autoridade Nacional de Proteção Civil, *Avaliação Nacional de Risco*, 2014. URL: http://www.prociv.pt/bk/RISCOSPREV/AVALIACAONACIONALRISCO/Documents/2016_Avaliacao_Nacional_Riscos.pdf, Date accessed: 05/06/2018

¹⁴¹⁴ Agência Portuguesa do Ambiente, (2015). *Estratégia Nacional de Adaptação às Alterações Climáticas* (ENAAC 2020)

- Promote the development of technical guidelines to ensure the integration of the adaptation to climate change in territorial management instruments
- Promote integration of adaptation into the National Spatial Planning Policy (Programa Nacional da Política de Ordenamento do Território- PNPOT)¹⁴¹⁵
- Promote the integration of adaptation to climate change in the Sustainable Urban Development;

Of particular importance has been the integration of the outputs of adaptation plans at national and subnational levels (municipal, inter-municipal and regional) into the revision of the national spatial planning strategic policy documents and action plan (PNPOT) which was in public consultation until 15th June 2018.¹⁴¹⁶ The proposed strategic document highlights climate change as a critical trend the spatial planning policy must take into consideration¹⁴¹⁷ when designing territorial planning policies. The action plan identifies measures in the following domains and scope:¹⁴¹⁸

- Natural domain – includes specific measures for protecting coastal and urban areas, therefore covering maritime and urban planning
- Territorial governance domain – proposes specific measures to improve territorial and multi-governmental collaboration, including geographical scope – local (rural, urban, inter-municipal) regional and transboundary.

As for coastal management, the Action Plan for the Protection and Enhancement of the Shore (Plano de Ação de Proteção e Valorização do Litoral - PAPVL) 2012-2015 highlights the risks and impacts connected to climate change and population development for the coastal areas of Portugal. Adaptation measures are identified for all the zones at risk. The main aim is to carry out interventions protecting people and assets and reducing the risk of damage. Rehabilitation interventions are also envisaged. The new Programmes for Coastal Areas take into consideration the findings of a Specific Working Group that focused on coastal dynamics and climate change impacts¹⁴¹⁹, and are progressively including climate change impacts for future interventions¹⁴²⁰.

¹⁴¹⁵ Direcção Geral do Ordenamento do Território e Desenvolvimento Urbano, Alteração Do PNPOT – Documentos Para Discussão Pública Disponíveis, URL: <http://pnpot.dgterritorio.pt/node/275>, Date accessed on 16/05/2018.

¹⁴¹⁶ Personal communication with MS contact

¹⁴¹⁷ Direcção Geral do Ordenamento do Território e Desenvolvimento Urbano, (2018). PNPOT – Alteração Estratégia E Modelo Territorial Versão para Discussão Pública, URL: <http://pnpot.dgterritorio.pt/node/275>, Date accessed on 16/05/2018.

¹⁴¹⁸ Direcção Geral do Ordenamento do Território e Desenvolvimento Urbano, (2018). PNPOT | Alteração Agenda para o Território (Programa de Ação) Versão para Discussão Pública, URL: <http://pnpot.dgterritorio.pt/node/275>, Date accessed on 16/05/2018.

¹⁴¹⁹ Agência Portuguesa do Ambiente, Relatório do Grupo de Trabalho do Litoral- Gestão da Zona Costeira O Desafio da Mudança, (2014). URL:

http://sniamb.apambiente.pt/infos/geoportaldocs/docs/Relatorio_Final_GTL2015.pdf, Date accessed: 05/06/2018

¹⁴²⁰ Agência Portuguesa do Ambiente, Programas de Orla Costeira, URL: <https://www.apambiente.pt/index.php?ref=16&subref=7&sub2ref=10&sub3ref=1193> Date accessed: 05/06/2018

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / **In progress** / No

The main driver for mainstreaming policy at the sectoral level is the NAS's organisational structure, which provides a clear indication of the willingness to promote adaptation at sectoral level. The sectoral working groups below form part of the coordination group for the NAS's implementation.

While a comprehensive list of the policy instruments promoting adaptation in each sector has not been found, the table below provides an overview of the work that each sectoral working group has undertaken to promote mainstreaming of adaptation into sectoral policies. The information is taken from the first interim progress report on implementation of ENAAC 2020, reporting against the third objective of “promote mainstreaming of adaptation into sectoral policies.”¹⁴²¹

Sectoral working groups	Existing and future policy which will mainstream adaptation in sectoral policy (identified in 2015-2016)
Agriculture	Adaptation measures identified in the ENAAC 2020 will inform the sector level policy strategy document “AGRI-ADAPT 2020” which is under development.
Biodiversity	The first NAS (ENAAAC 2010) is being used as a starting point to integrate adaptation in a wide range of future policies for nature conservation and biodiversity, and related policy documents including financing.
Energy	Existing policy around security of energy supply and climate change mitigation are broadly in line with adaptation objectives, including policies to increase networks, adopt smart grids and promoted distributed production. An area identified for further policy development is climate proofing of energy assets.
Forest	The climate adaptation component in territorial management instruments has been strengthened, particularly the Regional Plans of Forest Management (PROF).
Safety of people and assets	The legislative framework for civil protection at the municipal level has been amended to integrate vulnerability to climatic risks and climate adaptation measures. In addition, the National Strategy for Preventive Civil Protection has incorporated climate adaptation ¹⁴²² .
Water Resources and coastal areas	As part the “Integrated Management of Coastal Zones” policy, data is being collected for a section on the `Coastal Adaptation

¹⁴²¹ Agência Portuguesa do Ambiente, (2016). Estratégia Nacional de Adaptação às Alterações Climáticas - *RELATÓRIO INTERCALAR #1 - 2015-2016*

¹⁴²² Conselho de Ministros, (2017). Resolução do Conselho de Ministros n.º 160/2017. URL:

[https://dre.pt/pesquisa/-](https://dre.pt/pesquisa/-/search/114123460/details/normal?q=Estrat%C3%A9gia+Nacional+para+uma+Prote%C3%A7%C3%A3o+Civil+Preventiva)

[/search/114123460/details/normal?q=Estrat%C3%A9gia+Nacional+para+uma+Prote%C3%A7%C3%A3o+Civil+Preventiva](https://dre.pt/pesquisa/-/search/114123460/details/normal?q=Estrat%C3%A9gia+Nacional+para+uma+Prote%C3%A7%C3%A3o+Civil+Preventiva), Date accessed 20/06/18

	Strategy'. In addition, existing and future coastal action plans (Plano de Ação para o Litoral – Litoral XXI) will integrate adaptation, as the National Maritime Strategy (Estratégia Nacional para o Mar 2013-2020) and action plan (Plano Mar-Portugal).
Health	Interim reports of the regional health administrations and the Directorate General of Health integrate adaptation priorities. Future policy documents include the regional strategies for the adaptation in the health sector in Lisbon and Tejo Valley (Estratégias Regionais de Adaptação às Alterações Climáticas - Sector Saúde por duas Administrações Regionais de Saúde (Centro e Lisboa e Vale do Tejo).
Azores	2017 regional plan for climate change (Plano Regional para as Alterações Climáticas) integrated adaptation.
Madeira	Climate adaptation is gradually being integrated in sectoral plans.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

The Portuguese Association of Insurers (Associação Portuguesa de Seguradores - APS) and the Foundation of the Faculty of Science, University of Lisbon (Fundação da Faculdade de Ciências da Universidade de Lisboa - FFCUL) developed Flood Maps and Risk in Climate Change Scenarios (Risco em Cenários de Alterações Climáticas - CIRAC). CIRAC enables the assessment of risk by providing benchmark indices that allow for different types of vulnerability and assist stakeholders to make strategic decisions. It defines flooding, the links with climate change mitigation and adaptation, and maps climate vulnerabilities and risks in Portugal.

However, there is no clear evidence that adaptation is mainstreamed in insurance or alternative policy instruments. The topic is not covered in the ENAAC 2020 policy document or the interim update report¹⁴²³. In a joint statement, the APS and FFCUL stated in 2017 that it was their hope that the CIRAC project could become a tool to assess hazards.¹⁴²⁴ Insurance companies responded to the publication of the CIRAC report, by stating that premiums will be adapted according to the degree of flood risk linked to climate change in each of the country's zones.

¹⁴²³ Agência Portuguesa do Ambiente, (2015). Estratégia Nacional de Adaptação às Alterações Climáticas (ENAAAC 2020) and (2016). Estratégia Nacional de Adaptação às Alterações Climáticas - *RELATÓRIO INTERCALAR #1 - 2015-2016*

¹⁴²⁴ Associação Portuguesa de Seguradores, (2017). Projeto CIRAC - Sessão Técnica no Ministério do Ambiente, URL: https://www.apseguradores.pt/Portal/Content_Show.aspx?ContentId=2743&PageId=51&MicrositeId=1&CategoryId=37, Date accessed: 17/05/2018

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In progress** / No

At the national level, the ENAAC and ENAAC 2020 are high-level strategies which promote mainstreaming to encourage the sectoral groups to develop and adopt their own adaptation action plans. P-3AC, which is the equivalent of a NAP, is under-development at the national level and has not yet been implemented. It is currently the subject of internal consultation and is expected to be submitted shortly for political validation and public consultation. It takes into consideration the prioritised adaptation measures for sectors and thematic areas identified in the NAS, as well as the subnational action plans (municipal, inter-municipal and to some extent regional).

At the subnational level, adaptation strategies and plans covering about 80% of the national territory have either been developed or are under development at present. As described in Section A2, ClimAdaPT.Local led to the development of 27 local adaptation strategies. The remainder of activities have been started under the PO SEUR programmes, as described in Section B2. At present very few plans at subnational level have been finalised or implemented, but exceptions include the municipalities of Cascais, Leiria, and Ílhavo.¹⁴²⁵ In February 2018, the Environment Fund launched a call for funding for applications dedicated to the implementation of adaptation measures identified in strategies and plans at the subnational level, and a total of EUR 1,000,000 is being made available.¹⁴²⁶

At the regional level, Azores finalised their action plan in November 2017, while Madeira has not yet developed an action plan.

During the first NAS (ENAAAC 2010), nine sectoral strategies were prepared by the sectoral working groups, and became actions to be implemented in the second NAS (ENAAAC 2020). The ENAAAC 2020 interim progress report indicates the progress made with implementation by each sectoral and cross-cutting thematic area working group. These are measured against the three objectives of the NAS (identified in Section A1) and the actions identified in sectoral strategies. An example of a measure under implementation includes actions by the Biodiversity Working Group aimed at “improving the level of knowledge about climate change” by making available to society and decision makers the latest scientific knowledge about biodiversity and climate adaptation. Hundreds of other actions are identified, which range from being at the proposal stage to under implementation.

In addition, one of the cross-cutting thematic area working groups (Integrating adaptation into spatial planning policy) has a crucial role to play in supporting the implementation of adaptation plans at subnational level. One of its primary objectives is to produce guidelines

¹⁴²⁵ Personal communication with MS contact

¹⁴²⁶ Fundo Ambiental Portugal, *Apoiar a Adaptação às Alterações Climáticas*, URL: <http://www.fundoambiental.pt/avisos-2018/apoiar-a-adaptacao-as-alteracoes-climaticas.aspx>, Date accessed: 17/05/2018

for transposing the adaptation measures identified in subnational plans into subnational special planning policy instruments, such as municipal master plans, thereby enshrining the plans in the relevant legal framework.¹⁴²⁷

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / No

As mentioned in Section B2 and in relation to Indicator 1c, the relevant scales at which to foster and support adaptation include the municipal, inter-municipal and regional levels. The implementation of the ENAAC 2020 is supported by a coordination group chaired by the APA and composed of the representatives of the Autonomous Regions of Azores and Madeira and of the National Association of Portuguese Municipalities, as well as the coordinators of the thematic areas and of the sectoral working groups. This group formalises cooperation in adaptation planning and implementation at the national level (sectoral and cross-cutting) and subnational level.

In addition, adaptation plans at municipal and inter-municipal levels have been developed using NAS (ENAAAC 2020) guidance, which defined the work developed under the ClimAdaPT.Local and PO SEUR programmes described for the previous indicator. While the autonomous regions have greater flexibility in this respect, they may nonetheless benefit from the guidance on collaboration. The NAP will draw explicitly on the measures identified at subnational levels.

Finally, one of the cross-cutting thematic area working groups (Integrating adaptation into spatial planning policy) will be playing a crucial role in supporting the transposition of subnational plans into spatial planning legislation. As such, the collaboration between the national level cross-cutting and sectoral working groups with the subnational levels is considered to be strongly active and integral to the implementation of the action plans at all levels.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / **No**

Climate change is one of the factors to be assessed, formally specified under the national legislation that transposes SEA Directive and reflected in the published guidance. Also specific national guidance on the integration of climate change under EIA procedure is being developed by APA.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / No

¹⁴²⁷ Personal communication with MS contact

Stakeholders (NGOs in particular) are encouraged to actively engage in implementing actions. As stated in the law, the composition of the sectoral groups of the ENAAC includes relevant stakeholders, such as major associations, NGOs and the biggest companies. They take an active part in the development of all planning and action related to sectoral and horizontal work. Climadapt.local was developed through a consortium that included a major NGO, other NGOs are involved in Programme AdaPT and in LIFE projects.

The involvement of the private sector has been motivated by self-interest. For example, EPAL, the largest production, transport and water distribution company in Portugal, is aware of the vulnerability of its activities under a likely climate scenario and has completed a study to define its medium and long-term adaptation strategy. In the water sector, the ANQIP, an NGO that promotes quality and efficiency in the water cycle in buildings, has recently decided to develop a technical specification on reuse and recycling of grey water.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / No

A progress report for the first phase of the NAS (ENAAAC) was published by the APA in 2013. It identified the vulnerable sectors, the strengths and weaknesses observed during the implementation of the ENAAC and proposed measures.¹⁴²⁸ The report highlighted the main difficulties and gaps that should be addressed in the ENAAC 2020. Furthermore, during the first phase of the NAS, nine sectoral strategies were prepared by the sectoral working groups, identifying actions to be implemented in the second NAS (ENAAAC 2020).

As part of the implementation of the NAS (ENAAAC 2020), the coordination group has a responsibility to contribute to three interim progress reports planned for 2016, 2018, and the final report and evaluation in 2020. This group will monitor the progress of work undertaken by the different sectoral and thematic areas, namely in terms of the three objectives of the Strategy.

The first interim report, regarding 2015-2016, has been published.¹⁴²⁹ The report contains a description of the events and activities that were undertaken by the working groups during that year, and a list of the key actions for each sectoral working group against the NAS objectives. For each action it is indicated whether the action is at “proposal” stage, or “initiated/underway”.

A more formal procedure is addressed in the ENAAC 2020 under the ‘Financing Adaptation’ Thematic Area, in order to establish a monitoring and review system for the overall adaptation

¹⁴²⁸ Agência Portuguesa do Ambiente, (2013). Relatório de Progresso Estratégia Nacional de Adaptação às Alterações Climáticas

¹⁴²⁹ Agência Portuguesa do Ambiente, (2016). Estratégia Nacional de Adaptação às Alterações Climáticas - *RELATÓRIO INTERCALAR #1 - 2015-2016*

process. The first interim progress report states that the working group is still developing a methodology and indicators to track the level of implementation of the measures established in adaptation plans and strategies. No evidence has been found of a mechanism to track allocated budgets and costs of actions.

The current NAP proposal establishes a monitoring, reporting and evaluation system to track allocated budgets, costs and implementation of the actions identified.

Furthermore, PO SEUR has an outcome indicator on adaptation investment to measure the “level of implementation of adaptation measures identified in strategies or plans” (R511). The APA was responsible for the indicator’s development. For this purpose, the scoreboard methodology was established, and all relevant central, regional and local entities were asked to provide feedback on implementation of adaptation actions. Quantitative results were supplied under the reporting mechanisms for ESIF funding¹⁴³⁰. Qualitative results are being analysed and are an important source of information on adaptation action in Portugal.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

The first interim report of the ENAAC's coordination group (see Indicator 10a) lists the progress made towards integration of adaptation in prioritised policy sectors (which also indicates the difficulties of limited available knowledge about climate impacts on many of these sectors).

10c. Regional, subnational or local action is monitored and the results of the monitoring are disseminated

Yes / **No**

As stated in Indicator 10a, a Common Adaptation Indicator under PO SEUR is in place, after the establishment of a methodology to determine the “Level of implementation of adaptation measures identified in strategies and plans”. This indicator is used to measure implementation of adaptation at national, regional and local level, and all organisations responsible for implementation are addressed by means of a questionnaire/scorecard.

Aggregate results were reported under the ESIF reporting mechanism in May 2018.

The ENAAC interim report, which is available currently, is not a mechanism for subnational or local monitoring and reporting. However, a report is expected by the end of 2018, which will reflect the detailed results of the PO SEUR indicator.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

¹⁴³⁰ Reported to European Commission on May 2018: Implementation+report_2014PT16CFOP001_2017_0_pt

Three evaluations of the Strategy have been foreseen by Resolutions of the Council of Ministers in 2016, 2018 and 2020. As stated under Indicator 10a, the 1st interim report, which corresponds to the first evaluation in 2016, is already available.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / No

As mentioned under Indicator 1a, a coordination group chaired by the APA supported the revision of the first ENAAC. The group is composed of the coordinators of the thematic areas and of the sectoral working groups, as well as the representatives of the Autonomous Regions of Azores and Madeira and of the National Association of Portuguese Municipalities.

The analysis that led to the progress report was based on the contributions from the working groups, which, in turn, involved their sectoral stakeholders. As such, stakeholders are involved in monitoring the implementation of adaptation measures. The review undertaken since then is a further follow up to the Strategy and a definition of the actions and measures that could be implemented at sectoral level, which build on the current involvement of stakeholders.

Stakeholder consultation is further supported by two other structures: a scientific panel and the Inter-Ministerial Commission on Air and Climate Change (CIAAC). The scientific panel guarantees the engagement of the scientific community and can provide knowledge-based support to the ENAAC's coordination group. The CIAAC¹⁴³¹ guarantees political support.

¹⁴³¹ CIAAC was created for the monitoring of climate policy and sectoral policies impacting on national air quality and climate goals.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 <i>Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	<u>Yes</u> / In progress / No
2 <i>Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 <i>Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	<u>Yes</u> / In progress / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	Yes / <u>In progress</u> / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	<u>Yes</u> / In progress / No
4 <i>Knowledge gaps</i>		

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	<u>Yes</u> /In progress /No
5 <i>Knowledge transfer</i>		
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	<u>Yes</u> /In progress / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	<u>Yes</u> / In progress / No
Step C: Identifying adaptation options		
6 <i>Identification of adaptation options</i>		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	<u>Yes</u> / In Progress / No
7 <i>Funding resources identified and allocated</i>		
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	<u>Yes</u> / In progress /No
Step D: Implementing adaptation action		
8 <i>Mainstreaming adaptation in planning processes</i>		
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into	<u>Yes</u> / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	account climate change impacts and projections	
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	<u>Yes</u> / No
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	Yes / <u>In progress</u> / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 <i>Implementing adaptation</i>		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	<u>Yes</u> / No
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	Yes / <u>No</u>
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	<u>Yes</u> / No
Step E: Monitoring and evaluation of adaptation activities		
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10c	Regional-, subnational or local action is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
11 <i>Evaluation</i>		

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	<u>Yes</u> / No

Adaptation preparedness scoreboard for Romania

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List of abbreviations

ANAR	National Administration Romanian Waters
ANM	National Meteorological Administration
EEA	European Economic Area
EIA	Environmental Impact Assessment
ESIF	European Structural and Investment Funds
EUSDR	EU Strategy for the Danube Region
GIES	General Inspectorate for Emergency Situations
MEWF	Ministry of Environment, Waters and Forests
NAP	National Adaptation Plan
NAS	National Adaptation Strategy
NCCC	National Commission for Climate Change
SEA	Strategic Environmental Assessment

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

Romania adopted its National Climate Change Strategy (NAS) 2013-2020¹⁴³² in July 2013. The Strategy is divided in two parts, the first describes the mitigation-related aspects, the second addresses climate adaptation to climate change, so is hereafter referred to as the National Adaptation Strategy (NAS). The aim of the NAS is to provide an overall framework for action, as well as guidelines that would enable each of the priority sectors identified to develop their own action plans and align them with national strategic principles. The 13 priority sectors identified in the NAS are: industry; agriculture and fisheries; tourism; public health; buildings and infrastructure; transport; water resources; forests; energy; biodiversity; insurance; recreation activities; and education.

The NAS identifies two major sets of adaptation actions to be undertaken – specific actions at the national level, and indicative categories of sectoral adaptation actions. A very preliminary vulnerability and impact analysis is sketched out for the 13 priority sectors, and potential adaptation actions are recommended for most sectors. The NAS provides a brief outline of the existing and necessary resources dedicated to adaptation (touching in general terms on human resources, funding and information/knowledge). It also presents the proposed overall institutional framework for coordinating and implementing future adaptation actions.

A two-year programme to operationalise the National Climate Change Strategy¹⁴³³ resulted in the development of a National Climate Change and Low Carbon Green Growth Strategy (2016-2030)¹⁴³⁴ and an associated Action Plan on Climate Change (2016-2020)¹⁴³⁵, adopted through Government Decision 739/2016. The new Strategy and Action Plan cover both mitigation and adaptation. The priority sectors identified in the NAS 2013-2020 were maintained in the new NAS.

¹⁴³² Ministerul Mediului și Schimbărilor Climatice, 2013, Strategia națională a României privind schimbările climatice 2013 – 2020. Available at: http://www.mmediu.ro/beta/wp-content/uploads/2013/10/2013-10-01_SNSC.pdf

¹⁴³³ World Bank, 2015, Romania: Climate Change and Low Carbon Green Growth Program, project website available at: <http://www.worldbank.org/en/country/romania/brief/romania-climate-change-and-low-carbon-green-growth-program>

¹⁴³⁴ Strategia națională privind schimbările climatice și creșterea economică bazată pe emisii reduse de carbon pentru perioada 2016-2030 [National Climate Change and Low Carbon Green Growth Strategy 2016-2020], Annex 1 to Government Decision 739/2016, available at: <http://www.mmediu.ro/categorie/strategia-nationala-privind-schimbările-climatice-rezumat/171>

¹⁴³⁵ Planul național de acțiune pentru implementarea Strategiei naționale privind schimbările climatice și creșterea economică bazată pe emisii reduse de carbon pentru perioada 2016-2030 [National action plan for the implementation of the National Climate Change and Low Carbon Green Growth Strategy 2016-2020], Annex 2 to Government Decision 739/2016, available at: <http://www.mmediu.ro/categorie/strategia-nationala-privind-schimbările-climatice-rezumat/171>

A2. Adaptation strategies adopted at subnational levels

For the time being, there is no centralised information or evidence about adaptation strategies being developed at regional, sub-regional or local levels. However, there are some projects that aim to develop strategies, measures and local guidelines for adapting to climate change.

The project “Danube Delta Integrated Sustainable Development Strategy (2030)”¹⁴³⁶ (completed in 2015) identified a series of priority areas for intervention and key projects within each sector based on a number of criteria: expected impact towards the strategic objectives, geographical breadth, level of preparedness, and financial and administrative sustainability. Among the actions proposed was a reference to develop clear and easy to use local guidelines for climate change and energy efficiency programmes.

The Environmental Protection Agency Sibiu, the monitoring and coordination environmental body for the Region 7 Centre, implemented a project aiming to develop a set of good practices on adaptation to climate change, “Greenways for Sustainable Development” in February 2015 – April 2016. The project was part of the RO 07 programme, financed via the Financial Mechanism of the European Economic Area (EEA Grants).¹⁴³⁷ This project was also intended to provide a valuable model of good practices that could be replicated in other regions and to support the capacity building on climate data and climate experts in the field. The project promoted concerted and coordinated action to adapt to climate change in the Central Region of Romania and contributed to a better understanding of climate impacts and variability in all vulnerable sectors. The project supported local public authorities in three municipalities - Braşov¹⁴³⁸, Sibiu¹⁴³⁹ and Târgu Mureş¹⁴⁴⁰ – to develop local strategies and action plans on climate adaptation. These three municipalities represent about 3% of the population of Romania.¹⁴⁴¹

¹⁴³⁶ The project was developed by the Government of Romania through the Ministry of Regional Development and Public Administration (MRDPA) with the support of the World Bank. More information available at: http://www.mdrap.ro/userfiles/delta_dunarii/draft_Danube_Delta_Strategy.pdf

¹⁴³⁷ Calea Verde, Project website, URL: <https://caleaverde.ro/?lang=en>, date accessed: 16/05/2018.

¹⁴³⁸ Cristea, M. and Varvari, S., 2016, Strategie privind adaptarea la schimbarile climatice in Municipiul Brasov, available at: <http://caleaverde.ro/wp-content/uploads/2016/08/Plan-de-actiune-privind-adaptarea-la-schimbarile-climatice-in-Municipiul-Brasov.pdf>

¹⁴³⁹ Cristea, M. and Varvari, S., 2016, Strategie privind adaptarea la schimbarile climatice in Municipiul Sibiu, available at: <http://caleaverde.ro/wp-content/uploads/2016/08/Strategia-privind-adaptarea-la-schimbarile-climatice-in-Municipiul-Sibiu.pdf>

¹⁴⁴⁰ Cristea, M., 2016, Strategie privind adaptarea la schimbarile climatice in Municipiul Târgu Mureş, available at: <http://tirgumures.ro/pdf/caleaverde/Strategia%20privind%20adaptarea%20la%20schimbarile%20climatice.pdf>

¹⁴⁴¹ Based on 2016 data from the National Statistics Institute, URL: <http://www.insse.ro/cms/ro/content/populatia-romaniei-pe-localitati-la-1-ianuarie-2016>

Adaptation action plans

B1. National adaptation plan

A National Climate Change Action Plan¹⁴⁴² with a distinct adaptation component (hence, hereafter referred to as the National Adaptation Plan – NAP) was developed within the project Romania: Climate Change and Low Carbon Green Growth Programme¹⁴⁴³ undertaken by the Government of Romania, through the Ministry of Environment, Waters and Forests (MEWF) with the World Bank. The NAP, adopted in 2016, includes actions and timelines, identifies institutions responsible for each action, and recommends criteria and indicators to assess how the objectives can be/have been met.

B2. Adaptation plans adopted at sub-national level

There is currently no centralised information or evidence about adaptation action plans developed at subnational levels.

As mentioned in Section A2, climate adaptation plans for three municipalities – Sibiu¹⁴⁴⁴, Târgu Mureş¹⁴⁴⁵ and Braşov¹⁴⁴⁶ – were developed in the framework of the project “Green Path towards Sustainable Development”. It is unclear whether any other adaptation plans exist at sub-national level.

B3. Sectoral adaptation plans

The NAS 2013¹⁴⁴⁷ outlined a set of national adaptation actions to be developed and implemented (including mainstreaming adaptation into various policy areas). The NAS was also intended to enable the priority sectors to start developing and implementing their own sectoral adaptation plans. These sectors were: industry; agriculture and fisheries; tourism; public health; constructions and infrastructure; transport; water resources; forestry; energy;

¹⁴⁴² Planul național de acțiune pentru implementarea Strategiei naționale privind schimbările climatice și creșterea economică bazată pe emisii reduse de carbon pentru perioada 2016-2030 [National action plan for the implementation of the National Climate Change and Low Carbon Green Growth Strategy 2016-2020], Annex 2 to Government Decision 739/2016, available at: <http://www.mmediu.ro/categorie/strategia-nationala-privind-schimbarile-climatice-rezumat/171>

¹⁴⁴³ World Bank, 2015, Romania: Climate Change and Low Carbon Green Growth Program, project website available at: <http://www.worldbank.org/en/country/romania/brief/romania-climate-change-and-low-carbon-green-growth-program>, date accessed: 16/05/2018

¹⁴⁴⁴ Cristea, M. and Varvari, S., 2016, Plan de acțiune privind adaptarea la schimbările climatice în Municipiul Sibiu, URL: <http://caleaverde.ro/wp-content/uploads/2016/08/Plan-de-actiune-privind-adaptarea-la-schimbarile-climatice-in-Municipiul-Sibiu.pdf>

¹⁴⁴⁵ Cristea, M. and Varvari, S., 2016, Plan de acțiune privind adaptarea la schimbările climatice în Municipiul Târgu Mureş, URL: <http://caleaverde.ro/wp-content/uploads/2016/08/Plan-de-actiune-privind-adaptarea-la-schimbarile-climatice-in-Municipiul-Targu-Mures.pdf>

¹⁴⁴⁶ Cristea, M. and Varvari, S., 2016, Plan de acțiune privind adaptarea la schimbările climatice în Municipiul Braşov, URL: <http://caleaverde.ro/wp-content/uploads/2016/08/Plan-de-actiune-privind-adaptarea-la-schimbarile-climatice-in-Municipiul-Brasov.pdf>

¹⁴⁴⁷ National strategy on tackling climate change 2013-2020, available at: http://www.mmediu.ro/beta/wp-content/uploads/2013/10/2013-10-01_SNSC.pdf

biodiversity; insurance; recreational activities; education. We could not find information on the existence of separate sectoral adaptation plans. However, the NAS 2016-2030 and the NAP 2016-2020¹⁴⁴⁸ provide a series of proposed adaptation actions at sectoral level addressing the priority sectors identified in the previous NAS 2013-2020: industry; agriculture and rural development; tourism and recreational activities; public health; human environment, infrastructure and urbanism; transport; drinking water and water resources; forestry; energy; biodiversity; insurance; education. Furthermore, some adaptation measures are already included in the existing sectoral strategies and plans, notably for agriculture¹⁴⁴⁹ and flood risk management¹⁴⁵⁰.

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

In Romania, the MEWF¹⁴⁵¹ is the central body designated to coordinate the adaptation policy-making process, NAS and NAP. The ministry co-ordinates the integration of environmental protection requirements into national legislation and sectoral policies, including the creation of legal, institutional, administrative and financial instruments for promoting the integration of climate change in sectoral policies.¹⁴⁵²

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

¹⁴⁴⁸ Planul național de acțiune pentru implementarea Strategiei naționale privind schimbările climatice și creșterea economică bazată pe emisii reduse de carbon pentru perioada 2016-2030 [National action plan for the implementation of the National Climate Change and Low Carbon Green Growth Strategy 2016-2020], Annex 2 to Government Decision 739/2016, available at: <http://www.mmediu.ro/categorie/strategia-nationala-privind-schimbarile-climatice-rezumat/171>

¹⁴⁴⁹ Ministerul Agriculturii și Dezvoltării Rurale, 2015, Strategia pentru dezvoltarea sectorului agroalimentar pe termen mediu și lung orizont 2020-2030, URL: <http://www.madr.ro/strategia-pentru-dezvoltarea-sectorului-agroalimentar-pe-termen-mediu-si-lung-orizont-2020-2030.html>

¹⁴⁵⁰ Government of Romania, 2010, Strategia Națională de Management al Riscului la Inundații pe termen mediu și lung (perioada 2010 – 2035), URL: http://www.mmediu.ro/app/webroot/uploads/files/2012-01-10_risc_inundatii_hg846din2010aprobarenmri.pdf

¹⁴⁵¹ See: <http://www.mmediu.ro/>

¹⁴⁵² Strategia națională privind schimbările climatice și creșterea economică bazată pe emisii reduse de carbon pentru perioada 2016-2030 [National Climate Change and Low Carbon Green Growth Strategy 2016-2020], Annex 1 to Government Decision 739/2016, available at: <http://www.mmediu.ro/categorie/strategia-nationala-privind-schimbarile-climatice-rezumat/171>

During the development of the NAS 2013-2020, a horizontal coordination mechanism was in place. The MEWF consulted a number of line ministries and government agencies, as well as research institutes, an NGO and an umbrella association of the Romanian municipalities. A working group was established to carry out the environmental assessment of the NAS and NAP, comprising representatives from all relevant ministries.¹⁴⁵³

In November 2014, Government Decision no. 1026/2014 led to the reorganisation of the National Commission for Climate Change (NCCC) as a framework that enhances inter-ministerial coordination towards meeting Romania's climate objectives. According to this regulatory document, the proposed structure of the NCCC includes representatives from 16 ministries or agencies with competencies in the climate change area and also contains a technical working group of the representatives of 34 institutions at the operational level. The Government Decision no. 1026/2014, enables the NCCC to modify and update the NAS and NAP. Thus, the NCCC is designated as the principal operational structure ensuring a proper governance system for adaptation.

The new NAS was adopted in 2016. A working group, composed of representatives from ministries involved in activities regarding the NAP, was established at ministerial level, with the participation of the NCCC. The working group has held several meetings with the line ministries, agencies, municipalities and organisations with responsibilities for implementation of the NAP in order to prioritise or reconsider the implementation of actions included in the Plan. To date, consultations have been held with the Ministry of Transport, National Regulatory Agency for Energy, Ministry of Labour, Ministry of Regional Development and Public Administration, Bucharest City Hall, Environmental Fund Administration, Ministry of European Funds and Chamber of Commerce and Industry.¹⁴⁵⁴

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / In progress / No

Although no regional organisations or county administrations (i.e. NUTS-2 or NUTS-3 levels respectively) were directly involved in the development of the NAS 2013-2020, the active participation of the Association of the Romanian Municipalities (an umbrella organisation) provided satisfactory vertical coordination across various levels of administration.

As noted under Indicator 1b, a working group composed of representatives of ministries involved in the implementation of the NAP held meetings and consultations which included municipalities.

¹⁴⁵³ Raport de Mediu la Strategia națională privind schimbările climatice și creșterea economică bazată pe emisii reduse de carbon (CRESC) și Planul Național de Acțiune 2016-2020 privind schimbările climatice, available at: http://www.mmediu.ro/app/webroot/uploads/files/2015-09-24_Raport_Mediu_CRESC_final.pdf

¹⁴⁵⁴ Personal communication with MS contact.

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

Stakeholders that were actively involved in the development of the NAS 2013-2020 included the research sector (represented by several research institutes) and an NGO active in tackling climate change. Furthermore, during a self-assessment exercise carried out by the European Environment Agency (EEA) in 2013, the Romanian authorities reported that the private sector, various interest groups and the wider public were duly informed and consulted during the process.

A stakeholder consultation process also took place during the development of the NAS and NAP 2016-2030, as part of the Strategic Environmental Assessment (SEA) procedure. The first version of the NAS 2016-2030 was subject to a public consultation.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

While transboundary cooperation is not mentioned in the NAS (2013 or 2016), Romania is part of various transnational initiatives focusing on adaptation.

Transnational and cross-border cooperation comprises research components, policy-making activities and some implementation measures (mainly related to flood risk management). As such, teams of climate researchers, hydrologists, experts in environmental protection, experts in disaster management, and stakeholders from the forestry and agriculture sectors have participated in a number of transnational projects dealing with vulnerability assessments and adaptation measures.

With regard to policy-making processes, Romania contributed to the development of the EU Strategy for the Danube Region (EUSDR). This macro-regional strategy includes, among others, measures and actions for tackling the flood risk along the Danube. From an implementation point of view, relevant activities include joint planning, sharing best practices and joint capacity building facilitated by the EUSDR, as well as the proposed joint actions for tackling flood risks, desertification and heat waves to be implemented with the support of the Romania-Bulgaria Cross-border Cooperation Programme 2014-2020¹⁴⁵⁵.

¹⁴⁵⁵ Interreg V-A - Romania-Bulgaria, URL: http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/Territorial%20co-operation/2014tc16rfcb021, date accessed: 15/05/2018

Romania is an active party to the Commission on the Protection of the Black Sea Against Pollution¹⁴⁵⁶. Within this framework, the Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea adopted on 17 April 2009 in Sofia, Bulgaria considered, among other objectives, the assessment of climate impacts on the Black Sea ecosystem and sustainable development of the coastal population.

Romania was a partner in the transnational project "Joint Disaster Management risk assessment and preparedness in the Danube macro-region" (SEERISK) and contributed to the elaboration and testing of a common risk assessment methodology for the Danube region. The project partners (including Romania) also elaborated a guideline on climate adaptation and risk assessment in the Danube macro-region in 2014.¹⁴⁵⁷

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / **In progress** / No

The Romanian National Meteorological Administration (ANM in Romanian) is monitoring climate change and extreme weather events and has its own department for research. Thus, it plays a key role in providing data and research for climate adaptation. The ANM is also an active partner in a number of EU-funded transnational research projects that produced climate models and projections, such as the FP7 project European Reanalysis and Observations for Monitoring (EURO4M)¹⁴⁵⁸. The ANM website provides information about the current and future climate. The ANM is responsible for monitoring meteorological parameters – such as air temperature and pressure, precipitation, humidity, wind speed and direction – while the National Administration Romanian Waters (ANAR in Romanian) is responsible for monitoring surface water, groundwater and water quality. The ANM is also performing research regarding variability and change in climate-related hazards, predictability and regional numerical modelling.

The General Inspectorate for Emergency Situations (GIES), part of the Ministry of Internal Affairs is responsible for the coordination, prevention and management of emergency situations. GIES relies largely on information from ANM and ANAR to forecast climate-

¹⁴⁵⁶ More information can be found at: http://www.blacksea-commission.org/_bssap2009.asp, date accessed: 15/05/2018

¹⁴⁵⁷ SEERISK, 2014, Guideline on Climate Change Adaptation and Risk Assessment in the Danube Macro-Region, URL: http://www.rsoe.hu/projectfiles/seeriskOther/download/climate_change_adaptation.pdf

¹⁴⁵⁸ EURO4M project website, URL: <http://www.euro4m.eu/projectinfo.html>, date accessed: 16/05/2018

related emergency situations (e.g. floods).¹⁴⁵⁹ Records of historical extreme events exist, including floods, forest fires and droughts.

As regards the observation and monitoring of impacts (e.g. casualties, financial losses), the World Bank study underpinning the development of the NAS 2016-2030 mentions that several assessments of past impacts have been conducted by various organisations, but notes the lack (in 2014) of a standard evaluation methodology and national database containing information on damages.¹⁴⁶⁰ As we could not find evidence that the observation systems in place include systematic records on impacts, this indicator is assessed as being ‘in progress’.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

Climate projections from the ANM are available for Romania.¹⁴⁶¹ Climate scenarios to 2001-2030 (compared to 1961-1990) were elaborated through a project which commenced in 2008, funded by the MEWF.¹⁴⁶² Climate projections for Romania were obtained through both statistical and dynamic downscaling methods, applied to global and regional climate models, based on the IPCC Fourth Assessment Report (AR4) emissions scenario A1B.

Results from numerical experiments with ensembles of EURO-CORDEX models under new representative concentration scenarios RCP 4.5 and 8.5 (IPCC AR5) have also been analysed to document climate change over the Romanian territory.¹⁴⁶³

Several modelling exercises based on different scenarios were carried out to support the development of the NAS 2016-2020, including:

- Agricultural sector: modelling the effects by 2040 of three climate scenarios (low, medium, high) on the productivity of different crop types and on water demand for

¹⁴⁵⁹ World Bank, 2014, Monitorizarea efectelor schimbărilor climatice și a riscurilor în România: Evaluarea situației și a necesităților, http://www.fonduri-ue.ro/images/files/studii-analize/48145/Raport%20A.2.2.%20Monitorizare%20efecte%20si%20riscuri%20climatice_RO.pdf

¹⁴⁶⁰ Ibid.

¹⁴⁶¹ Website of the National Administration of Meteorology, <http://www.meteoromania.ro/anm2/clima/>

¹⁴⁶² Busuioc, A., Caian, M., Bojariu, R., Boroneant, C., Cheval, S., Baci, M. and Dumitrescu, A., undated, Scenarii de schimbare a regimului climatic in Romania pe perioada 2001-2030, available at: <http://www.mmediu.ro/categorie/link-uri-utile/103>

¹⁴⁶³ Bojariu R, Bîrsan MV, Cîcă R, Velea L, Burcea S, Dumitrescu A, Dascălu SI, Gothard M, Dobrinescu A, Cărbunaru F, Marin L., 2015, Climate change – from physical basis to risks and adaptation (in Romanian with abstract in English), Editor Printech, Bucharest, 200 p, ISBN: 978606-23-0363-1, DOI: 10.13140/RG.2.1.1341.0729, URL: <http://www.meteoromania.ro/anm/images/clima/SchimbariClimatice2014.pdf>

irrigation, in 12 hydrographical regions of Romania; the effect of different adaptation measures was also assessed.¹⁴⁶⁴

- Water sector: climate impacts on mean annual flow were quantified for four river basins of Romania: Buzau, Ialomita, Arges, and Mures.¹⁴⁶⁵ Recently, in another study, the Arges, Mures, Prut, Siret and Somes basins have been analysed from the standpoint of variability and change in their monthly potential run-off under scenarios RCP 4.5 and RCP 8.5.¹⁴⁶⁶
- Energy sector: modelling climate impacts on hydropower under different scenarios.¹⁴⁶⁷

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

A number of studies are available regarding climate impacts on water supply, water scarcity and drought impacts on agriculture, and comprehensive flood risk assessments have been completed for the major river basins. Furthermore, the NAS 2013-2020 involved a very rough and preliminary impact assessment at sectoral level. However, the NAS also acknowledged that a more detailed impact assessment should be run at sectoral level for identifying the main climate threats (or opportunities) and identifying appropriate adaptation measures.

Through the project developed by MEWF and World Bank¹⁴⁶⁸, rapid assessment reports were delivered in 2014, including climate impacts and vulnerabilities for six sectors: water, agriculture, forestry, energy, urban, and transport. The analytical work carried out within the

¹⁴⁶⁴ Strategia națională privind schimbările climatice și creșterea economică bazată pe emisii reduse de carbon pentru perioada 2016-2030 [National Climate Change and Low Carbon Green Growth Strategy 2016-2020], Annex 1 to Government Decision 739/2016, available at: <http://www.mmediu.ro/categorie/strategia-nationala-privind-schimbarile-climatice-rezumat/171>

¹⁴⁶⁵ Pahuja, S., Bica, I., Niculescu, C., Ionita, G., Fagarasan, A., Stanciu, P., Davy, T., Talbi, A., Paul, T., and Liden, R., 2014, Romania - Climate change and low carbon green growth program: component B sector report - integrated water resources rapid assessment, Washington DC; World Bank Group, available at:

<http://documents.worldbank.org/curated/en/675851468094456585/Romania-Climate-change-and-low-carbon-green-growth-program-component-B-sector-report-integrated-water-resources-rapid-assessment>

¹⁴⁶⁶ Bojariu, R., S I Dascălu, M Gothard, A Dumitrescu, R Cică, S Burcea, L Velea, M-V Bîrsan, V Craciunescu, A Irimescu, M Matreata, V Chendeș, B Boincean, Valeriu Cazac, V Potopová and A Nita, 2018, Variability and Change in Water Cycle at the Catchment Level, in Engineering and Mathematical Topics in Rainfall, T V Hromadka II (Ed.), IntechOpen. ISBN: 978-1-78923-019-2, URL: <https://www.intechopen.com/books/engineering-and-mathematical-topics-in-rainfall/variability-and-change-in-water-cycle-at-the-catchment-level>

¹⁴⁶⁷ Strategia națională privind schimbările climatice și creșterea economică bazată pe emisii reduse de carbon pentru perioada 2016-2030 [National Climate Change and Low Carbon Green Growth Strategy 2016-2020], Annex 1 to Government Decision 739/2016, available at: <http://www.mmediu.ro/categorie/strategia-nationala-privind-schimbarile-climatice-rezumat/171>

¹⁴⁶⁸ World Bank, 2015, Romania: Climate Change and Low Carbon Green Growth Program, project website available at: <http://www.worldbank.org/en/country/romania/brief/romania-climate-change-and-low-carbon-green-growth-program>

project developed by the MEWF and the World Bank expanded upon and replaced existing work from several completed EU-supported, multi-country/multi-year assessments, in particular, Climate Change and Variability: Impact on Central and Eastern Europe (CLAVIER), completed in 2009, and Central and Eastern Europe Climate Change Impact and Vulnerability Assessment (CECILIA), completed in 2010 (see below).

Case studies about heat waves risk assessment in Western Romania's urban areas were developed by the SEERISK project.¹⁴⁶⁹

An overarching methodology was developed through the project RO-RISK – support for the fulfilment of ex-ante Conditionality 5.1. – risk assessment at national level.¹⁴⁷⁰ The project was completed in 2016.

Additionally, a risk analysis and screening approach for climate mitigation and adaptation options was delivered to the MEWF as a milestone within the project 'Climate Change and Low Carbon Green Growth' (see above) – “Report on the analysis and risk assessment mitigation and adaptation actions and options in key policies”.¹⁴⁷¹

Other recently completed international projects which provide information on climate impacts and vulnerability in Romania include:

- CECILIA: Central and Eastern Europe Climate Change Impact and Vulnerability Assessment¹⁴⁷² - provides studies on air quality in urban areas, water management and water quality, hydrology, agriculture and forestry. The National Meteorological Administration was involved in the study "Climate change impacts on Agriculture and Forestry sectors."
- CLAVIER: Climate Change and Variability: Impact on Central and Eastern Europe¹⁴⁷³ - the main objective of this project was to investigate climate impacts on weather patterns, air pollution, extreme events and water resources in Central and Eastern Europe. Romania was involved in the projects "Impact on the hydrological and agricultural regime" and "Economic Vulnerability of CEE Societies and Economic Impact Assessment."

¹⁴⁶⁹ Papathoma-Koehle M, Promper C, Bojariu R, Cica R, Sik A, Perge K, Laszlo P, Czikora EB, Dumitrescu A, Turcus C, Birsan MV, Velea L, Glade T., 2016, A common methodology for risk assessment and mapping for south-east Europe: an application for heat wave risk in Romania, Nat Hazards, 82, pp. 89-109, doi 10.1007/s11069-016-2291-3; SEERISK project website, URL: <http://www.seeriskproject.eu/seerisk/#main>, date accessed: 16/05/2018

¹⁴⁷⁰ Country report 5.1 Conditionality Romania 2016, deliverable of the "National Risk Assessment – RO RISK", available at: https://www.igsu.ro/documente/RO-RISK/Raport_Final_de_tara.pdf; Metodologia de evaluare a riscurilor și de integrare a evaluărilor de risc sectoriale, <https://www.igsu.ro/documente/RO-RISK/Metodologia%20de%20evaluare%20unitara%20a%20riscurilor%20-%20versiune%20finala.pdf>

¹⁴⁷¹ World Bank (2015) Romania: Climate Change and Low Carbon Green Growth Program, project website available at: <http://www.worldbank.org/en/country/romania/brief/romania-climate-change-and-low-carbon-green-growth-program>

¹⁴⁷² CECILIA project website, URL: <http://www.cecilia-eu.org/>, date accessed: 16/05/2018

¹⁴⁷³ CLAVIER project website, URL: <http://www.clavier-eu.org/>, date accessed: 16/05/2018

- WATERCoRe: Water scarcity and droughts - Co-ordinated activities in European Regions¹⁴⁷⁴ - provides a platform for information exchange on water deficit, drought and climate change problems, as well as a manual of good practices and technological measures.
- CCWaters - Climate Change and Impacts on Water Supply¹⁴⁷⁵: the main objective of this project was to identify and evaluate climate impacts on availability and safety of public drinking water supply for several decades into the future, and resulting land-use changes.
- Climate adaptation measures in Romanian agriculture¹⁴⁷⁶ - pilot project (within the OrientGate project) providing adaptation options in agriculture.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

At transnational level, a hazard map for flood risk in the Danube river basin is available (developed in the framework of the Danube FloodRisk Project).¹⁴⁷⁷ However, there is not yet evidence that transboundary risks are systematically taken into account in other sectors.

The Environmental Impact assessment (EIA) that accompanied the NAP 2016-2020 ascertained that there were no measures and actions included in the plan that could generate significant cross-border effects.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / **In progress** / No

The NAS 2013-2020 includes as the first two priority actions with regard to adaptation: updating climate scenarios; and supporting research activities in the field of climate change and creating a national climate change database. The NAS 2016-2030 also identifies knowledge gaps regarding climate impacts on the water sector, flood risk management, and the energy sector. However, information could not be found on the progress in research efforts to date, or on the processes employed for periodically tackling knowledge gaps. It is

¹⁴⁷⁴ WATERCoRe project website, URL: <http://www.watercore.eu/>, date accessed: 16/05/2018

¹⁴⁷⁵ CC-WaterS project website, URL: <http://ccwaters.eu/>, date accessed: 16/05/2018

¹⁴⁷⁶ ORIENTGATE project website, URL: <http://www.orientgateproject.org/>. See also: <http://climate-adapt.eea.europa.eu/metadata/publications/climate-change-adaptation-measures-in-romanian-agriculture>, date accessed: 16/05/2018

¹⁴⁷⁷ Danube FloodRisk Project, URL: <http://www.icpdr.org/main/activities-projects/danube-floodrisk-project>, date accessed: 4/05/2018

also unclear how priority knowledge gaps are used to direct funding to climate adaptation research.

The National Administration for Meteorology develops projects and studies based on the strategic documents and guidelines. Studies falling under its remit include SEERISK - Changing risks in changing climate, and OrientGate – a structured network for integration of climate knowledge into policy and territorial planning. The project results are available on the respective project websites (see footnotes 38 and 45 under Indicator 3c).

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / **In progress** / No

Climate-related information (including some projections and brief information on adaptation-related policies and legislation) is available on the ANM website.¹⁴⁷⁸ The ANM website has a specific section on climate adaptation.¹⁴⁷⁹ The MEWF website¹⁴⁸⁰ also contains a section on climate change, with a sub-section dedicated to adaptation. It includes brief information on the international, EU, and national policy framework and links to the NAS and NAP. Vulnerability and risk assessments and adaptation tools are not the subject of specific sections on the ANM or MEWF websites. The visibility and breadth of information on these webpages could be improved.

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / **In progress** / No

The NAS 2013-2020 and NAS 2016-2030 do not explicitly foresee capacity building measures, however, they do refer to actions on information and awareness-raising, particularly among citizens. It is unclear whether capacity building activities are carried out in a coordinated way, driven by the NAS/NAP.

However, a number of projects with capacity building components have recently been carried out in the country, for example:

¹⁴⁷⁸ Website of the National Administration of Meteorology, URL: <http://www.meteoromania.ro/anm2/clima/>, date accessed: 16/05/2018

¹⁴⁷⁹ Adaptarea la Schimbarile Climatice, URL: <http://www.meteoromania.ro/anm2/clima/adaptarea-la-schimbarile-climatice/>, date accessed: 15/05/2018.

¹⁴⁸⁰ Website of the Ministry of Environment, URL: http://www.mmediu.ro/categorie/adaptarea-asc/101_date, date accessed: 16/05/2018

- ‘Making operational the National Strategy on Climate Change and the Development of the Climate Component of the Operational Programmes 2014-2020’ (a World Bank technical assistance project building the capacity of the MEWF with regard to climate action, including adaptation)
- OrientGate (implemented in 2012-2015, a project covering 13 Southern and Eastern European countries, included communication of up-to-date climate knowledge for the benefit of policy makers, such as urban planners, nature protection authorities, regional and local development agencies, and territorial and public works authorities), see footnote 45
- ‘A Green Way to Sustainable Development’ (implemented in 2015-2017; one of the project’s objectives was to educate, inform and develop knowledge through training programmes focused on climate adaptation and effects of vulnerable sectors).¹⁴⁸¹

One of the strategic objectives of the RO 007 Programme (see Section A2) was “enhancing capacity, knowledge and awareness on assessing and reducing the vulnerability to climate change of institutions, organizations and the public in Region 7”. Promotional materials were developed to disseminate project results, to inform and raise awareness of climate adaptation among stakeholders (brochures, flyers, press releases, publications) and were used in workshops and conferences. At the same time, the project website, Facebook page and knowledge base were created. An awareness and information campaign on climate adaptation at local and regional level was conducted, including through press releases, press conferences, a TV advertising campaign, street campaigns, exhibitions, etc.¹⁴⁸²

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

The NAS 2013-2020 mentions some preliminary potential adaptation actions for many of the 13 priority sectors. The NAS 2016-2030, extending the previous one, was complemented with a NAP with identifiable actions, timelines and indicators.¹⁴⁸³ The actions proposed in the NAP

¹⁴⁸¹ ClimateADAPT Country Information: Romania, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/romania>, date accessed: 16/05/2018

¹⁴⁸² Personal communication from Member State contact.

¹⁴⁸³ Planul național de acțiune pentru implementarea Strategiei naționale privind schimbările climatice și creșterea economică bazată pe emisii reduse de carbon pentru perioada 2016-2020 2030 [National action plan for the implementation of the National Climate Change and Low Carbon Green Growth Strategy 2016-2020], Annex 2 to Government Decision 739/2016, available at: <http://www.mmediu.ro/categorie/strategia-nationala-privind-schimbarile-climatice-rezumatoare/171>

cover all the sectors prioritised in the NAS. The proposed actions address geographical specificities where applicable. For six sectors, the selection of the actions was underpinned by rapid risk assessments (as described with respect to Indicator 3c). For the remainder, the methodology used for the identification of adaptation options is unclear.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

The selection of actions in the NAP was done through stakeholder consultation, taking into consideration primarily the sectoral priorities, the availability of additional financing apart from the national budget sources and the climate relevance of the actions. Expert judgement prevailed (also during the stakeholder consultations), although more complex tools were at times employed, especially in relation to climate change measures and actions proposed in sectors with a higher co-financing rate from European Structural and Investment Funds.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / In progress / No

It is not clear how climate change considerations are integrated into disaster risk reduction planning. A National Platform for Disaster Risk Reduction was established in October 2016¹⁴⁸⁴ and rendered operational in December 2017,¹⁴⁸⁵ but it is unclear to what extent climate change considerations will be integrated in its work.

Disaster risk reduction does not feature prominently in the NAS 2013-2020, however, the it mentions that “the General Inspectorate for Emergency Situations should be more involved in the process of climate adaptation, given that climate change represents a matter of national security.” In the updated NAS 2016-2030¹⁴⁸⁶ and associated NAP¹⁴⁸⁷, the emergency response

¹⁴⁸⁴ Government of Romania, 2016, Organizarea și funcționarea Platformei naționale pentru reducerea riscurilor la dezastre, reglementată de Guvern, <http://gov.ro/ro/guvernul/sedinte-guvern/organizarea-si-functionarea-platfomei-nationale-pentru-reducerea-riscurilor-la-dezastre-reglementata-de-guvern>

¹⁴⁸⁵ MAI: Platforma națională pentru reducerea riscurilor la dezastre a devenit operațională, URL: <https://www.agerpres.ro/social/2017/12/19/mai-platfoma-nationala-pentru-reducerea-riscurilor-la-dezastre-a-devenit-operationala--25086>, date accessed: 15/05/2018.

¹⁴⁸⁶ Strategia națională privind schimbările climatice și creșterea economică bazată pe emisii reduse de carbon pentru perioada 2016-2020 2030 [National Climate Change and Low Carbon Green Growth Strategy 2016-2020], Annex 1 to Government Decision 739/2016, available at: <http://www.mmediu.ro/categorie/strategia-nationala-privind-schimbarile-climatice-rezumat/171>

¹⁴⁸⁷ Planul național de acțiune pentru implementarea Strategiei naționale privind schimbările climatice și creșterea economică bazată pe emisii reduse de carbon pentru perioada 2016-2020 2030 [National action plan for the implementation of the National Climate Change and Low Carbon Green Growth Strategy 2016-2020], Annex 2 to Government Decision 739/2016, available at: <http://www.mmediu.ro/categorie/strategia-nationala-privind-schimbarile-climatice-rezumat/171>

services are discussed in connection with public health. The NAS 2016-2030 also considers flood risks. It foresees that “knowledge regarding flood risk management will be improved taking into account the expected effects of climate change” and that investments in the water sector will be prioritised on the basis of hazard and flood risk maps, taking into account, as far as possible, the climate impacts.

Regarding institutionalised cooperation and procedures, the institutional mandate for the coordination, prevention and management of emergency situations lies with the General Inspectorate for Emergency Situations (GIES), part of the Ministry of Internal Affairs.¹⁴⁸⁸ The 2015 version of this fact sheet noted that “a cross-institutional consultation group operates under the coordination of the GIES to facilitate a uniform approach towards climate risk-related drivers. However, this group does not carry regular meetings with an agenda established well in advance and encompassing preventive and analytic adaptation features.” Information on this group and whether it has been established could not be found.

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / In Progress / No

Funding is available for increasing climate resilience in a number of sectors (with an important contribution expected from the European Structural and Investment Funds - ESIF, which will also bring in national co-financing). Under Romania’s Partnership Agreement 2014-2020, EUR 2 billion is allocated to the thematic objective “promoting climate adaptation, risk prevention and management” (EUR 0.5 billion from the Cohesion Fund and EUR 1.5 billion from the European Agricultural Fund for Rural Development).¹⁴⁸⁹ The NAP – which identifies funding sources for each proposed action (including for cross-cutting actions, such as capacity-building and climate research) – indicates that some adaptation actions will also be funded through other ESIF funds, such as the European Regional Development Fund and the European Social Fund. By 2017, EUR 639 million was disbursed to ESIF-funded projects linked to this thematic objective.¹⁴⁹⁰

Other funding sources identified in the NAP include the national budget (however, a budget line is not always specified), local budgets (without further specification), Horizon 2020, LIFE, SEE/INTERREG.

¹⁴⁸⁸ ClimateADAPT Country Information: Romania: <http://climate-adapt.eea.europa.eu/countries-regions/countries/romania>

¹⁴⁸⁹ Summary of the Partnership Agreement with Romania, 2014-2020, available at: https://ec.europa.eu/info/publications/partnership-agreement-romania-2014-20_en

¹⁴⁹⁰ ESIF 2014-2020: Fin. Implementation by Theme for a Member State (2017; filter by fund and MS), URL: <https://cohesiondata.ec.europa.eu/EU-Level/ESIF-2014-2020-Fin-Implementation-by-Theme-for-a-M/k79g-g6rq>, date accessed: 7/05/2018.

Given that funding sources are identified for all actions within the NAS and evidence shows that funds are being disbursed a positive score is justified.

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / **No**

The revision of the national framework for EIA is underway in order to align it with the new EIA Directive. The new legislative act has been approved by the Romanian Government and has been submitted to the Romanian Parliament for final endorsement. All relevant climate adaptation aspects are considered in the new legislation.¹⁴⁹¹

The Strategic Environmental Assessment (SEA) Directive was transposed in Romania through Government Decision 1076 of 8 July 2004. With respect to climate change, the Decision requires that the assessment takes into account potential impacts of the plan or programme on climate factors, but does not mention adaptation or consideration of the climate impacts on the plan or programme.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / No

The General Inspectorate for Emergency Situations (GIES) implemented the RO-RISK “Support to fulfil the ex-ante conditionality 5.1. – risk assessment at national level” project, whose aim was to develop a common risk assessment methodology.¹⁴⁹²

The methodology aims to develop an integrated approach to risk assessment (natural, biological, technological). Its objective is to assure a common framework for sectoral risk assessment that provides information regarding the types of national risks. On the basis of this methodology, risk assessments were carried out for 10 risks, including floods, drought, forest fires and landslides. Climate projections were taken into consideration for the assessments

¹⁴⁹¹ Personal communication with MS contact.

¹⁴⁹² Country report 5.1 Conditionality Romania 2016, deliverable of the “National Risk Assessment – RO RISK”, available at: https://www.igsu.ro/documente/RO-RISK/Raport_Final_de_tara.pdf; Metodologia de evaluare a riscurilor și de integrare a evaluărilor de risc sectoriale, <https://www.igsu.ro/documente/RO-RISK/Metodologia%20de%20evaluare%20unitara%20a%20riscurilor%20-%20versiune%20finala.pdf>

regarding drought and forest fires.¹⁴⁹³ The risk assessments will be followed by the preparation of risk management plans at sectoral level.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / **No**

The NAS 2016-2030 mentions the need to update current building and infrastructure codes and norms in view of climate change and extreme events. The NAP also sets out a series of actions with respect to the human environment, infrastructure and urbanism, such as: improving the integration of climate change considerations in sectoral planning processes; providing capacity-building to local authorities regarding the integration of climate change considerations in spatial planning documents and processes; investing in climate resilient infrastructure; and modifying building codes and norms. However, information regarding progress in the implementation of these actions could not be found.

The Territorial Development Strategy of Romania¹⁴⁹⁴ adopted in 2016 mentions measures related to climate adaptation, for example, protecting cities, rural areas, and natural habitats from climate risks, preventing natural disasters, and developing urban green space and green belts surrounding urban areas.

In terms of individual projects contributing to the integration of climate adaptation in these sectors, the pilot project RO 007 - Greenways for Sustainable Development contributed to increasing the resilience of transport and communications infrastructure to extreme weather, storms, and floods. A pilot project on the creation of underground infrastructure of electricity/communication cables in Sibiu aimed at protecting the electricity and communication systems against storms and floods. The project also involved tree planting in bus stations to increase thermal comfort of public transport users.¹⁴⁹⁵

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / **In progress** / No

It is unclear whether there are coordinated actions to mainstream adaptation into national policies and policy instruments. However, one of the actions included in the NAS 2013-2020 foresaw that adaptation would be mainstreamed at the national level.

¹⁴⁹³ Country report 5.1 Conditionality Romania 2016, deliverable of the "National Risk Assessment – RO RISK", available at: https://www.igsu.ro/documente/RO-RISK/Raport_Final_de_tara.pdf

¹⁴⁹⁴ Strategia de Dezvoltare Teritorială a României, URL: http://www.fonduri-structurale.ro/Document_Files/Stiri/00017493/7hctm_Anexe.pdf, date accessed: 16/05/2018.

¹⁴⁹⁵ Personal communication with MS contact.

The sectors for which evidence of the integration of adaptation considerations could be found are agriculture, flood risk management and territorial development. The policy instruments promoting adaptation in these sectors are:

- The National Strategy for Rural Development and the National Rural Development Programme 2014-2020: mention climate adaptation as a priority and set out a number of related actions. Actions related to climate adaptation were implemented as part of Rural Development Programmes. The integration of adaptation considerations in these documents appears to be driven mainly by the requirements of the Common Agricultural Policy, particularly those concerning funds, rather than the national adaptation strategy.
- The ‘National medium and long term strategy for flood risk management’¹⁴⁹⁶: one of its objectives is to mitigate or avoid climate impacts on the occurrence of floods; the strategy also mentions that flood prevention and protection measures should take into account current and future climate conditions as well as climate change. This strategy predates the NAS.
- The Territorial Development Strategy of Romania¹⁴⁹⁷ (see Indicator 8c above). It is unclear whether the NAS was a driver for the inclusion of climate considerations in this instrument.

In addition, the National Sustainable Development Strategy Romania 2013-2020-2030 (adopted in 2008) includes among its objectives a reference to the ability to anticipate the climate impacts, to prepare solutions for adaptation in the long run and to develop cross-sector contingency plans comprising portfolios of alternative crisis-management solutions in case of natural or man-made disasters.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

The NAS 2016-2030 mentions the need to mainstream climate adaptation in this sector and the NAP sets out a list of measures in this regard, but so far, no evidence could be found that adaptation is mainstreamed in insurance policies or alternative policy instruments to provide incentives for investments in risk prevention.

¹⁴⁹⁶ Government of Romania, 2010, Strategia Națională de Management al Riscului la Inundații pe termen mediu și lung (perioada 2010 – 2035), URL: http://www.mmediu.ro/app/webroot/uploads/files/2012-01-10_risc_inundatii_hg846din2010aprobaresnmri.pdf

¹⁴⁹⁷ Strategia de Dezvoltare Teritorială a României, URL: http://www.fonduri-structurale.ro/Document_Files/Stiri/00017493/7hctm_Anexe.pdf, date accessed: 16/05/2018.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In progress** / No

As described in Section B1, a NAP was adopted in October 2016. Since it is relatively recent, no progress report on its implementation has been issued so far.

Some autonomous adaptation actions are being undertaken, e.g. at a sectoral level for agriculture and water management, and flood risk management, or at a local level regarding coastal erosion, flood protection or analysis of climate impacts. However, it is unclear whether these actions are coordinated with the NAS, and sectoral adaptation action plans are not yet in place. The ‘Large Infrastructure Operational Programme 2014-2020’ includes as a priority axis the promotion of climate adaptation, prevention and risk management that will be applied to projects financed through EU funds. The National Rural Development Plan 2014 – 2020 provides certain areas targeting climate adaptation actions (M01 - Knowledge transfer and information actions (art 14); M02 - Advisory services, farm management and farm relief services (art 15); M11 - Organic farming (art 29).

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / **No**

We could not find any information regarding specific cooperation mechanisms with regions and cities for implementation. The implementation of the project RO 007 - Greenways for Sustainable Development (see above) supported the increase of institutional capacity and the more active involvement of municipalities in reducing vulnerability to the climate impacts.¹⁴⁹⁸

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / **No**

Apart from various guidelines issued by the European Commission, specific procedures or guidelines issued or used by the Romanian authorities for assessing climate impacts on major projects or programmes and for facilitating their adaptation were not identified.

¹⁴⁹⁸ Personal communication with MS contact.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / **No**

It is unclear whether specific mechanisms for ensuring the involvement of stakeholders in implementation have been put in place.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / **No**

Reports on the implementation of the NAS/NAP have so far not been published.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / **No**

Currently, there appears to be no system in place for monitoring the integration of climate adaptation in sectoral policies. Sectoral reports including information on adaptation aspects could not be found.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / **No**

No evidence of information on reporting by sub-national administrations is available.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / **No**

A schedule for periodic review of adaptation action was included in the NAS 2013-2020. Specifically, the NAS was to be reviewed and its objectives updated during the first half of 2015. The World Bank technical assistance project mentioned above and the development of the NAS 2016-2030 responded to this requirement. The new NAS 2016-2030 does not specify when it will be reviewed.

The NAS does not foresee periodic review of the NAP. The latter contains actions planned for the period 2016-2020, which are intended to be evaluated post-2020.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / **No**

Information could not be found on the involvement of stakeholders in monitoring and evaluation of national adaptation policy. Additionally, the new NAS and NAP adopted in 2016 are not explicit on this point.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 <i>Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	<u>Yes</u> / In progress / No
2 <i>Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 <i>Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	Yes / <u>In progress</u> / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No
4 <i>Knowledge gaps</i>		
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	Yes / <u>In progress</u> / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
5	<i>Knowledge transfer</i>	
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	Yes / <u>In progress</u> / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	Yes / <u>In progress</u> / No
Step C: Identifying adaptation options		
6	<i>Identification of adaptation options</i>	
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	Yes / In progress / <u>No</u>
7	<i>Funding resources identified and allocated</i>	
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	<u>Yes</u> / In Progress / No
Step D: Implementing adaptation action		
8	<i>Mainstreaming adaptation in planning processes</i>	
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	Yes / <u>No</u>
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	<u>Yes</u> / No
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	Yes / <u>No</u>
8d	National policy instruments promote adaptation at	Yes / <u>In progress</u> /

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 <i>Implementing adaptation</i>		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	Yes / <u>No</u>
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	Yes / <u>No</u>
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	Yes / <u>No</u>
Step E: Monitoring and evaluation of adaptation activities		
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
11 <i>Evaluation</i>		
11a	A periodic review of the national adaptation strategy and action plans is planned	Yes / <u>No</u>
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	Yes / <u>No</u>

Adaptation preparedness scoreboard for Slovakia

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List of abbreviations

DRR	Disaster risk reduction
EIA	Environmental Impact Assessment
MZP	Ministry of Environment of the Slovak Republic
NAP	National Adaptation Plan
NAS	National Adaptation Strategy
OP	Operational Programme
RBMP	River Basin Management Plans
SEA	Strategic Environmental Assessment
SEE Risk	Joint Disaster Management Risk Assessment and Preparedness in the Danube macro-region
SHMU	Slovak Hydrometeorological Institute
ZMOS	Association of Towns and Municipalities of Slovakia

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

Slovakia adopted its National Adaptation Strategy (NAS) – "The strategy of adaptation of the Slovak Republic to the adverse impacts of climate change" – by Government Resolution No 148/2014 in March 2014.¹⁴⁹⁹ The main objective of the NAS is to provide information on current adaptation measures and actions in Slovakia, and, based on these, to propose a coordination framework for their implementation, as well as to increase awareness about this thematic area. The current NAS examines the climate impacts and proposes adaptation options in a number of areas, such as: environment, biodiversity, built environment, public health, agriculture, forestry, water management and transport. It proposes priority actions and identifies potential funding sources. It also presents the proposed overall institutional framework for coordinating and implementing future adaptation actions, as well as a proposal for monitoring and evaluation arrangements.

In 2016, the government adopted a progress report "Information on the progress made in implementing adaptation measures in the Slovak Republic",¹⁵⁰⁰ which analyses the process of adaptation in Slovakia between April 2014 and April 2016. The short timeframe for evaluation (approximately 1.5 years) made it difficult to quantify the progress made on implementing adaptation measures. The report deals mainly with qualitative characteristics of adaptation efforts in Slovakia and has the following structure: information on NAS, priority areas, monitoring of the environment, adaptation in the area of health, adaptation at local level, conclusion.

In the beginning of 2017, the Ministry of Environment (MZP) launched the revision and update of the NAS.¹⁵⁰¹ In March 2017, the members of the expert group on adaptation evaluated the NAS and proposed new texts. In June 2017, the first draft of the updated NAS was discussed. The high-level commission on climate change policy also considered the draft in June. In September 2017, the process of strategic environmental assessment (SEA) for the NAS was launched. Within this process, there was also public consultation on a further revision of the NAS¹⁵⁰² that took account of the published results of the SEA assessment.¹⁵⁰³

¹⁴⁹⁹ Uznesenie Vlády Slovenskej Republiky č. 148 z 26. marca 2014 k Stratégii adaptácie SR na nepriaznivé dôsledky zmeny klímy (Government Resolution No 148/2014),
URL: <http://www.rokovania.sk/File.aspx/ViewDocumentHtml/Uznesenie-14024?prefixFile=u>, Date accessed: 4 May 2018

¹⁵⁰⁰ Informácia o dosiahnutom pokroku pri realizácii adaptačných opatrení v SR (2016),
URL: <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=25576>

¹⁵⁰¹ Enviroportal website,
URL: <http://enviroportal.sk/sk/eia/detail/strategia-adaptacie-slovenskej-republiky-na-nepriaznive-dosledky-zmeny>, Date accessed : 17/5/2018

¹⁵⁰² The consulted draft of the revised adaptation strategy can be found here:
URL: <http://www.minzp.sk/files/odbor-politiky-zmeny-klimy/strategia-adaptacie-sr-nepriaznive-dosledky-zmeny-klimy-aktualizacia.pdf>, Date accessed: 1/6/2018

The final result was published in June 2018 and its results were incorporated to the annex of the NAS¹⁵⁰⁴. It is anticipated that the updated NAS will be submitted to the Government for approval by 31 October 2018. It was postponed from 30 April 2018 because of the lengthy strategic environmental assessment (SEA) process.¹⁵⁰⁵

In addition to the NAS, the Ministry of Environment (MZP) is preparing the Slovak National Strategy for the Environment to 2030 – Zelenšie Slovensko (“Greener Slovakia”, approval foreseen in 2018, currently under the SEA process)¹⁵⁰⁶. It includes a chapter on climate mitigation and adaptation. However, chapters on the protection of the environment and water management are also relevant to adaptation.

A2. Adaptation strategies adopted at subnational levels

According to the current NAS, there is currently no systematic approach to adaptation at regional or sub-regional level, as climate change and its impacts are not part of the standard planning processes at regional and local levels. The revised NAS (to be adopted) seeks improvements in vertical integration of adaptation processes at regional and current levels and proposes several measures to do so.

Currently, vulnerability assessments and planning documents have not been systematically developed at “kraje” level (the highest-level of administrative units in the country), although some examples exist. The first sub-regional adaptation strategy was adopted for region Horná Ondava in March 2015. It has three main parts: a strategy, an action plan, and a catalogue of adaptation measures (Regionálna adaptačná stratégia Hornej Ondavy)¹⁵⁰⁷.

Bratislava Self-Governing Region adopted a catalogue of adaptation measures for towns and villages in April 2017 (Katalóg adaptačných opatrení miest a obcí BSK na nepriaznivé dôsledky zmeny klímy)¹⁵⁰⁸. This also includes the assessment of the climate in the Bratislava region, a strategy and action plan and a catalogue of adaptation measures.

¹⁵⁰³ The announcement on the beginning of the strategic environmental assessment and the draft of the NAS is available in Slovak at

URL: <http://www.minzp.sk/aktualne/oznamenie-vypracovani-strategickeho-dokumentu-strategia-adaptacie-slovenskej-republiky-nepriaznive-dosledky-zmeny-klimy.html>, Date accessed: 17/5/2018; [Personal communication with MS contact.](#)

¹⁵⁰⁴ [Personal communication with MS contact.](#)

¹⁵⁰⁵ [Personal communication with MS contact.](#)

¹⁵⁰⁶ Personal communication with MS contact; Zelenšie Slovensko stratégia, URL:

[http://www.minzp.sk/iep/strategicke-materialy/envirostrategia-2030/;](http://www.minzp.sk/iep/strategicke-materialy/envirostrategia-2030/)

<http://enviroportal.sk/sk/eia/detail/zelensie-slovensko-strategia-environmentalnej-politiky-slovenskej-repu>, Date accessed: 17/5/2018

¹⁵⁰⁷ Regionálna adaptačná stratégia Hornej Ondavy, 2015, URL:

http://www.ondavaprezivot.sk/download/RASHO%20WEB/16_P1_Katalog_opatreni_f15.pdf, Date accessed: 17/5/2018

¹⁵⁰⁸ Katalóg adaptačných opatrení miest a obcí BSK na nepriaznivé dôsledky zmeny klímy, 2017, URL:

<http://www.region-bsk.sk/clanok/aktualne-spravy-kraj-znizuje-negativne-d%C3%B4sledky-klimatickych-zmien.aspx>; <http://www.region-bsk.sk/koncepcne-materialy.aspx>, Date accessed : 17/5/2018

The population coverage of these two regions is around 638 400 inhabitants in the Bratislava region and around 8 400 in Horná Ondava, corresponding to around 12% of the total Slovak population.

At the local level, various initiatives have been launched. Slovakia has to date 10 signatories to the Covenant of Mayors for Climate & Energy with respect to adaptation.¹⁵⁰⁹ The capital city of Bratislava acceded to the Mayors Adapt initiative in April 2012, other cities only did so in 2016-2017.

The current adaptation strategies at city level are:

- The Adaptation Strategy of Bratislava, which was adopted in September 2014.¹⁵¹⁰
- The proposal for an adaptation strategy of Spišská Nová Ves and its surroundings (2012)¹⁵¹¹
- The Adaptation Strategy of Košice - Západ districts on heat waves (2014)¹⁵¹²
- The Adaptation Strategy of Trnava on heat waves (2015)¹⁵¹³
- The Adaptation Strategy of Zvolen on rainwater utilisation (2015)¹⁵¹⁴
- The Adaptation Strategy of Kežmarok on heavy rainfall (2015).¹⁵¹⁵
- A pilot study on adaptation measures in Čierny Balog (2016)¹⁵¹⁶

These cities and towns cover approximately 20% of the population of Slovakia.

Adaptation action plans

B1. National adaptation plan

The MZP in cooperation with the Slovak Academy of Sciences launched the preparation of the national adaptation action plan (NAP) in April 2018. The outputs of a preparatory project

¹⁵⁰⁹ Covenant of Mayors for Climate & Energy, Adaptation, Slovakia, URL:

<https://www.covenantofmayors.eu/about/covenant-community/signatories.html> (accessed on 24 April 2018)

¹⁵¹⁰ Adaptation Strategy of Bratislava (2015), Shorter version, the City of Bratislava, URL:

http://www.bratislava.sk/VismoOnline_ActionScripts/File.ashx?id_org=700000&id_dokumenty=11051660,

Date accessed: 17/5/2018

¹⁵¹¹ Stratégia adaptácie na dopady zmeny klímy v meste Spišská Nová Ves a okolí (2012), URL:

http://www.spiskanovaves.eu/fileadmin/snv/user_upload/editor/editor1/dokumenty/projekty/strategicke_dokumenty/Strategia_adaptacie_navrh_3-2012.pdf, Date accessed: 17/5/2018

¹⁵¹² Adaptation Strategy of Kosice on heat waves – Zapad districts (2014), the City of Kosice, URL:

http://www.kri.sk/web_object/435.pdf

¹⁵¹³ Adaptation Strategy of Trnava on heat waves (2015), the City of Trnava, available at URL:

http://www.trnava.sk/userfiles/download/attachment/Strategia_adaptacie_Trnava%20schv%C3%A1len%C3%A1_1.pdf, Date accessed : 17/5/2018

¹⁵¹⁴ Adaptačná stratégia na zmenu klímy –využitie dažďovej vody (2015), available in Slovak at URL:

http://www.zvolen.sk/download_file_f.php?id=603216, Date accessed: 17/5/2018

¹⁵¹⁵ Stratégia adaptácie mesta Kežmarok na zmenu klímy so zameraním na rast častosti intenzívnych zrážok (2015), available in Slovak at URL: https://www.kezmarok.sk/download_file_f.php?id=806813, Date accessed: 17/5/2018

¹⁵¹⁶ Adaptačné opatrenia na zmenu klímy – projektová štúdia pre Čierny Balog (2016), available in Slovak at URL:

http://www.obnovadediny.sk/Upload/POD/priklady/dokumentacia/2016_%C4%8Cierny%20Balog.pdf, Date accessed: 17/5/2018

conducted together with the Slovak Academy of Sciences in the form of a final report will be used to formulate the NAP.

On 14 March 2018, the Government approved the first NAP addressing drought and water scarcity, called “H2ODNOTA JE VODA” (Water is value), prepared by the MZP, as a follow up to the Water Management Plan of Slovakia and the current NAS.¹⁵¹⁷ The NAP proposes measures in the area of water management, agriculture and forestry management, urban areas, and science and research (for identifying vulnerabilities). It also proposes measures on monitoring and early warning systems for drought and disaster risk management.¹⁵¹⁸

B2. Adaptation plans adopted at sub-national level

There is no specific regional adaptation action plan adopted, as yet.

At the city level, the Adaptation Action Plan of Bratislava 2017-2020 was adopted in March 2017¹⁵¹⁹.

B3. Sectoral adaptation plans

In Slovakia, there are no sectoral adaptation plans. Where relevant, adaptation measures are integrated in sectoral strategies and action plans.¹⁵²⁰ Several examples are given in relation to Indicator 8d (below).

As noted in Section B1, there is an action plan addressing drought and water scarcity, which was adopted in March 2018. Some adaptation actions are included in the existing sectoral strategies and plans for water management (flood risk management), agriculture, forestry and disaster risk management.

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

¹⁵¹⁷ The Action Plan HODNOTA JE VODA (2018), URL: <http://www.minzp.sk/files/sekcia-vod/hodnota-je-voda/h2odnota-je-voda-akcny-plan-riesenie-dosledkov-sucha-nedostatku-vody.pdf>; Announcement can be found here in Slovak, <http://www.minzp.sk/tlacovy-servis/tlacove-spravy/tlacove-spravy-2018/tlacove-spravy-marec-2018/svetovy-den-vody-si-envirorezort-pripomenie-pracou-lepsej-ochrane-vodnych-zdrojov.html>; <http://www.rokovania.sk/Rokovanie.aspx/NezaradenyMaterialDetail?idMaterial=27274>, Date accessed: 17/5/2018

¹⁵¹⁸ Ministry of Environment news item, URL: <http://www.minzp.sk/tlacovy-servis/tlacove-spravy/tlacove-spravy-2018/tlacove-spravy-marec-2018/solymos-investicie-do-opatreni-proti-suchu-nedostatku-vody-pomozu-zlepsit-zivotne-prostredie-aj-kvalitu-zivota-ludi.html>, Date accessed: 1/6/2018

¹⁵¹⁹ Akčný plán adaptácie na nepriaznivé dôsledky zmeny klímy na území hlavného mesta Slovenskej republiky Bratislavy na roky 2017-2020 (2017), URL: <https://zastupitelstvo.bratislava.sk/data/att/14595.pdf>

¹⁵²⁰ Personal communication with MS contact.

The MZP¹⁵²¹, Directorate for Climate Change and Air Protection, Department of Climate Change Policy is the central body designated to coordinate the adaptation policy-making process.¹⁵²² It is responsible for the development and implementation of climate change policy, including climate adaptation.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

Before the adoption of the current NAS in 2014, a High-Level Committee for Coordination of the Climate Change Policy was established on 15 January 2012. A special working group on adaptation was created under this committee designated to focus on the NAS and to continue the work on adaptation. This working group meets at least once a year, the next meeting is scheduled in the second half of 2018.¹⁵²³ The members include representatives from other ministries (the Ministry of Education, Science, Research and Sport, the Ministry of Health, the Ministry of the Economy, the Ministry of the Interior, the Ministry of Agriculture and Rural Development, the Ministry of Transport and Construction), and other institutions, such as the Public Health Authority of the Slovak Republic, the Slovak Hydrometeorological Institute (SHMU), the Slovak Academy of Science and other professional institutions, research and non-governmental organisations as the Carpathian Development Institute, the Association of Towns and Municipalities of Slovakia or the Union of Slovak Cities. The 2014 NAS identified clear tasks for ministries and municipalities to achieve the objectives of the NAS.

Regarding the draft of the revised NAS (to be adopted in 2018), the working group on adaptation commented on the progress report “Information on the progress made in implementing adaptation measures in the Slovak Republic” and facilitated the development of the updated version of the NAS. There was coordination with the Ministry of the Interior with regard to the management of security risks, which include natural hazards and disaster risk management.

Besides the regular meetings of the adaptation working group, there are further bilateral or multilateral meetings arranged on an *ad hoc* basis. These meetings are aimed to address any issues that have arisen throughout the process.

¹⁵²¹ Ministry of Environment of the Slovak Republic website, URL: <http://www.minzp.sk/>, Date accessed: 1/6/2018

¹⁵²² Climate Adapt website, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/slovakia>, Date accessed: 4 May 2018.

¹⁵²³ Personal communication with MS contact.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / In progress / No

The NAS Resolution No 148/2014 recommends that municipalities and cities take on the responsibilities in implementing the NAS.¹⁵²⁴ The Association of Towns and Municipalities of Slovakia and the Union of Slovak Cities are part of the adaptation working group.

Moreover, MZP communicates with the Association of Towns and Municipalities of Slovakia (ZMOS) and the Union of Slovak Cities (consultations, meetings, gathering of ideas, disseminating of current information). ZMOS and the Union of Cities are a link in the process of translating national content and providing information to/from lower levels. During the SEA process of the updated NAS, all self-governing regions were approached and involved in the process of assessing impacts and commenting on the NAS. The national project¹⁵²⁵ of the Slovak Environmental Agency also plans to organise meetings at the level of municipalities, starting from fall 2018/spring 2019.¹⁵²⁶

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

The Working Group on Adaptation has involved multiple government stakeholders, other institutions and public bodies, research organisations and NGOs in the preparation of the current NAS, as well as the revised version (still to be adopted). The list of consulted representatives has been recently extended.

The National Contact Point on Adaptation (MZP) provides communication with international and European organisations and coordinates national activities in collaboration with the Working Group on Adaptation.¹⁵²⁷ Furthermore, the Slovak authorities have reported that the private sector and the wider public were duly informed during the process. For example, the revised draft of the NAS was made available for public consultation¹⁵²⁸ and due to the

¹⁵²⁴ The NAS Resolution No 148/2014 <http://www.rokovania.sk/File.aspx/ViewDocumentHtml/Uznesenie-14024?prefixFile=u>, Date accessed: 17/5/2018

¹⁵²⁵ Information on the national project, URL: <http://www.sazp.sk/projekty/narodne-projekty/>, Date accessed: 17/5/2018

¹⁵²⁶ Personal communication with MS contact.

¹⁵²⁷ Climate Adapt website, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/slovakia>, Date accessed: 4 May 2018

¹⁵²⁸ See the announcement, Oznámenie o vypracovaní strategického dokumentu „Stratégia adaptácie Slovenskej republiky na nepriaznivé dôsledky zmeny klímy - aktualizácia,, URL: <http://www.minzp.sk/aktualne/oznamenie-vypracovani-strategickeho-dokumentu-strategia-adaptacie-slovenskej-republiky-nepriaznive-dosledky-zmeny-klimy.html>, Date accessed: 4 May 2018

involvement of stakeholders in the revision process, the deadline to submit the revised NAS to the Government was prolonged.¹⁵²⁹

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

The current NAS discusses transnational and/or cross-border cooperation (see NAS Chapter 6.6) and this issue will be also part of the new NAS to be adopted later in 2018. Slovakia is also part of various transnational initiatives focusing on adaptation. Transnational cooperation is currently ongoing with the other European countries crossed by the Carpathians under the Carpathian Convention. In 2014, the Fourth Meeting of the Conference of the Parties to the Carpathian Convention adopted the Strategic Agenda on Adaptation to Climate Change in the Carpathian Region, which is being implemented mainly through the activities of the Working Group on Adaptation to Climate Change under the Convention.¹⁵³⁰ In October 2017, a new Article 12 on “Climate Change” was adopted at the Fifth Meeting of the Conference of the Parties.¹⁵³¹

Transnational cooperation is currently ongoing with the other European countries crossed by the Danube river for tackling flood risks, preparing anti-flooding action plans, and building flood defences. In the framework of the International Commission for the Protection of the Danube, a climate adaptation strategy was adopted in 2012.¹⁵³²

Slovakia has been involved in other cross-border cooperation through Interreg/ERDF funded projects, such as "Green and blue space adaptation for urban areas"¹⁵³³, and "Regio Clima"¹⁵³⁴. Regional and cross-border cooperation is also implemented through other regional

¹⁵²⁹ Personal communication with MS contact.

¹⁵³⁰ Fourth Meeting of the Conference of the Parties to the Framework Convention on the Protection and Sustainable Development of the Carpathians, URL:

http://www.carpathianconvention.org/tl_files/carpathiancon/Downloads/03%20Meetings%20and%20Events/COP/2014_COP4_Mikulov/Follow%20Up/DOC5_Joint%20AplineCarpathianStatement_FINAL.pdf, Date accessed: 15/5/2018

¹⁵³¹ Carpathian Convention website, URL:

http://www.carpathianconvention.org/tl_files/carpathiancon/Downloads/03%20Meetings%20and%20Events/COP/2017_COP5_Lillafuered/outcomes_documents/Article%20on%20Climate%20Change_FINAL_ADOPTED.pdf, Date accessed:

¹⁵³² Strategy and background study available on the International Commission for the Protection of the Danube River website, URL: www.icpdr.org/main/activities-projects/climate-change-adaptation, Date accessed: 4 May 2018

¹⁵³³ GRaBS: Green and Blue Space Adaptation for Urban Areas and Eco Towns, URL: <http://climate-adapt.eea.europa.eu/metadata/projects/green-and-blue-space-adaptation-for-urban-areas-and-eco-towns>, Date accessed: 1/6/2018

¹⁵³⁴ Regioclima, URL: <http://www.interreg4c.eu/projects/project-details/index-project=19-regional-cooperation-towards-adaptation-to-climate-change&.html>, Date accessed: 1/6/2018

conventions, such as the Carpathian Convention¹⁵³⁵, where specific adaptation projects have received EU funding (e.g. CARPIVIA), or the Ramsar Convention.¹⁵³⁶

Moreover, some Slovak institutions are participating in several international research projects, for example, the Comenius University participates in the CC-TAME Project (Terrestrial Adaptation & Mitigation in Europe) and RESIN project (Bratislava Municipality and Comenius University are partners from the Slovak side). The SHMU participates in the project Joint Disaster Management Risk Assessment and Preparedness in the Danube macro-region (SEE Risk), which is focused on risk assessment and which seeks to foster awareness and effectiveness of the measures in emergency situations caused by climate change.¹⁵³⁷ The SHMU also participates in the project DriDanube focusing on drought in the Danube region.¹⁵³⁸ Slovak institutions also participated in the international project ‘Modelling the impact of climate change on heat load increase in Central European cities’,¹⁵³⁹.

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / In progress / No

The Slovak Hydro-meteorological Institute (SHMU) monitors climate change and extreme weather events on an ongoing basis and has its own research capacity. Thus, it plays a key role in providing data and research for climate adaptation and indeed was a source of expertise and knowledge for drafting the current NAS. The website of the institute provides potential warnings for floods, wind, drought and heatwaves in the summer period. There is a section on climate impacts in Slovakia.¹⁵⁴⁰

SHMU also provides information on drought monitoring, climate change, Slovak climate, station infrastructure etc. In 2015, the Climate Atlas of the Slovak Republic was published by the SHMU¹⁵⁴¹. SHMU operates the Climatological Information System of the Slovak Republic and is involved in the National Climate Program of the Slovak Republic, under which various tasks related to monitoring of climate change are taking place.

The framework for complex environmental monitoring in Slovakia is determined by the resolutions of the Slovak Government No. 623/1990 Coll., No. 449/1992 Coll. and No.

¹⁵³⁵ Carpathian Convention, URL : <http://www.carpathianconvention.org/>, Date accessed: 1/6/2018

¹⁵³⁶ Ramsar Convention, URL: <http://www.ramsar.org/>, Date accessed: 1/6/2018

¹⁵³⁷ Climate Adapt website, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/slovakia>, Date accessed: 4 May 2018

¹⁵³⁸ DRIDANUBE project, URL: <http://www.interreg-danube.eu/approved-projects/dridanube>, Date accessed: 1/6/2018

¹⁵³⁹ See at: http://www.meteo.fr/icuc9/LongAbstracts/ccma2-5-3151332_a.pdf, Date accessed: 17/5/2018

¹⁵⁴⁰ Slovak Hydrometeorological Institute, URL: <http://www.shmu.sk/sk/?page=1>, Date accessed: 4/May/2018

¹⁵⁴¹ Slovak Hydrometeorological Institute, URL: <http://klimat.shmu.sk/kas/>, Date accessed: 17/5/2018

620/1993 Coll. The Monitoring Subsystem "Meteorology and Climatology" is one of the most important ones, which includes the observing networks of monitoring stations, remote sensing measurements and observations of some biological subjects (phenology). Other subsystems are focused on air, water and radioactivity monitoring.

Within the framework of the national environmental monitoring system of the Slovak Republic there are different sub-systems: air, water (including mineral and mining waters), land, biota (fauna, flora), forests, geological factors, waste, foreign substances in food and feed, meteorology and climatology and radioactivity in the environment. The SHMU is responsible for: air, water, meteorology and climatology and radioactivity in the environment.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

Climate projections are available from the Climate Change and Adaptation Report of the SHMU project¹⁵⁴² for eight selected sectors from 2011, mainly from downscaling the outputs of GCM and RCM models. These climate projections were used in assessing the economic and environmental impacts of climate change in the priority sectors considered by the current NAS.

The climate change studies in Slovakia use the outputs from several Global General Circulation Models and Regional General Circulation Models. These outputs enable development of sub-regional and national climate change scenarios by statistical and dynamic downscaling with the use of measured data from Slovak meteorological stations gathered in the period 1951-2010. From 2010 to 2014 the GCMs CGCM3.1 (Canada) and ECHAM5 (Germany), Regional General Circulation Models KNMI (Netherlands) and MPI (Germany) outputs were applied.¹⁵⁴³

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

The SHMU 2011 report¹⁵⁴⁴ describes in detail the analyses, mentioned under Indicator 3b (above), for eight sectors, which were covered by the NAS as well: agriculture, forestry, biodiversity, energy, water management, transport, tourism, and health. The SHMU report feeds into decision making via the NAS, because the adaptation measures were selected on

¹⁵⁴² Climate Change and Adaptation Report of the Slovak Hydrometeorological Institute (SHMU) Project, 2011 (EFRA, Dôsledky klimatickej zmeny a možné adaptačné opatrenia v jednotlivých sektoroch)

¹⁵⁴³ Climate Adapt website, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/slovakia>, Date accessed 4 May 2018

¹⁵⁴⁴ Climate Change and Adaptation Report of the Slovak Hydrometeorological Institute (SHMU) Project, 2011 (EFRA, Dôsledky klimatickej zmeny a možné adaptačné opatrenia v jednotlivých sektoroch)

the basis of a vulnerability assessment, which comes from the SHMU report. The current NAS particularly uses this study to briefly describe the impacts and vulnerabilities in the sectors covered.¹⁵⁴⁵ The NAS does not refer to any specific sources that were used to provide these assessments (besides the SHMU study).¹⁵⁴⁶

The updated NAS includes additional areas/sectors and additional adaptation measures for sectors not covered in the current NAS: soil, industry, energy and private sector, and tourism. The impacts and vulnerability assessments in the revised NAS are still based on the SHMU 2011 report.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

Slovakia is involved in the Danube Region Strategy and the Carpathian Convention with all relevant countries, which addresses a wide range of issues, including environmental risks.¹⁵⁴⁷ The SEERISK project is a transnational project for disaster risk management and preparedness in the Danube macro-region, which developed and tested a Common Risk Assessment Methodology for the region.¹⁵⁴⁸ Hence, transboundary risks are taken into account in climate risk/ vulnerability assessments for this sector.

However, there is not yet evidence of systematic consideration (e.g. as part of the NAS) of the cross-border climate risks when carrying out vulnerability and risks assessments.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / In progress / **No**

A science-policy adaptation working group was established to prepare the NAS (both the current version and forthcoming revision). Various research institutes and the national meteorological administration provided valuable feedback in that process.

The current NAS does not provide information on identified knowledge gaps, nor is there a process outlined on how to address potential knowledge gaps.

Main objectives of the updated NAS from 2018 are raising public awareness about climate impacts and developing a knowledge base to address adaptation more effectively. Chapter 6.3 of this revised NAS provides information on the planned national project of the Slovak Environmental Agency to address the knowledge gaps. However, this has not been

¹⁵⁴⁵ The National Adaptation Strategy of the Slovak Republic, January 2014

¹⁵⁴⁶ Climate Change and Adaptation Report of the Slovak Hydrometeorological Institute (SHMU) Project, 2011 (EFRA, Dôsledky klimatickej zmeny a možné adaptačné opatrenia v jednotlivých sektoroch)

¹⁵⁴⁷ Danube Region Strategy, URL: <http://www.danube-region.eu/>, Date accessed: 4 May 2018

¹⁵⁴⁸ SEERISK project, URL: <http://www.seeriskproject.eu/seerisk/index.zul#main>, Date accessed: 4 May 2018

implemented yet, as the revised NAS will be submitted to the Government only at the end of October 2018.

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / **In progress** / No

The MZP website hosts a section dedicated to climate change, including adaptation information. The adaptation sub-section¹⁵⁴⁹ presents some general information, documents (the Resolution¹⁵⁵⁰, the NAS¹⁵⁵¹ and the SHMU 2011 study¹⁵⁵²), and links that are relevant for adaptation (including links to Climate-ADAPT and DG Climate Action of the EU). This sub-section only provides basic information. There are no data or projections presented, only a link to the documents mentioned above. There is no section on planned activities or follow up. It is not clear from the website what has been done to implement the current NAS since its adoption in 2014.

After the updated NAS has been approved by the Government, the first results from the elaboration of the NAP will be available, and the first materials from the national project of the Slovak Environmental Agency will be prepared and published. An update of the website information is scheduled for 2019.¹⁵⁵³

Some additional relevant information can be found on the website of the Slovak Environment Agency.¹⁵⁵⁴

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / In progress / **No**

There is little evidence on any capacity building activities or education and training activities in the field of climate adaptation since the adoption of the current NAS in 2014. The current NAS itself acknowledges that information campaigns and training on adaptation are not implemented systematically and based on a specific concept, but rather *ad hoc* and irregularly,

¹⁵⁴⁹ Ministry of Environment website, adaptation related information URL: <http://www.minzp.sk/sekcie/temy-oblasti/ovzdušie/politika-zmeny-klimy/aktualne-temy/adaptacia.html>, Date accessed: 1/6/2018

¹⁵⁵⁰ The NAS Resolution No 148/2014 http://www.rokovania.sk/File.aspx/ViewDocumentHtml/Uznesenie-14024?prefixFile=u_, Date accessed: 17/5/2018

¹⁵⁵¹ The National Adaptation Strategy of the Slovak Republic, January 2014

¹⁵⁵² Climate Change and Adaptation Report of the Slovak Hydrometeorological Institute (SHMU) Project, 2011 (EFRA, Dôsledky klimatickej zmeny a možné adaptačné opatrenia v jednotlivých sektoroch)

¹⁵⁵³ Personal communication with MS contact.

¹⁵⁵⁴ Slovak Environment Agency, URL: <http://www.sazp.sk/zivotne-prostredie/starostlivosť-o-zivotne-prostredie-3976/zmena-klimy/zmena-klimy.html>, Date Accessed: 17/5/2018

through conferences, lectures and articles in professional journals. Other sources of information include the results of scientific tasks and projects that are published on the internet portals of professional bodies.

In 2018, the preparation for the implementation of a national project by the Slovak Environmental Agency called "Improvement of information and advice on improving the quality of the environment in Slovakia" has started. This national project is funded under the Operational Programme Quality of the Environment 2014-2020 and has six main activities. Key Activity 6 focuses on climate adaptation and risk management. The aim of the project is to improve the awareness on climate change and adaptation among experts as well as the public, regions and schools. Key Activity 6 includes a number of tasks to improve communication and raise awareness, such as organising conferences on climate change, seminars for regions, thematic and informational days for the public, festivals, competitions for schools, publishing publications as well as for example making a documentary film on climate change and adaptation processes in the Slovak Republic.¹⁵⁵⁵

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

The current NAS presents adaptation options and measures for almost all sectors analysed in the NAS. The revised NAS also proposes adaptation options and measures for those sectors not included in the current NAS (soil, energy and industry, tourism). Adaptation options proposed in the current NAS for the priority sectors are based on expert judgement, after considering the sectoral climate impacts. The measures seem to build on good practices identified elsewhere for similar contexts, with some stronger sectors leading and capitalising on more detailed expertise on adaptation (e.g. agriculture, forestry, water management). However, the use of sectoral risk assessments in the process is not totally clear. Adaptation options also do not address regional specificities.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

Chapter 9 of the current NAS describes the criteria for prioritisation of adaptation options and measures. The adaptation options described in the current NAS have been reported as being based on objective methods (e.g. expert judgement, consultations among organisations or with

¹⁵⁵⁵ Personal communication with MS contact.

stakeholders, using guidelines). More detailed prioritisation will be carried out as part of the NAP preparation. Some measures have already been prioritised (e.g. on drought).

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / **In progress** /No

The current and revised NAS describe the synergies between adaptation and disaster risk management. A mechanism in the form of working groups is in place to coordinate climate adaptation and disaster risk management strategies and actions.

The Ministry of Interior of the Slovak Republic is the national contact point for the Sendai framework for disaster risk reduction 2015 - 2030 and the responsible body for the national Strategy on the Management of Security Risks. MZP cooperates with a representative from the Ministry of Interior of the Slovak Republic responsible for these issues, while the same representative is also a member of the Working Group on Adaptation. Concurrently, the representative of the MZP is a member of a working group under the Ministry of Interior, and is engaged in the process of updating the national Strategy on the Management of Security Risks. Based on these facts, active communication takes place in the preparation of documents in each of the aforementioned areas.¹⁵⁵⁶

Moreover, there is the Joint Disaster Management Risk assessment project in the Danube macro-region¹⁵⁵⁷, where stakeholders for the two communities are well integrated.

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / **In progress** /No

Chapter 10 of the current NAS discusses the financial instruments that can be used to finance adaptation measures in Slovakia from 2014.¹⁵⁵⁸ The chapter explains the different funding programmes (national and EU) that are available for financing adaptation projects. In Annex 2 of the current NAS, there is an overview of all projects with an adaptation element financed through these programmes (one table per programme) after 2013.

The funding programmes include:

- National revitalisation and integrated management of floods programme
- EU Operational Programme (OP) for Environment (2007-2013), and EU Operational Programme (OP) for the Quality of Environment (2014-2020) European programming cycle will include over EUR 730 million from the European Structural and Investment

¹⁵⁵⁶ Personal communication with MS contact.

¹⁵⁵⁷ SEERISK project, URL: <http://www.seeriskproject.eu/seerisk/#main>, Date accessed: 1/6/2018

¹⁵⁵⁸ The National Adaptation Strategy of the Slovak Republic, January 2014

Funds (ESIF) for adaptation projects (which will tackle flood risks and address specific issues in agriculture, forestry and biodiversity). National funding supported adaptation measures in agriculture, forestry and water management. Annual reports of the OP Environment include a list of financed projects, some of which tackle these sectors.¹⁵⁵⁹

- The European Economic Area grants and Norway grants.
- The LIFE programme (3rd phase) and LIFE+
- Transnational cooperation programmes.

The current NAS mentions that one of its mid-term and long-term goals is to map the use of financial instruments for planned and pro-active adaptation and, if possible, to monitor the link between the costs and benefits of such investments. Similar information on funding mechanisms for adaptation can be found in the revised NAS.

There is no dedicated budget available for financing cross-cutting/coordinated adaptation action.

The progress report on the implementation of adaptation measures in the Slovak Republic mentions that cities are not motivated to develop local or regional adaptation strategies, as financing of adaptation strategies does not fall under the activities of operation programmes. The local adaptation strategies that do exist are usually funded by international projects.¹⁵⁶⁰

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

Slovakia has transposed the revised Environmental Impact Assessment (EIA) Directive. The amendment transposing the new EIA Directive, Act (142/2017) (amending Act (24/2006), has been in force since 15th June 2017 and considers climate change, including adaptation. The amendment requires the assessment of project impacts related to climate change and vulnerabilities, including natural hazards. The EU SEA Directive is transposed into the Slovak legislation by the same Act (24/2006) and its amendments, hence climate change, including adaptation, is considered in the same way as EIA.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / **No**

¹⁵⁵⁹ Operačný program Životné prostredie, URL: <http://www.opzp.sk/>, Date accessed: 1/6/2018

¹⁵⁶⁰ Informácia o dosiahnutom pokroku pri realizácii adaptačných opatrení v SR, 2016, URL: <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=25576>, Date accessed: 17/5/2018

A national framework for single and multi-hazard risk assessment is in place and considers some current climate-related risks (notably floods). Strategies are in place for tackling those risks, i.e. the Management of Flood Risks plan from 2012¹⁵⁶¹, Strategy of Floods protection until 2020 from 2013¹⁵⁶². The first flood management plans from the end of 2015¹⁵⁶³ consider climate impacts and adaptation.¹⁵⁶⁴

The current NAS quotes several civil protection legislative provisions, and calls for consideration of climate adaptation within complex risk assessment activities linked to civil protection. As mentioned in relation to Indicator 6c, there is a close cooperation between the national climate adaptation and disaster risk management policies. Similarly, the national Strategy on the Management of Security Risks considers future climate impacts and risks.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / **No**

Chapter 11 of the current NAS advocates mainstreaming adaptation into the national legislation on land-use planning, for instance, when it comes to investments with a long life-cycle, such as industry or energy infrastructure. The Urban Development Framework of the Slovak Republic until 2030¹⁵⁶⁵ mentions the need to consider adverse climate impacts in city and spatial planning.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / In progress / No

Mainstreaming of adaptation into sectoral policies is driven by the NAS. Adaptation to the adverse effects of climate change is included, for example, in the following sectoral strategies and plans:

- Updated National Biodiversity Strategy for 2020
- Orientation, principles and priorities of the Slovak water policy until 2027, Water Plan of Slovakia, Plans for Flood Risk Management of the Slovak Republic
- Strategy of Urban Development of the Slovak Republic
- Action Plan for the Environment and Health of the Slovak Republic IV,

¹⁵⁶¹ MZP SR, ČASOVÝ AVECŇNÝ HARMONOGRAM PRÍPRAVY NÁVRHU PRVÝCH PLÁNOV MANAŽMENTU POVODŇOVÉHO RIZIKA, URL: <http://www.minzp.sk/files/sekcia-vod/casovy-a-vecny-harmonogram-navrhu-prvych-planov-manazmentu-povodnoveho-rizika.pdf>, Date accessed: 17/5/2018

¹⁵⁶² Stratégia protipovodňovej ochrany do roku 2020, URL: <http://www.minzp.sk/sekcie/temy-oblasti/voda/ochrana-pred-povodnami/strategia-protipovodnej-ochrany-sr-do-roku-2020/>

¹⁵⁶³ Spravne uzemie povodia Dunaja a Visly, URL: <http://www.minzp.sk/mpr/>, Date accessed: 1/6/2018

¹⁵⁶⁴ Ministry of Environment website, floods protection related information, URL: <http://www.minzp.sk/sekcie/temy-oblasti/voda/ochrana-pred-povodnami/povoden-uvod.html>, Date accessed: 1/6/2018

¹⁵⁶⁵ <https://www.mindop.sk/ministerstvo-1/mestske-rozvoj-6/mestske-rozvoj/dokumenty/koncepcia-mestskeho-rozvoja-slovenskej-republiky-do-roku-2030>, Date accessed: 17/5/2018

- Strategy of agricultural development of the Slovak Republic for 2013 - 2020,
- National Forestry Program (NLP)
- National Strategy for Risk Management of the Slovak Republic.

The interest in adaptation is growing in other sectors and the extent of inclusion of adaptation concerns in sectoral policies is improving.¹⁵⁶⁶

Currently, the Ministry of Economy is preparing a new Economic Policy Strategy 2030, which should integrate climate adaptation concerns. Currently, the Strategy is in the SEA process.¹⁵⁶⁷

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

The current and updated NAS includes an extensive section on Insurance, which recognises the relevance of this instrument in adaptation, and the need to take into account climate impacts. However, no evidence could be found that adaptation is mainstreamed in insurance policies or alternative policy instruments to provide incentives for investments in risk prevention.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In progress** / No

As mentioned in Section A1, in 2016, the government adopted a progress report “Information on the progress made in implementing adaptation measures in the Slovak Republic”,¹⁵⁶⁸ which analyses the process of adaptation in Slovakia between April 2014 and April 2016. The report deals mainly with qualitative characteristics of the adaptation efforts in Slovakia. The progress report shows that adaptation concerns were included in several sectoral strategies and plans, and that the situation in this respect has improved. Adaptation concerns are included already at the concept phase of developing sectoral strategies and plans, or added at later stages (during the SEA process or inter-ministerial consultations of the documents).¹⁵⁶⁹

¹⁵⁶⁶ Further information can be found in the draft of the updated adaptation strategy (Chapter 3, Conceptual and Legislative Framework, and Annex 3, 4), URL: <https://www.enviroportal.sk/sk/eia/detail/strategia-adaptacie-slovenskej-republiky-na-nepriaznive-dosledky-zmeny>, Date accessed: 17/5/2018

¹⁵⁶⁷ STRATÉGIA HOSPODÁRSKEJ POLITIKY SLOVENSKEJ REPUBLIKY DO ROKU 2030, URL: <http://www.enviroportal.sk/de/eia/detail/strategia-hospodarskej-politiky-slovenskej-republiky-do-roku-2030>, Date accessed: 17/5/2018

¹⁵⁶⁸ Informácia o dosiahnutom pokroku pri realizácii adaptačných opatrení v SR, URL:

<http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=25576>, Date accessed: 17/5/2018

¹⁵⁶⁹ Personal communication with MS contact.

As mentioned in Section B, the national action plan, H2ODNOTA JE VODA, addresses drought and water scarcity, and the Adaptation Action Plan of Bratislava for years 2017-2020.

There are no specific sectoral action plans proposed, as adaptation concerns are directly included in their own strategies and plans (as explained above).¹⁵⁷⁰

Implementing adaptation measures are also included in the Operational Programme for the Environment, 2014-2020.¹⁵⁷¹ With regard to floods protection, there is further action under the Rural Development Programme of the Slovak Republic 2014-2020, the Integrated Regional Operational Programme 2014-2020. In addition, there are several local initiatives launched since 2014, as specified in Section A2, which is relatively recent.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / No

The Ministry of Transport and Construction developed and published a guideline in 2015 on how to help implement adaptation options included in the current NAS within land-use and spatial plans at a local level.¹⁵⁷² The guideline was provided to all municipalities and will be updated after the adoption of the revised NAS.¹⁵⁷³

In January 2018, the Urban Development Framework of the Slovak Republic until 2030 was approved. It mentions the need for climate adaptation, as one of the main future challenges for cities and municipalities.¹⁵⁷⁴ One of the measures in this framework is to support cities in implementing local adaptation options.

The Ministry of Transport and Construction, as well as regional and local authorities, intend to focus more on implementing adaptation measures.¹⁵⁷⁵ Several cities as mentioned in Section A2 have already begun implementation. Moreover, there are several funding mechanisms, which can provide financial support to regional and local authorities.

¹⁵⁷⁰ Personal communication with MS contact.

¹⁵⁷¹ Climate Adapt website, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/slovakia>, Date accessed: 1/6/2018

¹⁵⁷² Metodické usmernenie MDVRR SR odboru územného plánovania k zabezpečeniu plnenia uznesenia vlády SR č.148/2014 z 26.3.2014 k Stratégii adaptácie SR na nepriaznivé dôsledky zmeny klímy, URL: <https://www.mindop.sk/ministerstvo-1/vystavba-5/uzemne-planovanie/metodicke-usmernenia-oznamenia-stanoviska-pokyny>, Date accessed: 18/5/2018

¹⁵⁷³ Personal communication with MS contact.

¹⁵⁷⁴ Koncepcia mestského rozvoja Slovenskej republiky do roku 2030, URL: <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=27130>, Date accessed: 18/5/2018

¹⁵⁷⁵ Personal communication with MS contact.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / No

The Ministry of Transport and Construction of the Slovak Republic in cooperation with the Transport Research Institute issued a manual entitled: “Climate Change Assessment – Creation of methodology and incorporation of climate impact assessments on infrastructure plans/projects into existing processes at national level”.¹⁵⁷⁶ This manual is being further developed. Additionally, an accompanying report “Methodological guidebook for climate impact assessment on large projects in the transport sector” is currently being discussed by the working group established under the Ministry of Transport.

The revised NAS mentions the preparation of this manual, and is expected to be updated to reflect the development of the latest manual.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / No

Non-governmental organisations are actively participating in the implementation of adaptation measures, especially at the local level. They provide help on the development of local adaptation strategies, apply for projects in cooperation with municipalities and also realise awareness-raising activities. The most active NGO is the Carpathian Development Institute.

The energy sector and industry stakeholders can be involved through the SEA and EIA consultation processes. They can then choose whether they consider the impacts of climate change in their business activities and implement adaptation measures.¹⁵⁷⁷

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / No

The schedule of the periodic review of the NAS is determined in Resolution No 148/2014 of the Government of the Slovak Republic. The deadline to publish information on the progress

¹⁵⁷⁶ Ministerstvo dopravy a výstavby SR v spolupráci s Výskumným ústavom dopravným vydalo príručku s názvom: Posúdenie klimatických zmien – tvorba metodiky a zakomponovanie posudzovaní dopadov na zmeny klímy infraštruktúrnych plánov/projektov do existujúcich procesov na národnej úrovni.

¹⁵⁷⁷ Personal communication with MS contact.

of implementation of adaptation measures was 31 May 2016. In line with the Resolution, in 2016, the Government adopted a progress report “Information on the progress made in implementing adaptation measures in the Slovak Republic”, which analysed the process of adaptation in Slovakia between April 2014 and April 2016. The short timeframe for evaluation (approximately 1.5 years) made it difficult to quantify progress with implementation. The report dealt mainly with qualitative characteristics of the adaptation efforts in Slovakia and has the following structure: information on the NAS, priority areas, monitoring of the environment, adaptation in the area of health, adaptation at local level, conclusion.¹⁵⁷⁸ This report provides information on possible funding mechanisms that can be used to finance adaptation related measures and projects. However, no information is given on the amount of funding.

As indicated above, the NAS is currently being revised. Furthermore, as part of the preparation of the NAP in 2019, a monitoring, reporting and evaluation framework will be elaborated.¹⁵⁷⁹

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

A short chapter on adaptation actions in key sectors is available in the report mentioned under Indicator 10a.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / No

A short chapter on adaptation actions on the local level is available in the report mentioned under Indicator 10a.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

The schedule of the periodic review of the NAS is determined by the Resolution No 148/2014 of the Government of the Slovak Republic and includes information on the progress made with implementation (deadline: 31 May 2016), and the NAS update in view of new scientific knowledge on climate change (deadline: 30 April 2018, postponed to 31 October 2018). This information is available in the draft revised NAS, but not on the main adaptation page of the MZP website.

¹⁵⁷⁸ Informácia o dosiahnutom pokroku pri realizácii adaptačných opatrení v SR, URL:

<http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=25576>, Date accessed: 17/5/2018

¹⁵⁷⁹ Personal communication with MS.

The results of the review are briefly described in the draft version of the updated NAS.¹⁵⁸⁰

The evaluation of the updated version of the NAS is planned to be carried out in 2023.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / No

Current mechanisms will stay in place. During the process of updating the NAS, the working group on adaptation was revitalised and new representatives were invited and involved (around 40 members). This working group is involved in all issues related to adaptation. Under the SEA, general public and NGOs were invited to provide their opinions and remarks on the draft revised NAS, as previously mentioned.

¹⁵⁸⁰ At the time of the final update (June 2018) of this Country Fiche, in the process of interdepartmental consultation..

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 <i>Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	<u>Yes</u> / In progress / No
2 <i>Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 <i>Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	Yes / <u>In progress</u> / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
4 Knowledge gaps		
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	Yes / In progress / <u>No</u>
5 Knowledge transfer		
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	Yes / <u>In progress</u> / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	Yes / In progress / <u>No</u>
Step C: Identifying adaptation options		
6 Identification of adaptation options		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	Yes / <u>In progress</u> / No
7 Funding resources identified and allocated		
7	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / <u>In progress</u> / No
Step D: Implementing adaptation action		
8 Mainstreaming adaptation in planning processes		
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	Yes / <u>No</u>

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	Yes / <u>No</u>
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	<u>Yes</u> / In progress / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 Implementing adaptation		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	<u>Yes</u> / No
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	<u>Yes</u> / No
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	<u>Yes</u> / No
Step E: Monitoring and evaluation of adaptation activities		
10 Monitoring and reporting		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
11 Evaluation		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	<u>Yes</u> / No

Adaptation preparedness scoreboard for Slovenia

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List of abbreviations

ARSO	Slovenian Environment Agency
CLISP	‘Climate Change Adaptation by Spatial Planning in the Alpine Space‘ project
DMCSEE	Disaster Management Centre for South-eastern Europe
EEA	European Economic Area
EIA	Environmental impact assessment
EU	European Union
EUSAIR	EU Strategy for Adriatic-Ionian Region
EUSALP	EU Strategy for Alpine Region
EUSDR	EU Strategy for Danube Region
ICPDR	International Commission for the Protection of the Danube River
ISRBC	International Sava River Basin Commission
MESP	Ministry of Environment and Spatial Planning of the Republic of Slovenia
MFAF	Ministry of Forestry, Agriculture and Food of the Republic of Slovenia
NAP	National Action Plan for adaptation
NDRA	National Disaster Risk Assessment
RCP	Representative Concentration Pathways
RDP	Rural Development Programme
SEA	Strategic environmental assessment
TRP	Target Research Programme

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

Slovenia has a Strategic Framework for Climate Change Adaptation. The Ministry of Environment and Spatial Planning (MESP) developed the Strategic Framework¹⁵⁸¹, which was approved at the end of 2016. It provides a long-term vision and strategic guidelines for adaptation-related activities. The ambition is for Slovenia to be fully adapted to climate impacts by 2050 and to develop into a climate resilient and sustainable society with a high quality of life. The Strategic Framework includes four separate annexes:

1. A guide to Terminology¹⁵⁸²;
2. Assessment plan for analysing climate impacts until the end of the 21st century¹⁵⁸³;
3. Comparisons of good adaptation processes in other European Union (EU) member states¹⁵⁸⁴;
4. Methodology for determining current and future vulnerability levels for Slovenian regions¹⁵⁸⁵.

The Framework Programme for Transition to a Green Economy¹⁵⁸⁶, adopted in October 2015 together with Plan of Governmental Activities for 2015-2016, refers to the need for integration in sectoral strategies. It links climate adaptation particularly with the objectives of biodiversity conservation, green jobs creation, sustainable urban development, and green agricultural practices.

A2. Adaptation strategies adopted at subnational levels

In Slovenia, municipalities are the only level of self-government; they have an extensive role regarding spatial and urban planning, housing, water management, economic development, tourism and environmental protection.

Climate adaptation initiatives at the local and/or regional levels are so far mostly based on one-off participation in various projects (e.g. pilot research, transnational cooperation,

¹⁵⁸¹ MESP; 2016; Strategic Framework for Climate Change Adaptation; http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/podnebne_spremembe/SOzP_an_g.pdf

¹⁵⁸² MESP; 2016; Annex 1 to Strategic Framework; http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/podnebne_spremembe/SOzP_priloga1.pdf

¹⁵⁸³ MESP; 2016; Annex 2 to Strategic Framework; http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/podnebne_spremembe/SOzP_priloga2.pdf

¹⁵⁸⁴ MESP; 2016; Annex 3 to Strategic Framework; http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/podnebne_spremembe/SOzP_priloga3.pdf

¹⁵⁸⁵ MESP; 2016; Annex 4 to Strategic Framework; http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/podnebne_spremembe/SOzP_priloga4.pdf

¹⁵⁸⁶ MESP, 2015, Okvirni program za prehod v zeleno gospodarstvo – OPZG z Akcijskim načrtom izvajanja OPZG (ANi OPZG) in Načrtom aktivnosti ministrstev in vladnih služb (NAMVS) 2015–2016; URL:

http://www.vlada.si/fileadmin/dokumenti/si/projekti/2016/zeleno/opzg_akcijski_nacrt_in_nacrt_aktivnosti.pdf

LIFE)¹⁵⁸⁷. Some of the frontrunners include the municipality of Ajdovščina, which developed its local draft adaptation strategy¹⁵⁸⁸ on the basis of the regional ‘Strategy of agriculture sector adaptation to climate change in the Vipava Valley 2017-2021’. The latter is one of the key documents in the framework of the LIFE project ViVaCCAdapt¹⁵⁸⁹ developed by the Ajdovščina Development Agency.

In the new Spatial Planning Law¹⁵⁹⁰, which comes into effect on 1 June 2018, climate adaptation considerations are expected to form an integral part of development processes at the local and the regional level.

Adaptation action plans

B1. National adaptation plan

Slovenia's Strategic Framework is intended to be followed up by National Adaptation Plan (NAP), which will take account of the national risk assessments and a comprehensive national climate vulnerability assessment¹⁵⁹¹. The NAP drafting process has not yet started, as vulnerability assessments for the sectors and municipalities are still ongoing¹⁵⁹².

B2. Adaptation plans adopted at sub-national level

The Strategic Framework encourages the mainstreaming of adaptation at all regional and local levels¹⁵⁹³. According to the new umbrella Spatial Planning Law¹⁵⁹⁴ (see Section A2 above), the regions are required by 2023 to develop regional development plans and regional spatial plans that should include climate vulnerability assessments. Climate adaptation considerations, including green infrastructure, should now form an integral part of spatial, urban and land-use planning processes at all levels. This is in line with a new strategic approach under development¹⁵⁹⁵ that would integrate development planning and spatial planning at regional level, instead of relying only on municipal-level spatial planning.

¹⁵⁸⁷ MESP; 2016; Strategic Framework for Climate Change Adaptation; URL:

http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/podnebne_spremembe/SOzP_ang.pdf

¹⁵⁸⁸ Ajdovščina municipality; 2017; Predlog strategije prilaganja kmetijstva občine Ajdovščina na podnebne spremembe v Vipavski dolini za obdobje 2018-2021; URL: <https://www.ajdovscina.si/mma/strategija-kmetijstvo.pdf/2017121813180177/?m=1513599475>

¹⁵⁸⁹ Project web VivaCCadapt; URL: <http://www.life-vivaccadapt.si/en/>; accessed 15.05.2018

¹⁵⁹⁰ Government of the Republic of Slovenia, 2018, Zakon o urejanju prostora, URL:

http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/zakonodaja/prostorsko_nacrtovanje/ZUREP.pdf

¹⁵⁹¹ MESP climate adaptation activities; URL:

http://www.mop.gov.si/si/delovna_podrocja/podnebne_spremembe/prilagajanje_podnebnim_spremembam/; accessed 03.05.2018

¹⁵⁹² Personal communication with MS contact

¹⁵⁹³ MESP; 2016; Strategic Framework for Climate Change Adaptation; URL:

http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/podnebne_spremembe/SOzP_ang.pdf

¹⁵⁹⁴ Government of the Republic of Slovenia, 2018, Zakon o urejanju prostora, URL:

http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/zakonodaja/prostorsko_nacrtovanje/ZUREP.pdf

¹⁵⁹⁵ dr. Janez Nared et al.; 2018; Projekt V6-1652: Model povezovanja prostorskega in razvojnega načrtovanja na regionalni ravni v okviru ciljnega raziskovalnega programa »CRP 2016« v letu 2016; URL:

http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/ragionalno_prostorsko_nacrtovanje/model_povezovanja_prostorsega_nacrtovanja.pdf

In practice, consideration of climate impacts is dependent upon the availability of studies and impact assessments, so the extent and depth of consideration varies¹⁵⁹⁶ (e.g. floods and landslides are often included in local spatial plans; regional development programmes 2014-2020 include climate adaptation goals and measures in line with the overarching national cohesion policy¹⁵⁹⁷).

B3. Sectoral adaptation plans

There are sectoral plans that include adaptation. In 2008, the Government of the Republic of Slovenia adopted the Strategy for the Adaptation of Slovenian Agriculture and Forestry to Climate Change¹⁵⁹⁸. The Strategy was followed by an action plan for 2010 and 2011¹⁵⁹⁹, which the Government adopted in October 2010 and amended in March 2011. The plan was not updated in 2012 due to lack of funding. However, many adaptation measures are implemented in the framework of the Common Agricultural Policy's Pillar 1 and 2. For example, the Rural Development Programme (RDP)¹⁶⁰⁰ encourages adaptation measures (e.g. in relation to hops and maize production on light soils¹⁶⁰¹), supported by a number of applied research projects.

The River Basin Management Plans for the Danube¹⁶⁰² and Adriatic Sea Basins for the 2016–2021¹⁶⁰³ period define a range of measures that can contribute to climate adaptation. A

¹⁵⁹⁶ Personal communication with MS contact

¹⁵⁹⁷ Slovenian cohesion policy web portal, URL: <http://www.eu-skladi.si/>; accessed 30.05.2018

¹⁵⁹⁸ MFAF, 2008, Strategija prilagajanja slovenskega kmetijstva in gozdarstva podnebnim spremembam, URL: <http://agromet.mkgp.gov.si/Publikacije/STRATEGIJA%20prilagajanja.pdf> <http://agromet.mkgp.gov.si/Publikacije/STRATEGIJA%20prilagajanja.pdf>, accessed on 04.05.2018.

¹⁵⁹⁹ MFAF, 2010, Akcijski načrt strategije prilagajanja slovenskega kmetijstva in gozdarstva podnebnim spremembam za leti 2010 in 2011 – prečiščeno besedilo, URL: http://www.mko.gov.si/fileadmin/mko.gov.si/pageuploads/podrocja/Kmetijstvo/Naravne_nesrece/Akcijski_nactr_precisceno_besedilo_.pdf http://www.mko.gov.si/fileadmin/mko.gov.si/pageuploads/podrocja/Kmetijstvo/Naravne_nesrece/Akcijski_nactr_precisceno_besedilo_.pdf, accessed on 04.05.2018.

¹⁶⁰⁰ European Environment Agency, National adaptation policy processes in European countries — 2014, URL: <http://www.eea.europa.eu/publications/national-adaptation-policy-processes>, European Climate Adaptation Platform – self-assessment Slovenia, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/slovenia>, accessed on 03.05.2018, and Program razvoja podeželja – Okvirni terminski načrt objave javnih razpisov za ukrepe PRP 2014.2020 do konca leta 2017., 2017, URL: http://www.mkgp.gov.si/fileadmin/mkgp.gov.si/pageuploads/Medijsko_sredisce/2017/06_junij/13_PRP/S2J-SP-KMC417061315311.pdf http://www.mkgp.gov.si/fileadmin/mkgp.gov.si/pageuploads/Medijsko_sredisce/2017/06_junij/13_PRP/S2J-SP-KMC417061315311.pdf

¹⁶⁰¹ Barbara Čeh, 2011, Zaključno poročilo o rezultatih opravljenega raziskovalnega dela na projektu v okviru ciljnega raziskovalnega programa (CRP) »Konkurenčnost Slovenije 2006 – 2013«, URL: <http://www.dlib.si/stream/URN:NBN:SI:DOC-IG27NYOZ/78fc0a7b-76ef-458c-b85c-869db7f009a9/PDF>, accessed on 03.05.2018.

¹⁶⁰² Vlada Republike Slovenije, 2016, Načrt upravljanja voda na vodnem območju Donave za obdobje 2016–2021, URL: http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/voda/nuv_II/NUV_VOD.pdf http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/voda/nuv_II/NUV_VOD.pdf

¹⁶⁰³ Vlada Republike Slovenije, 2016, Načrt upravljanja voda na vodnem območju Jadranskega morja za obdobje 2016–2021, URL: http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/voda/nuv_II/NUV_VOD.pdf

specific fundamental measure included in the programme of measures¹⁶⁰⁴ under the climate change heading is the preparation of a set of indicators of drought. However, all measures related to improving water status and management could be considered as contributing to climate adaptation.

The Flood Risk Mitigation Plan 2017-2021¹⁶⁰⁵ defines a wide range of flood protection measures, such as regular hydrological and meteorological monitoring, as well as adaptation measures for energy and transport infrastructure. However, the plan is not based on a flood risk assessment that considers climate impacts and projections. The flood risk assessment expected at the end of 2018 will take these into account.

The new Spatial Planning Law has been adopted and enters into force on 1 June 2018. It provides for land use, regional spatial plans, urban and maritime spatial plans. In the process of environmental impact assessment (EIA), climate impacts are also considered.

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

In Slovenia, the MESP is responsible for adaptation policy-making. Technical support for the MESP's work is provided by several public agencies, such as the Environmental Agency, Inspectorate of the Republic of Slovenia for the Environment and Spatial Planning, Slovenian Water Agency, Slovenian Nuclear Safety Administration and Surveying and Mapping Authority of the Republic of Slovenia. The MESP, supported by the Slovenian Environment Agency (ARSO), also serves also as the technical coordination unit of the Inter-Ministerial Working Group on Climate Change Adaptation.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

The Inter-Ministerial Working Group on Climate Change Adaptation, with members from all concerned ministries, agencies and government offices, held informal meetings during 2014. It was officially nominated by the Government in September 2016¹⁶⁰⁶ to coordinate inter-

http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/voda/nuv_II/NUV_VOJM.pdf

http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/voda/nuv_II/NUV_VOJM.pdf

¹⁶⁰⁴ MESP; Načrt upravljanja voda, URL:

http://www.mop.gov.si/si/delovna_podrocja/voda/nacrt_upravljanja_voda/#c18222, accessed on 04.05.2018.

¹⁶⁰⁵ Vlada Republike Slovenije, 2017, Načrt zmanjševanja poplavne ogroženosti 2017–2021, URL:

http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/voda/nzpo_2017_2021.pdf

¹⁶⁰⁶ Vlada Republike Slovenije, 2016, SKLEP o ustanovitvi Medresorske delovne skupine za prilagajanje podnebnim spremembam, URL:

sectoral adaptation-related activities in Slovenia. The Group serves as a main reference point during the process of adaptation policy development, led by the MESP with the help of external experts and the ARSO. The Group provides horizontal and vertical coordination of adaptation policy-making. The Group participated in drafting and implementing the Strategic Framework and implementation documents (including the NAP), inter- and intra-sectoral harmonisation of specific content, contributing to involving the public, providing support in international, regional and local adaptation processes, identifying needs for additional funding to support expert research required for implementation, and evaluation of adaptation measures.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.

Yes / In progress / **No**

There is no active vertical coordination mechanism specifically for adaptation policy-making, however, there are mechanisms in place that provide vertical coordination between local, regional and national level in development, spatial planning and strategic environmental assessment (SEA) procedures, as well as in standard legislation and policy making structures.

The Strategic Framework indicates that municipalities will be supported in the future by relevant groundwork, guidelines and funds for developing adaptation plans. A national contact point needs to be established to coordinate and promote implementation of measures at the local level.

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes/ No

A dedicated process to facilitate stakeholders' involvement formed an integral part of developing the national Climate Change Risk Assessment (CCRA)¹⁶⁰⁷. In cooperation with external experts: a plan was prepared on how to involve stakeholders; a public event was organised with more than 100 participants to prepare the risk assessment; and sectoral associations and experts were consulted separately.

http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/podnebne_spremembe/medresorska_delovna_skupina_sklep.pdf

¹⁶⁰⁷ Biotechnical Faculty, 2014, "The expert groundwork for preparing the assessment of the risks and opportunities that climate change presents for Slovenia", final report, URL:

http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/podnebne_spremembe/prizr_podl_prip_ocene_tveganj.pdf

A standard public consultation process was used for the Strategic Framework document preparation¹⁶⁰⁸. The document was drafted by the MESP, the ARSO and external experts, based on consultations within the Inter-Ministerial Climate Change Adaptation Working Group. Public consultation on the draft document took one month, and included: a presentation of the document in a session of the national Council for Sustainable Development and Environmental Protection; a public hearing; a conference-workshop with 25 representatives of NGOs, sectoral associations, research and public sector institutions; and an invitation to provide written comments directly to the MESP.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

Transboundary cooperation to address common challenges with relevant countries exists but is limited. It does not yet result in specific adaptation on the ground. In the Strategic Framework, the ambition for better transboundary cooperation is mentioned¹⁶⁰⁹. Some cooperation has been conducted bilaterally in cross-border cooperation programmes based on an assessment of common priority sectors and risks, such as floods¹⁶¹⁰. Recent natural disasters (e.g. floods, hailstorms and sleet) have drawn more attention to transboundary issues in terms of preventive and relief actions. The 2014 floods in Croatia, Bosnia and Herzegovina, and Serbia intensified cooperation in the region on adaptation, and sharing of information and best practice (e.g. on flood prevention measures, flood control).

Slovenia participates in the work of two international river commissions: the International Sava River Basin Commission (ISRBC) and the International Commission for the Protection of the Danube River (ICPDR). The ISRBC developed the Water and Climate Adaptation Plan for the Sava River Basin¹⁶¹¹ (covering five countries) in 2015, as a guidance document to governments for climate adaptation measures in navigation, hydropower, agriculture, flood protection and economic evaluation of climate impacts. The Plan includes hydrological modelling, and suggests a methodology to examine climate impacts on water-related sectors. However, the integrated effects of other types of changes (demography, land use etc.) have not been considered due to lack of data. Furthermore, in 2018 an outline of the Climate Adaptation Strategy and basin-wide priority measures for the Sava River Basin was published.¹⁶¹² ICPDR developed a climate adaptation strategy¹⁶¹³ in 2012, as one of the first major transboundary river basin strategies worldwide, based on a scientific study on climate change in the basin.

¹⁶⁰⁸ MESP - Climate adaptation activities, URL:

http://www.mop.gov.si/si/delovna_podrocja/podnebne_spremembe/prilagajanje_podnebnim_spremembam/, accessed on 04.05.2018.

¹⁶⁰⁹ MESP; 2016; Strategic Framework for Climate Change Adaptation, 2016, URL:

http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/podnebne_spremembe/SOzP_ang.pdf

¹⁶¹⁰ ICPDR website; URL: <http://www.icpdr.org/main/danube-basin>; accessed on 15.05.2018

¹⁶¹¹ Project “Water and Climate Adaptation Plan for the Sava River Basin”; URL:

https://www.savacommission.org/project_detail/18/1; accessed on 04.05.2018

¹⁶¹² See at:

http://www.savacommission.org/dms/docs/dokumenti/peg_rbm/ad.3.1_wm_issues_doc_8_outline_of_the_climate_adaptation_strategy_for_the_sava_rb.pdf

¹⁶¹³ ICPDR Climate adaptation, URL: <https://www.icpdr.org/main/activities-projects/climate-change-adaptation>, accessed on 11.05.2018.

Slovenia also takes part in the implementation of the three EU-level macro-regional strategies: the EU Strategy for the Alpine Region (EUSALP)¹⁶¹⁴, the EU Strategy for the Adriatic-Ionian Region (EUSAIR)¹⁶¹⁵ and the EU Strategy for the Danube Region (EUSDR)¹⁶¹⁶. It does so by participating in regional cooperation projects that address various climate-related challenges shared in the region through research, knowledge transfer, capacity building and awareness-raising activities. Slovenia also participates in the work of the Alpine Convention, which adopted the action plan on climate change in the Alps in 2009. The action plan aims to make the Alps an exemplary territory for climate adaptation with regard to water resources and biodiversity, mountain forests and farming, tourism, settlements and infrastructure. ‘Mitigation and adaptation to climate change in the Alpine space’¹⁶¹⁷ and the ‘Alpine strategy for adaptation to climate change in the field of natural hazards’¹⁶¹⁸ are among the guidance documents produced. Recently, a new Climate Board has been established and tasked with preparing a new system of targets.

Furthermore, sub-national research and activities focused on the Alpine region have been carried out as part of EU-funded projects CLISP¹⁶¹⁹ and C3-Alps¹⁶²⁰. These address climate adaptation by spatial planning, and by capitalising on climate change knowledge from previous EU projects to integrate adaptation into sectoral and regional policies, respectively.

Slovenia is also involved in climate adaptation activities with regard to transport in the context of the international United Nations Economic Commission for Europe¹⁶²¹. International collaboration is one of the guiding principles to stimulate climate adaptation in Slovenia.

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / **In progress** / No

¹⁶¹⁴ EU-Strategy for the Alpine Region, URL: <https://www.alpine-region.eu/>, accessed on 15.05.2018

¹⁶¹⁵ EU-Strategy for the Adriatic-Ionian Region, URL: <http://www.adriatic-ionician.eu/>, accessed on 15.05.2018

¹⁶¹⁶ EU-Strategy for the Danube Region, URL: <http://www.danube-region.eu/>, accessed on 15.05.2018

¹⁶¹⁷ Permanent Secretariat of the Alpine Convention, Alpine signals 5: Mitigation and adaptation to climate change in the Alpine space, 2007, URL:

http://www.alpconv.org/en/publications/alpine/Documents/Alpsig5_en.pdf

¹⁶¹⁸ Platform on Natural Hazards of the Alpine Convention, Alpine strategy for adaptation to climate change in the field of natural hazards, 2012, URL:

http://www.planat.ch/fileadmin/PLANALP/planalp_pdf/2012_PLANALP_Alpine_Strategy.pdf

¹⁶¹⁹ CLISP project website, URL: <http://www.alpine-space.org/2007-2013/projects/projects/detail/CLISP/show/index.html>, accessed on 04.15.2018

¹⁶²⁰ C3-Alps project website, URL: <http://www.alpine-space.org/2007-2013/projects/projects/detail/C3-Alps/show/index.html>, accessed on 04.05.2018

¹⁶²¹ Group of Experts on Climate Change impacts and adaptation for transport networks and nodes (WP.5/GE.3), URL: <https://www.unece.org/trans/areas-of-work/trends-and-economics/activities/group-of-experts-on-climate-change-impacts-and-adaptation-for-transport-networks-and-nodes-wp5ge3.html>, accessed on 15.05.2018

The meteorological portal of the ARSO provides scientific data and information on current climate change, extreme climate events and their impacts¹⁶²². These indicators include air temperature, precipitation, snow, wind, solar radiation, phenology and heating. Environmental indicators also provide data on extreme weather events and glaciers. Data on extreme weather events and their impacts (including damage to infrastructure and property) are collected and made available to the public by the Administration for Civil Protection and Disaster Relief. A specific indicator on the climate vulnerability of Slovenia is currently being developed.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

In 2016 and 2017, a project 'Assessments of Climate Change Impacts in the 21st Century' was carried out at the ARSO¹⁶²³. Based on the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) Representative Concentration Pathways (RCP) emissions scenarios, ensembles of six models from EURO-CORDEX for RCP4.5 and RCP8.5 were used to assess the long-term changes in climate variables for Slovenia (average climate conditions and extreme weather events until 2100). Impact assessments were carried out (including for agricultural drought, heat waves, frost, and soil conditions) using these scenarios.

Tailored climate services¹⁶²⁴ are in high demand from different users. Climate services are currently used for upgrades of risk assessments, vulnerability assessments of major projects and other activities, such as long-term planning in different areas. For example, in preparing the National Disaster Risk Assessment (NDRA) and Report, climate scenarios were used to evaluate the impact and probability of future risks.¹⁶²⁵ Based on three emissions scenarios (RCP2.6, RCP4.5, and RCP8.5), projections of the following climate variables were prepared: air temperature, soil temperature, surface water temperature, temperature of the sea, groundwater temperature, water content in the soil, amount of precipitation, the quantitative status of watercourses, water supply of aquifers, and phenological development of selected plant species. On the basis of the knowledge of past trends, changes in the frequency of occurrence, duration and severity were also estimated for heatwaves, agricultural droughts, surface water droughts, groundwater droughts, high-water conditions and frost. All this information will be used in drafting the NAP.

Extensive databases have been prepared to assess the impacts mentioned above, which will be useful for further research into climate impacts.

¹⁶²² Meteorological portal of ARSO, URL: <http://meteo.arso.gov.si/met/en/climate/> and http://kazalci.arso.gov.si/?data=group&group_id=8, accessed 15.05.2018

¹⁶²³ Project "Assessments of Climate Change Impacts in the 21st Century", URL: <http://meteo.arso.gov.si/met/sl/climate/pss-project/>, accessed 15.05.2018

¹⁶²⁴ Slovenian Environment Agency, URL: <http://www.arso.gov.si/>, accessed 15.05.2018

¹⁶²⁵ National Coordination Body for Disaster Risk Assessment, 2016, Report on disaster risk assessment in the Republic of Slovenia for the period 2014–2016, URL: http://www.sos112.si/slo/tdocs/porocilo_izdelava_ocen_ang.pdf

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.

Yes / In progress / No

To support adaptation policy and decision making, a comprehensive national CCRA together with a wide public and inter-ministerial consultation process was carried out in 2014. It included all sectors, while indirect and transboundary risks were taken into account to some extent. It formed a basis for further work in this area.

The agriculture and forestry sectors analysed climate vulnerabilities in 2004¹⁶²⁶, resulting in an adaptation strategy for the agriculture and forestry sectors, which was adopted in 2008. These strategies have not since been reviewed.

The water sector also carried out preliminary risk assessments in the framework of river basin management planning and flood risk management.

Slovenia adopted the first NDRA¹⁶²⁷ in 2015. Selected separate risk assessments for climate-related disasters (particularly floods, drought and forest fires), as well as the NDRA, were updated with available climate impact assessments in 2016¹⁶²⁸. Certain individual disaster risk assessments already incorporated available climate risk data in their assessments. The Ministry of Health, for example, prepared a 'Risk Assessment for the Dangers of Biological, Chemical, Environmental and Unknown Origin to Human Health' and complemented it with consideration of climate impacts on the occurrence of infectious diseases¹⁶²⁹. At the regional level, a research project funded by the Target Research Programme (TRP) 'Adaptation to Climate Change with Spatial Planning Tools'¹⁶³⁰ was carried out as a continuation of the EU project CLISP and provided a first vulnerability assessment for the Gorenjska region.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

Neither the vulnerability assessment nor the Strategic Framework identify any transboundary risks.

¹⁶²⁶ ARSO, 2004, Ranljivost slovenskega kmetijstva in gozdarstva na podnebno spremenljivost in ocena predvidenega vpliva, URL:

<http://meteo.arso.gov.si/uploads/probase/www/agromet/product/document/sl/ranljivost.pdf>,

¹⁶²⁷ Directorate for Protection and Rescue - Disaster Risk Assessment documents, URL:

<http://www.sos112.si/slo/page.php?src=os17.htm>, accessed on 15.05.2018

¹⁶²⁸ Directorate for Protection and Rescue - - Current protection and rescue plans, URL:

<http://www.sos112.si/slo/page.php?src=os12.htm>, accessed on 15.05.2018

¹⁶²⁹ MESP, 2018, 7th National Communication & 3rd Biennial Report from Slovenia under the United Nations Framework Convention on Climate Change, URL:

http://unfccc.int/files/national_reports/biennial_reports_and_iar/submitted_biennial_reports/application/pdf/453201_slovenia-br3-nc7-1-7nc3br-en_v0b_f.pdf, accessed on 15.05.2018

¹⁶³⁰ Project 'Adaptation to Climate Change with Spatial Planning Tools', URL:

<http://www2.uirs.si/sl/Raziskovanje/Projekti/CRPKonkuren%C4%8DnostSlovenije20062013.aspx>, accessed on 11.05.2018

Major projects and sectoral strategic documents are subject to environmental impact assessment (EIA) or to SEA. All EIAs and SEAs take transboundary risks into account, so these risks have been, for example, assessed in the SEA during preparation of the Flood Protection Plan.

The Water and Climate Adaptation Plan for the Sava River Basin¹⁶³¹ made in the frame of ISRBC, acts as a guidance document to governments for climate adaptation measures in navigation, hydropower, agriculture, flood protection and economic evaluation of climate impacts. It contains hydrological modelling, and suggests a methodology to examine climate impacts on water-related sectors.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / In progress / No

Knowledge gaps are identified and work is ongoing to address them. The Strategic Framework¹⁶³² clearly emphasises the importance of knowledge and knowledge transfer in order to be able to adapt. The objectives are to further develop and provide user-friendly climate services, upgrade and link databases and processes in support of decision making and establish regular cooperation between researchers and decision-makers.

Annexes 2 and 4 to the Strategic Framework define future steps for scientific data collection, modelling and establishing vulnerability indicators to be used as a baseline for preparing the NAP. The majority of scientific analyses for this purpose have already been finalised by ARSO. Historical climate data (temperature, precipitation, hydrology, climate impacts on forestry and agriculture) and some future climate scenarios until the end of the 21st Century are also publicly available at the ARSO meteorological portal¹⁶³³. Several specific assessments are planned to consider the needs of individual sectors (e.g. solar energy potential, biodiversity, human health, sea and coast, avalanches, occurrence of torrential floods, fire hazards).¹⁶³⁴

There is, however, still limited research on climate adaptation is available. National funding for applied research to be used for policy-making by specific ministries is provided through the TRP¹⁶³⁵. Sectors decide independently on funding priorities for research in their respective departments. Adaptation-related research through the TRP has, thus, mainly been carried out

¹⁶³¹ Water and Climate Adaptation Plan for the Sava River Basin, URL: https://www.savacommission.org/project_detail/18/1 accessed on 27.04.2018

¹⁶³² Strategic Framework for Climate Change Adaptation; http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/podnebne_spremembe/SOzP_ang.pdf

¹⁶³³ Meteorological portal of ARSO, URL: <http://meteo.arso.gov.si/met/sl/climate/change/>, accessed on 15.05.2018

¹⁶³⁴ MESP, 2018, 7th National Communication & 3rd Biennial Report from Slovenia under the United Nations Framework Convention on Climate Change, URL: http://unfccc.int/files/national_reports/biennial_reports_and_iar/submitted_biennial_reports/application/pdf/453201_slovenia-br3-nc7-1-7nc3br-en_v0b_f.pdf, accessed 15.05.2018

¹⁶³⁵ Slovenian Research Agency- Target research programmes, URL: <http://www.arrs.gov.si/en/progproj/crp/>, accessed 15.05.2018

by the Ministry of Forestry, Agriculture and Food (MFAF), which is responsible for the sectors assessed as most vulnerable. However, some adaptation-related research gaps are also addressed through the dedicated Climate Change Fund.

The ARSO hosts the Drought Management Centre for South-Eastern Europe – DMCSEE¹⁶³⁶. The Centre monitors and assesses drought and risks and vulnerability connected to drought for the South-East Europe region, also partly through EU-funded projects (currently within the DriDanube project¹⁶³⁷).

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / **In progress** / No

The ARSO has an information website dedicated to climate change information¹⁶³⁸. The MESP¹⁶³⁹ and MFAF¹⁶⁴⁰ provide some information and material on adaptation-related issues. By September 2018, the MESP plans to publish all summaries and layman reports on available climate impact assessments carried out since 2016. Information on relevant national activities are provided by the EU portal ClimateADAPT¹⁶⁴¹. Slovenia has not yet established a dedicated portal with information on climate adaptation.

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / **In progress** / No

There are few capacity-building activities and education and training materials on climate adaptation. Promotional and educational material is made available and disseminated through participation in European projects, such as C3-Alps¹⁶⁴². The ARSO and the National Public Health Institute regularly organise events on hazardous climate and hydrological consequences to provide instructions to citizens. The ARSO also regularly publishes climate change information and newsletters with information on climate monitoring. The project ‘Slovenia reduces CO₂’¹⁶⁴³ shares examples of good adaptation practices. These mainly concern flood protection infrastructure, and the regional ‘Strategy for adapting agriculture to

¹⁶³⁶ DMCSEE website, URL: <http://www.dmcsee.org/>, accessed 15.05.2018

¹⁶³⁷ DriDanube project website, URL: <http://www.interreg-danube.eu/approved-projects/dridanube>, accessed on 15.05.2018

¹⁶³⁸ Project "Assessments of Climate Change Impacts in the 21st Century", URL: <http://meteo.arso.gov.si/met/sl/climate/pss-project>, accessed 15.05.2018

¹⁶³⁹ MESP climate adaptation activities, URL: http://www.mop.gov.si/si/delovna_podrocja/podnebnne_spremembe/prilagajanje_podnebnim_spremembam/, accessed 04.05.2018

¹⁶⁴⁰ MFAF, URL: <http://www.mkgp.gov.si/en/>, accessed on 15.05.2018

¹⁶⁴¹ ClimateADAPT. URL: <http://climate-adapt.eea.europa.eu/>

¹⁶⁴² C3-Alps project, URL: [http://www.alpine-space.org/2007-2013/projects/projects/index4ec0.html?tx_txrunningprojects_pi1\[uid\]=39&tx_txrunningprojects_pi1\[view\]=singleView](http://www.alpine-space.org/2007-2013/projects/projects/index4ec0.html?tx_txrunningprojects_pi1[uid]=39&tx_txrunningprojects_pi1[view]=singleView), accessed on 15.05.2018

¹⁶⁴³ Project “Slovenija znižuje CO₂”, URL: <http://www.slovenija-co2.si/index.php/dobre-prakse/prilagajanje-na-podnebnne-spremembe>; accessed on 16.05.2018.

climate change for Vipava Valley¹⁶⁴⁴ (see Section A2). Slovenia plans to develop a capacity-building and communication programme funded by the Climate Fund in the future.

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / **No**

Slovenia is yet to start working on a NAP. Many sectors are in the initial stages of exploring and integrating climate adaptation. However, in sectoral policy plans, some adaptation options have already been identified; for instance, in the strategy and the action plan for the Adaptation of Slovenian Agriculture and Forestry to Climate Change (2008). The River Basin Management Plans for the Danube¹⁶⁴⁵ and Adriatic Sea Basins for 2016–2021¹⁶⁴⁶ contain measures for climate adaptation, which are based on a vulnerability assessment.

It can be concluded that adaptation options for the agriculture, forestry and water management sectors are consistent with sectoral risk assessments, and with measures and good practices identified in similar contexts.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / **No**

As mentioned in relation to Indicator 6a, Slovenia has yet to start working on a NAP and it is, therefore, too early to indicate whether the selection of priority adaptation options is based on robust methods.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes/ In Progress / No

In August 2014, the Slovenian government adopted the Decree Implementing the Decision on a Union Civil Protection Mechanism (Official Gazette of the Republic of Slovenia, no. 62/14), which determined a list of risk assessments to be carried out, as well as responsible ministries, deadlines, procedures and requirements for such assessments, together with

¹⁶⁴⁴ Project website VivaCCadapt, URL: <http://www.life-vivaccadapt.si/en/>, accessed on 15.05.2018

¹⁶⁴⁵ Vlada Republike Slovenije, 2016, Načrt upravljanja voda na vodnem območju Donave za obdobje 2016–2021, URL: http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/voda/nuv_II/NUV_VOD.pdf

¹⁶⁴⁶ Vlada Republike Slovenije, 2016, Načrt upravljanja voda na vodnem območju Jadranskega morja za obdobje 2016–2021, URL: http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/voda/nuv_II/NUV_VOJM.pdf

procedures and requirements for the NDRA¹⁶⁴⁷. These were first prepared in 2015. In 2016, selected risk assessments and the NDRA were updated to include climate impacts.

The Administration for Civil Protection and Disaster Relief under the Ministry of Defence is the national coordination body for risk assessment processes. The Administration provides links with adaptation-related policies through an Inter-Ministerial Working Group on Disaster Risk Assessments and is also responsible for national emergency response plans in cooperation with other ministries. The NDRA presents the national risk assessment of disasters and is a first step towards comprehensive risk management.

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / **In Progress** / No

Funds for cross-cutting climate adaptation action are available within the Climate Change Fund, but specific allocations are not clearly defined in advance by sector. Since 2015, funds have been allocated mainly to sustainable transport and energy infrastructure, renewable energy, and general awareness and education activities. However, in some sectors, such as agriculture and water management, reliable multiannual funds can be mobilised once an action plan of adaptation measures is identified. Specific funds available within the water and agriculture sectors include the National Water Fund and EU Rural Development Programmes (RDPs).

The Strategic Framework lays down the main principles for mobilising funds. The focus is on using national and local budgets, as co-finance, to attract additional international funding. The Strategic Framework also seeks to foster investments from the private sector.

The preparation of a vulnerability index for municipalities, outlined in Annex 4 of the Strategic Framework, will be the basis for classifying municipalities according to their climate vulnerability. This classification will guide the preparation of a call for co-financing adaptation strategies for municipalities and regions. In addition to development of local and regional adaptation strategies, it is planned to use the Climate Funds for supporting adaptation training, awareness, research, and development of an integrated information system on environment, as an aid to policy-making. Local and regional adaptation strategies will aim to review the climate resilience of existing development and spatial planning documents, processes and contents, and identify disparities and priority areas for adaptation measures at local and regional levels.

Under the European Economic Area and Norway grants mechanisms for the period 2014-2021¹⁶⁴⁸, a total of EUR 14,500,000 has been allocated to climate mitigation and adaptation (plus national co-funding of EUR 2,558,823). The focus is on increasing public awareness,

¹⁶⁴⁷ Directorate for Protection and Rescue - Disaster Risk Assessment documents, URL: <http://www.sos112.si/slo/page.php?src=os17.htm>, accessed on 15.05.2018

¹⁶⁴⁸ European Economic Area grants website article; URL: <https://eeagrants.org/News/2018/Education-and-climate-change-in-the-spotlight-in-Slovenia>; accessed on 30.05.2018

improved planning and management competencies among key stakeholders in Slovenia, and pilot and demonstration activities (in sectors which will be defined in the specific calls).

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

The new EIA Directive has been transposed in the ‘Regulation on the scope and preparation of EIA reports’¹⁶⁴⁹. Developers are expected to assess the climate impacts and vulnerabilities of each project. Although the national SEA regulations do not yet require consideration of climate change, EU guidance on integrating climate change and biodiversity into EIA and SEA¹⁶⁵⁰, as well as guidance on the preparation of the EIA Report¹⁶⁵¹, are available on the MESP website and recommended to developers.

The Catalogue of Expert Knowledge¹⁶⁵² is guidance for environmental assessment experts on the content required of environmental assessment reports. The Catalogue includes legislation, assessment methodologies and studies from all fields of environment and nature protection, resources and heritage conservation, to enable better quality environmental assessments.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / No

In the new disaster risk assessment, prepared in 2016, impacts of climate change have been taken into account. The Administration for Civil Protection and Disaster Relief under Ministry of Defence is the national coordination body for risk assessment. It provides links with adaptation-related policies through an inter-ministerial working group on disaster risk assessments and is also responsible for national emergency response plans (disaster risk management plans) in co-operation with other ministries. The national risk management plans date back to 2010 and do not specifically mention climate impacts, although plans exist for floods, fires, epidemics, and other relevant issues; regional plans also take account of landslide events. New national disaster risk management plans are currently being prepared based on the NDRA of 2016.

¹⁶⁴⁹ Uredba o vsebini poročila o vplivih nameravanega posega na okolje in načinu njegove priprave; (Uradni list RS, 36/09, 40/17); URL: <http://www.pisrs.si/Pis.web/pregledPredpisa?id=PRAV8124>; accessed on 15.05.2018

¹⁶⁵⁰ MESP – SEA regulations; URL: http://www.mop.gov.si/si/delovna_podrocja/presoje_vplivov_na_okolje/celovita_presoja_vplivov_na_okolje/; accessed on 15.05.2018

¹⁶⁵¹ MESP – EIA regulations; URL: http://www.mop.gov.si/si/delovna_podrocja/presoje_vplivov_na_okolje/presoja_vplivov_na_okolje/; accessed on 15.05.2018

¹⁶⁵² ARSO EIA regulations; URL: http://www.arsso.gov.si/varstvo%20okolja/presoja%20vplivov%20na%20okolje/Katalog%20strokovnih%20znanj/KATALOG_KON%20C4%208CNA%20OBLIKA_14jun2013.pdf; accessed on 15.05.2018

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / No

Spatial planning legislation has been recently changed in Slovenia. The new Spatial Planning Law¹⁶⁵³ that comes into effect on 1 June 2018 fully transposes the EU's EIA, SEA, Habitat and Maritime Spatial Planning directives and covers land use, spatial, urban and maritime spatial planning. Regional land-use plans and urban plans are to be developed and harmonised under this umbrella law by 2023. According to this new legislation, climate adaptation, including green infrastructure, now forms an integral part of spatial, urban and land-use planning considerations at all levels. However, in practice, the extent to which climate impacts can be taken into account in planning decisions will be dependent upon the availability of studies and impact assessments¹⁶⁵⁴. Climate impacts (e.g. floods, landslides) can be better factored into risk assessments at the local and regional levels.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / In Progress / No

Currently, adaptation considerations are included only in water management (floods and droughts), forestry and agricultural sectors. Forestry and agriculture, as the most vulnerable sectors to climate change, were forerunners of this process, triggered in the framework of a multi-annual sectoral research programme "Securing food for tomorrow". The programme enabled research and collection of historical climate data relevant for these sectors, as well as development of benchmarks, scenarios and an action plan with adaptation measures for several upcoming years. Currently, adaptation actions are implemented under the Common Agricultural Policy (Pillars I and II), and are integrated in the Rural Development Programme 2014-2020.

The water sector developed its adaptation actions for periodical flood protection, water management and spatial planning in the context of national legislation and obligations under the EU Water Framework and Floods Directives, simultaneously participating in the work of international river commissions, such as ICPDR and ISRBC.

The Strategic Framework was not the driver behind the existing sectoral strategies and action plans mentioned above, as they preceded it. However, it provides some guidelines on how climate adaptation can be mainstreamed in sectoral policies in the future in two steps:

- Effective coordination of the contents and processes of development and spatial planning, including consideration of capabilities for disaster risk management
- Strengthening the use of environmental impact assessment instruments.

¹⁶⁵³ Government of the Republic of Slovenia, 2018, Zakon o urejanju prostora, URL:

http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/zakonodaja/prostorsko_nacrtovanje/ZUREP.pdf

¹⁶⁵⁴ Personal communication with MS contact

These steps are currently used to foster mainstreaming of adaptation in sectoral policies and actions¹⁶⁵⁵.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

Currently, adaptation is not being mainstreamed in insurance policies or alternative policy instruments. However, there are incentives in place at the Ministry for Agriculture for investments in risk prevention, and co-financing is available for insurance against losses associated with agricultural and fisheries production and hail storms¹⁶⁵⁶.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In progress** / No

Adaptation actions are being carried out in the agricultural, forestry and water management sectors, in line with the existing national-level sectoral action plans:

- Strategy for the Adaptation of Slovenian Agriculture and Forestry to Climate Change (2008)¹⁶⁵⁷ and its action plans of 2010 and 2011¹⁶⁵⁸. The plan was not updated in 2012 due to lack of funding, however, many adaptation measures are still implemented under the 1st and 2nd pillar of the RDP¹⁶⁵⁹, supported by a number of applied research projects related mainly to new technologies and cultivation of more climate-resilient crops

¹⁶⁵⁵ MESP; Strategic Framework for Climate Change Adaptation – main text; 2016; URL:

http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/podnebne_spremembe/SOzP_ang.pdf

¹⁶⁵⁶ Government of the Republic of Slovenia, 2014, Decree on co-financing of insurance premiums of agricultural production and fishery, URL: <http://www.pisrs.si/Pis.web/pregledPredpisa?id=URED5345> and Agency for Agricultural market and rural development, URL:

http://www.arsktrp.gov.si/storitve_ukrepi/trzni_ukrepi/ukrepi_pomoci/sofinanciranje_zavarovalnih_premij/, accessed 15.05.2018

¹⁶⁵⁷ MFAF; 2008; Strategija prilagajanja slovenskega kmetijstva in gozdarstva podnebnim spremembam; <http://agromet.mkgp.gov.si/Publikacije/STRATEGIJA%20prilagajanja.pdf>

¹⁶⁵⁸ MFAF; 2011; Akcijski načrt strategije prilagajanja slovenskega kmetijstva in gozdarstva podnebnim spremembam za leti 2010 in 2011 - prečiščeno besedilo;

http://www.mko.gov.si/fileadmin/mko.gov.si/pageuploads/podrocja/Kmetijstvo/Naravne_nesrece/Akcijnski_nacrt_precisceno_besedilo_.pdf

¹⁶⁵⁹ EEA; 2014; National adaptation policy processes in European countries — 2014;

<http://www.eea.europa.eu/publications/national-adaptation-policy-processes>, <http://climate-adapt.eea.europa.eu/countries-regions/countries/slovenia>; and

MFAF; 2017; Program razvoja podeželja: Okvirni terminski načrt objave javnih razpisov za ukrepe PRP 2014-2020 do konca leta 2017; URL:

http://www.mkgp.gov.si/fileadmin/mkgp.gov.si/pageuploads/Medijsko_sredisce/2017/06_junij/13_PRP/S2J-SP-KMC417061315311.pdf

- River Basin Management Plans for the Danube¹⁶⁶⁰ and Adriatic Sea Basins for the 2016–2021¹⁶⁶¹ define a range of measures also contributing to climate adaptation, including preparation of a set of indicators for drought, and measures related to improving water status and management
- Flood Risk Mitigation Plan 2017-2021¹⁶⁶² defines a large set of flood protection projects, which include measures to adapt land-use change, energy and transport infrastructure, and undertake regular hydrological and meteorological monitoring.

These actions are carried out by the respective national governmental departments, within available financial resources. Implementation of all three action plans in the water sector started just recently and there are no available progress reports as yet. Adaptation-related actions in agriculture and forestry have been implemented since 2010 and progress is reported annually, as part of agricultural development monitoring reports¹⁶⁶³ issued by the Agricultural Institute of Slovenia. Measures in all action plans are primarily sectoral, and not horizontal in nature.

In the Vipava Valley region, Ajdovščina Development Agency autonomously implements the LIFE ViVaCCAdapt project¹⁶⁶⁴ with MESP's financial help (20%) from the Climate Fund. A Strategy for adapting agriculture to climate change for the period 2017-2021¹⁶⁶⁵ has been prepared, as the first regional strategy of its kind. Implementation started recently and pilot actions are currently being taken that support the decision-making process for irrigation and planting of green windbreaks.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / **No**

The Strategic Framework describes the guiding principle of cooperation that should underpin climate adaptation. Municipalities will be supported in their implementation by laying down of expert groundwork, and through guidelines and funding. The specific mechanisms of providing these support tools will be detailed in the NAP. Furthermore, the plan is to establish a national contact point for the coordination and promotion of the implementation of measures at local and regional level. Existing inter-sectoral and inter-institutional networks, such as the Association of Municipalities and the Council for Sustainable Development and

¹⁶⁶⁰ Vlada Republike Slovenije, 2016, Načrt upravljanja voda na vodnem območju Donave za obdobje 2016–2021, URL: http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/voda/nuv_II/NUV_VOD.pdf

¹⁶⁶¹ Vlada Republike Slovenije, 2016, Načrt upravljanja voda na vodnem območju Jadranskega morja za obdobje 2016–2021, URL:

http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/voda/nuv_II/NUV_VOJM.pdf

¹⁶⁶² Vlada Republike Slovenije, 2017, Načrt zmanjševanja poplavne ogroženosti 2017–2021, URL: http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/voda/nzpo_2017_2021.pdf

¹⁶⁶³ Agriculture institute of Slovenia – reports on state of agriculture; URL:

http://www.kis.si/Porocila_o_stanju_v_kmetijstvu_OEK; accessed on 15.05.2018

¹⁶⁶⁴ Project VivaCCadapt website; URL: <http://www.life-vivaccadapt.si/en/>; accessed on 15.05.2018

¹⁶⁶⁵ Development Agency ROD Ajdovščina; 2017; Climate Change Adaptation Strategy for Agriculture in the Vipava Valley for the period 2017-2021; URL:

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.showFile&rep=file&fil=ViVaCCAdapt_Strategy-2017-2021.pdf

Environmental Protection, will also help to address the challenges of climate adaptation and encourage collaboration.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / No

The Strategic Framework indicates that mainstreaming climate adaptation is one of its main objectives. Guidelines are in place to integrate adaptation in spatial planning policies, prepared through a transboundary project¹⁶⁶⁶. There are sectoral development planning documents that outline guidelines for integrating adaptation. As noted in relation to Indicator 8a, there are also guidelines on how to include climate adaptation in the SEA process¹⁶⁶⁷, which have been applied, for example, in the assessment of the Transport Development Strategy in 2014¹⁶⁶⁸.

Several local-level guidance documents have been developed under the Alpine Convention, e.g. Guidelines for climate adaptation at the local level in the Alps¹⁶⁶⁹, also available in Slovenian¹⁶⁷⁰.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.

Yes / **No**

As the national adaptation policy implementation process is in its early phases, there do not seem to be many opportunities for stakeholder involvement in the implementation of adaptation policies and measures. However, processes for stakeholder involvement in policymaking are laid down in general laws regulating public policy development, and are systematically implemented.

The Strategic Framework generally acknowledges the importance of awareness raising and stakeholder participation¹⁶⁷¹. Implementation actions will include: communication campaigns

¹⁶⁶⁶ CLISP project website; URL: http://www.clisp.eu/content/sites/default/files/guidance_slovenian.pdf; accessed 30.04.2018

¹⁶⁶⁷ EEA; 2014; National adaptation policy processes in European countries — 2014; URL:

<http://www.eea.europa.eu/publications/national-adaptation-policy-processes>

¹⁶⁶⁸ Ministry of Infrastructure; 2014; Environmental report on a strategic environmental assessment for the Transport Development Strategy in the Republic of Slovenia; URL:

http://www.mzi.gov.si/fileadmin/mzi.gov.si/pageuploads/DMZ/OP_strategija_prirocnik_julij_CPVO_ang.pdf

¹⁶⁶⁹ Permanent Secretariat of the Alpine Convention; 2014; Guidelines for Climate Change Adaptation at the local level in the Alps; URL:

http://www.alpconv.org/en/publications/alpine/Documents/guidelines_for_climate_change_EN.pdf

¹⁶⁷⁰ Permanent Secretariat of the Alpine Convention; Smernice za prilaganje podnebnim spremembam na lokalni ravni v Alpah, URL:

http://www.alpconv.org/sl/publications/alpine/Documents/guidelines_for_climate_change_SL.pdf?AspxAutoDetectCookieSupport=1; accessed on 15.05.2018

¹⁶⁷¹ MESP; 2016; Strategic Framework for Climate Change Adaptation – main text; URL:

http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/podnebne_spremembe/SOzP_ang.pdf

and media work to support adaptation objectives and measures; inform target audiences about climate impacts; as well as developing a permanent cooperation mechanism with non-governmental and private sectors to strengthen and improve information provision and exchange.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / **No**

The Strategic Framework has been only adopted very recently and implementation is not yet monitored.

Slovenia will qualitatively and quantitatively monitor the implementation of the Strategic Framework through use of a vulnerability index. The Strategic Framework outlines a set of indicators that will form the vulnerability index. The aim is to monitor a range of variables relating to sensitivity, adaptive capacity, exposure, and key climate impacts, risks and opportunities. Variables to monitor the implementation of measures will be selected when adaptation plans and actions are developed. Monitoring will be conducted and reported by the Inter-Ministerial Climate Change Adaptation Working Group.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

Regular monitoring of plans takes place in the water sector¹⁶⁷², for example, in relation to the Danube River Basin Water Management Plan. This monitoring includes monitoring of climate adaptation measures.

Adaptation is monitored and reported as part of national annual agricultural development reports.

No other sectors so far show any progress with monitoring integration of climate adaptation. A system for periodic review of adaptation action of all relevant sectoral policies will be developed in relation to the future NAP, which will provide indicators for each of the sectors.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / **No**

¹⁶⁷² ICPDR projects on river basin management; URL: <https://www.icpdr.org/main/activities-projects/river-basin-management>; accessed on 16.05.2018

Regional, sub-national or local plans that are explicitly focused on climate adaptation have not yet been developed.

A system for periodic review of adaptation action at sectoral and local level, and the allocation of reporting responsibilities, will be developed in relation to the future NAP. The NAP should establish the type of framework to be used to monitor progress via a set of indicators that assess preparedness.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / **No**

Although monitoring and evaluation are activities that are developed in the Strategic Framework, both in qualitative and in quantitative terms (see Indicator 10a), a timetable for periodic review of the Strategic Framework is not yet available.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / **No**

Through the Inter-Ministerial Climate Change Adaptation Working Group, involvement of stakeholders is assured in the future development and implementation of adaptation policy. This body will ensure that: sectors make concerted efforts to develop and implement strategic documents; themes are coordinated among and within sectors; and that the general public and experts are involved. However, involvement in monitoring, evaluation and review seems to be less clearly enshrined in the Strategic Framework.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 <i>Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	Yes / In progress / <u>No</u>
2 <i>Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 <i>Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	Yes / <u>In progress</u> / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No
4 <i>Knowledge gaps</i>		
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	<u>Yes</u> / In progress / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
5	<i>Knowledge transfer</i>	
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	Yes / <u>In progress</u> / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	Yes / <u>In progress</u> / No
Step C: Identifying adaptation options		
6	<i>Identification of adaptation options</i>	
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	Yes / <u>No</u>
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	Yes / <u>No</u>
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	<u>Yes</u> / In Progress / No
7	<i>Funding resources identified and allocated</i>	
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / <u>In Progress</u> / No
Step D: Implementing adaptation action		
8	<i>Mainstreaming adaptation in planning processes</i>	
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	Yes / <u>No</u>
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	<u>Yes</u> / No
8d	National policy instruments promote adaptation at	Yes / <u>In</u>

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	<u>Progress</u> / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 <i>Implementing adaptation</i>		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	Yes / <u>No</u>
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	<u>Yes</u> / No
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	Yes / <u>No</u>
Step E: Monitoring and evaluation of adaptation activities		
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
11 <i>Evaluation</i>		
11a	A periodic review of the national adaptation strategy and action plans is planned	Yes / <u>No</u>
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	Yes / <u>No</u>

Adaptation preparedness scoreboard for Spain

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List of abbreviations

AEMET	State Meteorological Agency
CCPCC	Coordination Commission of Climate Change Policies
CENEAM	National Centre for Environmental Education
CNC	National Climate Council
DRR	Disaster Risk Reduction
EIA	Environmental Impact Assessment
GTIA	Impacts and Adaptation Working Group
IPCC	Intergovernmental Panel on Climate Change
MPF	Multiannual financial framework
NAP	National Adaptation Plan
NAS	National Adaptation Strategy
NCC	National Climate Council
OECC	Oficina Española de Cambio Climático
PAND	Programa de Acción Nacional contra la Desertificación
PIMA	Plan to Support the Environment for Adapting to Climate Change
PNACC	National Climate Change Adaptation Plan (Plan Nacional de Adaptación al Cambio Climático)
SEA	Strategic Environmental Assessment
WP	PNACC work programmes, e.g. Work Package 1 (WP1)

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

Spain adopted its national adaptation strategy, the National Climate Change Adaptation Plan (Plan Nacional de Adaptación al Cambio Climático: PNACC) in 2006¹⁶⁷³. The PNACC is the reference framework for the coordination of the public administrations to address the climate impacts across key sectors and resources in the country. It aims to support policymakers in tackling climate adaptation, defining a cyclical process to generate knowledge, and building capacity to address the effects of climate change.

A2. Adaptation strategies adopted at subnational levels

Apart from Asturias and Rioja, all Spanish regions have adopted regional action plans, or adaptation strategies¹⁶⁷⁴, which address 97% of the country's population and territory.¹⁶⁷⁵

Adaptation action plans

B1. National adaptation plan

The PNACC is implemented through work programmes (WPs)¹⁶⁷⁶, which describe the priority activities to be implemented under its framework. WPs have become more complex and mature over the years: addressing more sectors, improving governance and stakeholder involvement, and reinforcing coordination across all levels of administration. The Third Work Programme (WP3) was adopted in December 2013 and aims to address adaptation and its governance comprehensively, by further integrating stakeholder coordination vertically (across administrations) and horizontally (across sectors). This is the first work programme that contains a clear timeline (2014-2020), which has also been aligned with the EU multiannual financial framework (MFF). WP3 promotes actions to be implemented at national level, and seeks to reinforce coordination and synergies between the PNACC and subnational (regional and local) strategies and the EU Adaptation Strategy. Implementation of WP3 for

¹⁶⁷³ PNACC (2006). Available at http://www.mapama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/pna_v3_tcm7-12445_tcm30-70393.pdf. Date accessed: 15/05/2018

¹⁶⁷⁴ AdapteCCa, URL: <http://www.adaptecca.es/administracion-autonomica-local/comunidades-autonomas>, Date accessed: 07/05/2018; Committee of the Regions, 2016, Regional and Local Adaptation in the EU since the Adoption of the EU Adaptation Strategy in 2013, URL: <http://cor.europa.eu/en/documentation/studies/Documents/Local%20and%20regional%20adaptation.pdf>. Date accessed: 15/05/2018

¹⁶⁷⁵ INE, 2018, [Población por comunidades y ciudades autónomas y tamaño de los municipios](http://www.ine.es/jaxiT3/Datos.htm?t=2915), URL: <http://www.ine.es/jaxiT3/Datos.htm?t=2915>, Date accessed: 07/05/2018. Date accessed: 15/05/2018

¹⁶⁷⁶ PNACC Work Programmes, URL: http://www.mapama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/plan-nacional-adaptacion-cambio-climatico/planificacion_segguimiento.aspx. Date accessed: 15/05/2018

the period 2014-2017 was to be reported in the Fourth Monitoring Report by end of 2017 but is not yet published as of June 2018¹⁶⁷⁷.

B2. Adaptation plans adopted at sub-national level

As noted above, apart from Asturias and Rioja, all Spanish regions have adopted regional action plans, or adaptation strategies (97% of Spanish population and 97% of territory covered).¹⁶⁷⁸ To date, 1,817 municipalities are signatories to the Covenant of Mayors for Climate and Energy in relation to adaptation (of which 94 are cities with over 50,000 inhabitants)¹⁶⁷⁹.

B3. Sectoral adaptation plans

WP1 was adopted in 2006 and focused on priority actions, namely the launch of a national programme on regional climate scenarios, and the assessment of vulnerability in key horizontal sectors: water resources, biodiversity and coastal areas.¹⁶⁸⁰ WP2, adopted in 2009, continued WP1 activities and set additional goals by: enlarging the target sectors and reinforcing the adaptation goals within them; promoting detailed vulnerability assessments; integrating adaptation into sectoral regulations and planning tools; and mobilising, building capacity and raising awareness of key actors. The sectoral approach was complemented by: establishing an indicators system; further promoting research; development and innovation; and reinforcing inter-administrative coordination to strengthen the governance system. WP3 for the period 2014-2020 follows the same structure as WP2, it also enlarges the vulnerable sectors and territories to be assessed¹⁶⁸¹ (to include e.g. islands and rural and urban areas) and focuses on governance and stakeholder engagement (public and private) to mainstream adaptation into all vulnerable sectors and territories.¹⁶⁸² Areas of work and general lines of activity in WP3 remain the same as WP2, focused mainly on sectoral vulnerability assessments, sectoral impact assessments, establishment of climate change indicators, and evaluations of climate impacts. Adaptation actions in WP3 have been mainstreamed, for

¹⁶⁷⁷ MAPAMA, 2017, *7ª Comunicación Nacional de España. Convención Marco de Naciones Unidas sobre el Cambio Climático*. Date accessed: 15/05/2018

¹⁶⁷⁸ AdapteCCa, URL: <http://www.adaptecca.es/administracion-autonomica-local/comunidades-autonomas>, Date accessed: 07/05/2018; Committee of the Regions, 2016, *Regional and Local Adaptation in the EU since the Adoption of the EU Adaptation Strategy in 2013*, URL: <http://cor.europa.eu/en/documentation/studies/Documents/Local%20and%20regional%20adaptation.pdf>

¹⁶⁷⁹ Pacto de los Alcaldes para el Clima y la Energía, URL: <http://www.pactodelosalcaldes.eu/sobre-nosotros/la-comunidad-del-pacto/firmantes.html>, Date accessed: 07/05/2018

¹⁶⁸⁰ Climate-ADAPT, 2018, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/spain>, Date accessed: 07/05/2018

¹⁶⁸¹ The following sectors have been considered by the PNACC-WP3 to address adaptation actions during the period 2014-2020: Biodiversity; Forestry; Water; Soils; Agriculture, fishing, aquaculture; Tourism; Health; Finances/ Insurance; Energy; Industry; Transport; Urbanism and building; Hunting and inland fishing; Geographic Territories (Islands; Marine environment; Countryside; Urban areas; Mountains; Coastal Areas.

¹⁶⁸² Ministerio de Agricultura, Alimentación y Medio Ambiente, 2013, *Plan Nacional de adaptación al cambio climático (III Programa de trabajo (2014/2020))*, URL: http://www.mapama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/3er_programa_trabajo_pnacc_tcm30-70400.pdf. Date accessed: 15/05/2018

example, in the National Biodiversity Plan¹⁶⁸³, Spanish Forest Plan¹⁶⁸⁴ and the Basic Law on Mountains (Law 43/2003)¹⁶⁸⁵ and the National Action Programme against Desertification (PAND)¹⁶⁸⁶.

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

The Spanish Climate Change Office (Oficina Española de Cambio Climático - OECC by its Spanish acronym), a General Directorate of the Ministry for the Ecological Transition, is in charge of adaptation policy-making. OECC developed the PNACC and have since coordinated, managed and implemented it.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

The bodies coordinating and participating in climate change action in Spain are the National Climate Council (CNC), the Coordination Commission of Climate Change Policies (CCPCC) and the Environmental Sector Conference.

The CNC is an inter-ministerial body linking the Ministry for the Ecological Transition (through the Secretary of State for the Environment and involving different government departments) with the regions (Autonomous Communities), the Spanish Federation of Municipalities and Provinces, representatives from research institutions, social actors and NGOs. The CNC develops proposals and recommendations to define climate change policies, including the drafting of adaptation strategies.¹⁶⁸⁷ However, CNC's main role is to inform and encourage the participation of policymakers and other organizations representing social and

¹⁶⁸³ MAPAMA, Plan Estratégico del Patrimonio Natural y la Biodiversidad, URL: http://www.mapama.gob.es/es/biodiversidad/temas/conservacion-de-la-biodiversidad/valoracion-y-aspectos-economicos-de-la-biodiversidad/cb_vae_plan_estrategico_patrimonio_nat_bio.aspx, Date accessed: 07/05/2018

¹⁶⁸⁴ MAPAMA, Desarrollo Rural Política forestal Planificación forestal, URL: http://www.mapama.gob.es/es/desarrollo-rural/temas/politica-forestal/planificacion-forestal/politica-forestal-en-espana/pfe_descargas.aspx, Date accessed: 15/05/2018

¹⁶⁸⁵ BOE, Ley 43/2003, de 21 de noviembre, de Montes, URL: <https://www.boe.es/buscar/act.php?id=BOE-A-2003-21339>, Date accessed: 15/05/2018

¹⁶⁸⁶ MAPAMA, Programa de Acción Nacional contra la Desertificación (PAND), URL: http://www.mapama.gob.es/es/desarrollo-rural/temas/politica-forestal/desertificacion-restauracion-forestal/lucha-contra-la-desertificacion/lch_pand_descargas.aspx, Date accessed: 15/05/2018

¹⁶⁸⁷ Climate-Adapt, Countries, regions and cities / Country Information / Spain, Engaging Stakeholders, URL: <https://climate-adapt.eea.europa.eu/countries-regions/countries/spain>, Date accessed: 08/05/2018

environmental interests in the preparation and monitoring of climate change policies and measures promoted by the State.¹⁶⁸⁸ Hence, CNC is a horizontal coordination body for the central administration.

The CCPCC¹⁶⁸⁹ is the national coordination body for climate change and adaptation. It represents all key Spanish Ministries¹⁶⁹⁰ (horizontal coordination and cooperation) and all 17 regional governments. The CCPCC adopts all of the Spanish adaptation planning and reporting documents.

The Environmental Sector Conference is a political high-level cooperation body with a multilateral composition that brings together members of: the Ministry for the Ecological Transition, the State General Administration, and the Environmental Council, representing the Administrations of the Autonomous Communities¹⁶⁹¹. It thereby also acts as horizontal coordination body.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / In progress / No

The CCPCC coordinates and collaborates with the national and regional administrations in relation to all climate change and adaptation-related matters. The CCPCC established the Impacts and Adaptation Working Group (GTIA), which is a technical working group involving the central and regional governments. The GTIA pursues coordination and integration of adaptation strategies and activities, and decides upon activities to implement the PNACC¹⁶⁹². The GTIA meets regularly, usually twice a year, and the European Commission has often participated in the meetings. The GTIA reports to the CCPCC.

The Spanish Network of Cities for Climate (RECC)¹⁶⁹³ is a thematic network created in 2009 by the Spanish Federation of Municipalities and Provinces and the Spanish Ministry for the

¹⁶⁸⁸ MAPAMA, El Consejo Nacional del Clima (CNC), URL: <http://www.mapama.gob.es/es/cambio-climatico/temas/organismos-e-instituciones-implicados-en-la-lucha-contra-el-cambio-climatico-a-nivel-nacional/el-consejo-nacional-del-clima/>, Date accessed: 07/05/2018

¹⁶⁸⁹ Climate-ADAPT, 2018, URL: <http://climate-adapt.eea.europa.eu/countries-regions/countries/spain>, Date accessed: 07/05/2018

¹⁶⁹⁰ Ministry of Agriculture and Fisheries, Food and Environment; Ministry of the Treasury and Public Function; Ministry of Public Works; Ministry of Justice; Ministry of Energy, Tourism and Digital Agenda; Ministry of Economic Affairs, Industry and Competition; Ministry of Health, Social Services and Equality; Ministry of Home Affairs; Ministry of the Presidency.

¹⁶⁹¹ Climate-Adapt, Countries, regions and cities / Country Information / Spain, Engaging Stakeholders, URL: <https://climate-adapt.eea.europa.eu/countries-regions/countries/spain>, Date accessed: 08/05/2018

¹⁶⁹² PNACC, 2006, Marco para la coordinación entre Administraciones Públicas para las actividades de evaluación de impactos, vulnerabilidad y adaptación al cambio climático, URL: http://www.mapama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/pna_v3_tcm7-12445_tcm30-70393.pdf

¹⁶⁹³ La Red Española de Ciudades por el Clima, URL: <http://www.redciudadesclima.es>, Date accessed: 07/05/2018

Ecological Transition for joint action on climate adaptation and mitigation. The network coordinates, fosters, provides technical support and contributes to translation of national climate and energy objectives at the local level. As of May 2018, the network included 312 Spanish cities, towns and villages (60% of the Spanish population).

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

The PNACC was adopted after a public consultation process channelled through various key national bodies, namely the CCPCC, the CNC, the Inter-Ministerial Climate Change Commission and the Sectoral Conference on Climate Change¹⁶⁹⁴. The stakeholders consulted included representatives from the public administration, NGOs and interested social sectors¹⁶⁹⁵.

The CNC is the national participatory body where most relevant stakeholders are represented: national sectoral ministries, regions (Autonomous Communities), local governments, key research institutions, social actors and NGOs. The CNC drafts proposals and recommendations about Spanish climate policies, and channels information to the Spanish society about climate science and policies, including adaptation.

Forums, such as the sectoral seminars described under Indicator 5b (below), or other activities with actors (administrations, private sector) are also used to frame and define the contents of the PNACC work plans and associated stakeholder involvement.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

Transboundary cooperation is neither explicitly mentioned in the PNACC nor in its work programmes, however, cooperation mechanisms in place.

In 2016, the State Meteorological Agency (AEMET) signed a transboundary agreement to initiate climate research in the Pyrenees with a consortium of Spanish, French and Andorran institutions. This Working Community of the Pyrenees (Comunidad de Trabajo de los Pirineos in Spanish: CTP), which spans six Spanish, French and Andorran regions, decided to create the Pyrenees Climate Change Observatory (Observatorio Pirenaico del Cambio

¹⁶⁹⁴ PNACC, 2006, LIFE SHARA - Sharing Awareness and Governance of Adaptation to Climate Change in Spain, LIFE15 GIC/ES/000033, URL:

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=5679,

Date accessed: 07/05/2018

¹⁶⁹⁵ The specific list of NGOs and other parties were not specified.

Climático: OPCC) in 2010 in order to monitor and have a better understanding of climate change phenomena in the Pyrenees. The resultant project (CLIM'PY¹⁶⁹⁶) is compiling existing information and developing climate indicators for different sectors affected by climate change. Although the OPCC is focused on adaptation-related issues¹⁶⁹⁷, it is not mentioned in the PNACC. In 2017, the OECC accepted an invitation from the CTP to become a member of the Advisory Committee of the Observatory.

Transboundary adaptation cooperation exists with Portugal. On 19th December 2017, the first joint meeting of the Spanish and Portuguese administrations' climate adaptation teams took place. This marked the beginning of Action C.10 of the LIFE SHARA project (LIFE15 GIC/ES/000033)¹⁶⁹⁸, which aims to establish a systematic cooperation between Spain and Portugal regarding exchange of information and identification of common priorities and actions in the field of transboundary risks associated with climate impacts. The general objective of LIFE SHARA is to strengthen adaptation governance and resilience to climate change. LIFE SHARA lays the ground for a long-term transnational cooperation mechanism between the Adaptation Units of Portugal and Spain, which it is intended will catalyse joint actions and projects and will lead to organisation of the first Iberian Conference on Adaptation to Climate Change in 2020.¹⁶⁹⁹

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / In progress / No

Atmospheric climate data and analyses are provided by the Spanish Meteorological Agency (AEMET)¹⁷⁰⁰. Other key climate variables are collected by several institutions, such as the National Aerospace Technical Institute¹⁷⁰¹, the Spanish Oceanographic Institute¹⁷⁰², and the State Ports authority. The OECC coordinates compilation of these climate variables periodically. The OECC collected the main evidence available on climate impacts in Spain,

¹⁶⁹⁶ AEMET, URL: http://www.aemet.es/en/noticias/2016/02/convenio_pirineos, Date accessed: 07/05/2018

¹⁶⁹⁷ OPCC, 2007, URL: <http://www.opcc-ctp.org/en/who-are-we/historycontextobjectives>, Date accessed: 07/05/2018

¹⁶⁹⁸ LIFE SHARA - Sharing Awareness and Governance of Adaptation to Climate Change in Spain, LIFE15 GIC/ES/000033, URL: <http://www.lifeshara.com/>
http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=5679,
Date accessed: 07/05/2018

¹⁶⁹⁹ LIFE SHARA, Actions, URL: <http://lifeshara.com/en/actions>, Date accessed: 07/05/2018

¹⁷⁰⁰ AEMET, URL: <http://www.aemet.es/es/portada>, Date accessed: 07/05/2018

¹⁷⁰¹ INTA, URL: <http://www.inta.es/opencms/export/sites/default/INTA/es/>, Date accessed: 07/05/2018

¹⁷⁰² IEO, URL: <http://www.ieo.es/>, Date accessed: 07/05/2018

covering several relevant systems and sectors (forestry, agriculture, extractive industries, extreme events, human and health), in a study published in 2012¹⁷⁰³.

According to Law 10/2001, Spanish Basin authorities have created Special Plans on Droughts¹⁷⁰⁴. These plans include chapters analysing historical droughts. Basin authorities have developed hydrological indicators to project drought situations and assess the severity with which they occur.¹⁷⁰⁵

In relation to Directive 2007/60/EC, flood risk management plans identify areas prone to significant coastal and fluvial flood risks, including their flood history.

The Spanish Insurance Compensation Consortium (“Consortio de Compensación de Seguros”) is a public business institution attached to the Ministry of Economy and Competitiveness covering insurance on extraordinary risks. This Consortium has a register of insured damages caused by floods (fluvial and coastal) and high winds (up to 120 km/h).

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

The production of regional climate scenarios is identified as a key element of the PNACC.

The national Meteorological Service, AEMET, provides a set of reference climate projections for Spain. Regional scenarios have been produced by AEMET in line with developments by the Intergovernmental Panel on Climate Change (IPCC): the first set was produced in 2007, based on IPCC 3rd Assessment Report (AR3) scenarios; a second generation, the ‘Scenarios-PNACC 2012’, which offer both dynamic and statistical models were based on IPCC AR4 scenarios; and a third generation were based on the IPCC AR5 scenarios¹⁷⁰⁶.

Vulnerability assessments, which are promoted by the WPs as the starting point for sectoral adaptation action, make use of the regional climate scenarios in combination with expert judgement.

¹⁷⁰³ PNACC, 2012, Evidencias del cambio climático y sus efectos en España, URL: http://adaptecca.es/sites/default/files/documentos/oeccevidencias_2012.pdf

¹⁷⁰⁴ MAPAMA, Planes Especiales de Sequía de los Organismos de cuenca, URL: http://www.mapama.gob.es/es/agua/temas/observatorio-nacional-de-la-sequia/planificacion-gestion-sequias/Observatorio_Nacional_Sequia_3_1_planes_especiales_sequia.aspx, Date accessed: 07/05/2018

¹⁷⁰⁵ MAPAMA, Sistemas de indicadores de estado hidrológico, URL: http://www.mapama.gob.es/es/agua/temas/observatorio-nacional-de-la-sequia/planificacion-gestion-sequias/Observatorio_Nacional_Sequia_3_2_sistemas_indicadores.aspx, Date accessed: 07/05/2018

¹⁷⁰⁶ AEMET, Proyecciones climáticas para el siglo XXI. Gráficos, URL: http://www.aemet.es/es/serviciosclimaticos/cambio_climat/result_graficos?opc6=0, Date accessed : 07/05/2018

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

The first report that summarized and integrated the foreseeable climate impacts on a variety of socio-economic sectors and ecological systems was the 'Preliminary Assessment of the 'Impacts in Spain due to the Effects of Climate Change' in 2005¹⁷⁰⁷. Promoted by the OECC, and with the participation of over 400 experts, the report laid the foundations for the PNACC by identifying key sectors and the status of climate impacts, vulnerabilities, adaptation options and knowledge gaps in Spain. It assessed the following sectors: terrestrial ecosystems, agriculture, inland aquatic ecosystems, coastal areas, marine ecosystems and the fisheries, natural hazards of climatic origin, plant biodiversity, energy, animal biodiversity, tourism, water resources, insurance, soil resources, human health, forestry.

Sectoral vulnerability assessments are planned in cooperation with the relevant sectoral authorities, and aim to integrate knowledge generated into specific policymaking tools and instruments. The OECC finances and coordinates periodic updates of the status of climate impacts, vulnerabilities and adaptation in different sectors and systems by engaging with sectoral experts and leading researchers.

Since the report on the 'Impacts in Spain due to the Effects of Climate Change' in 2005, many sectoral assessments of climate impacts and vulnerabilities have been produced within the PNACC framework, including on water resources, forestry, biodiversity, winery, aquaculture, energy, tourism, the private sector, and at a local level.¹⁷⁰⁸ One of the most recent assessments is an OECC report¹⁷⁰⁹ from 2016 on the climate impacts on desertification in Spain. It includes desertification maps based on an analysis of physical and biological indicators (e.g. soil erosion, acidity levels, overexploitation of aquifers) used in the National Action Programme Against Desertification (PAND). Other assessments include: a study by the OECC from 2016¹⁷¹⁰ focusing on climate impacts on the marine environment, which assesses various physicochemical indicators of climate change in the marine environment; a similar study¹⁷¹¹ on climate impacts and adaptation for the agriculture sector; and a study¹⁷¹² specifically on cattle.

¹⁷⁰⁷ MAPAMA, 2005, A Preliminary General Assessment of the Impacts in Spain due to the Effects of Climate Change, URL: http://www.mapama.gob.es/en/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/plan-nacional-adaptacion-cambio-climatico/eval_impactos_ing.aspx, Date accessed: 07/05/2018

¹⁷⁰⁸ Climate-ADAPT, Countries, regions and cities / Country Information / Spain, URL: <https://climate-adapt.eea.europa.eu/countries-regions/countries/spain>, Date accessed: 09/05/2018

¹⁷⁰⁹ MAPAMA, 2016, Impactos del cambio climático en los procesos de desertificación en España, URL: http://www.mapama.gob.es/es/cambio-climatico/publicaciones/publicaciones/impactos-desertificacion_tcm30-178355.pdf, Date accessed: 07/05/2018

¹⁷¹⁰ MAPAMA, 2016, Cambio Climático en el Medio Marino Español: Impactos, Vulnerabilidad y Adaptación, URL: http://www.mapama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/kersting_2016_cambio_climatico_medio_marino_tcm30-70535.pdf, Date accessed: 16/05/2018

¹⁷¹¹ MAPAMA, 2016, Impactos, Vulnerabilidad Y Adaptación Al Cambio Climático En El Sector Agrario, URL: <http://www.mapama.gob.es/es/cambio->

Vulnerability assessments are promoted by the WPs as the starting point for sectoral adaptation action.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

Transboundary impacts are not systematically addressed by either the PNACC or the WPs. However, there are some joint efforts with neighbouring countries to evaluate transboundary impacts. For example, the LIFE SHARA project plans address vulnerable issues of mutual relevance to Portugal and Spain in areas such as biodiversity, marine ecosystems and forestry (see Indicator 2b).

4 Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / In progress / No

The PNACC is mostly defined as a knowledge-generation and capacity-building programme. Since the PNACC was launched, it has been supported by national research strategies and various programmes. The PNACC is supported by the National Strategy for Science, Technology and Innovation (2013-2020), which explicitly addresses adaptation. One of Strategy's eight challenges is 'Climate Change action and resource and raw materials efficiency'; adaptation is also mentioned in other challenges. The Strategy is implemented through four-year plans that reflect most European priorities in the research field.

The State Plan for Scientific and Technical Research and Innovation 2017-2020¹⁷¹³ explicitly prioritises knowledge gaps identified by the PNACC in the fields of: systematic observation, climate scenarios and projections; and vulnerability, impacts and adaptation. The State Plan is implemented through annual calls.

Adaptation knowledge development is funded at the national level through grants for research on global change in protected areas, such as national parks, and through grants from the Biodiversity Foundation for climate change and adaptation projects. At the regional level, there are strategies and instruments for planning research, development and innovation, and a management system is in place.

[climatico/publicaciones/publicaciones/impactos_vulnerabilidad_adaptacion_cambio_climatico_sector_agrario_tcm30-178448.pdf](#), Date accessed: 16/05/2018

¹⁷¹² MAPAMA, 2017, Impactos, vulnerabilidad y adaptación al cambio climático en los sistemas extensivos de producción ganadera en España, URL: http://www.mapama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/informe_ganaderia_extensiva_tcm30-435573.pdf, Date accessed: 16/05/2018

¹⁷¹³ PECTI, 2017, Plan Estatal de Investigación Científica, Técnica y de Innovación, URL: <http://www.idi.mineco.gob.es/stfls/MICINN/Prensa/FICHEROS/2018/PlanEstatalIDI.pdf>, Date accessed: 16/05/2018

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / In progress / No

Spain has a dedicated web-based adaptation platform developed by the OECC: AdapteCCa¹⁷¹⁴. The platform is available to experts, organisations, institutions and interested stakeholders, for the exchange and consultation of information, knowledge and experience about climate impacts, vulnerability and adaptation. It provides information on territorial (vertical) and sectoral (horizontal) adaptation action in Spain, as well as technical resources, tools, links, news, funding opportunities, etc. It is also an instrument for interactive communication within the adaptation community in Spain. AdapteCCa provides a user friendly online viewing tool for freely consulting and downloading regional climate scenarios¹⁷¹⁵. The tool has a visual and intuitive interface with graphic and cartographic facilities and products. The scenarios build on work begun in the ESCENA project (2008-2011)¹⁷¹⁶. To facilitate use and understanding of the scenarios, they are accompanied by some supporting material: a report "Generation of Regional Climate Change Scenarios for Spain"¹⁷¹⁷, and a set of user-tailored products, including indicators for different sectoral policies, graphs and other material to facilitate communication with policymakers, the media, etc. Combined, this online information provides the initial basis of a national climate service.

The PNACC is producing educational and awareness-raising materials to disseminate knowledge about impacts, vulnerability and adaptation options, mostly targeting a technically-proficient audience. Books and leaflets¹⁷¹⁸ about the PNACC, presenting the results of risk assessments, as well as other relevant sectoral publications, have been produced. The OECC has compiled and produced its own brochure on the latest findings from the IPCC AR5¹⁷¹⁹. There are also specific web resources (e.g. a map viewer for impacts in coastal areas), periodic brochures (e.g. on impacts in national parks), summaries of IPCC reports for non-specialists, etc.

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / In progress / No

¹⁷¹⁴ AdapteCCa, URL: <http://www.adaptecca.es/>, Date accessed : 07/05/2018

¹⁷¹⁵ Visor de Escenarios de Cambio Climático, URL: <http://escenarios.adaptecca.es/>, Date accessed: 07/05/2018

¹⁷¹⁶ SMG, A set of regional climate change scenarios over Spain: ESCENA Project, URL: <http://www.meteo.unican.es/en/node/73284>, Date accessed: 07/05/2018

¹⁷¹⁷ SMG, Climate change and regional scenarios, URL: http://www.meteo.unican.es/en/research/climate_change, Date accessed : 07/05/2018

¹⁷¹⁸ MAPAMA, Publicaciones y documentación, folletos, URL: <http://www.mapama.gob.es/es/cambio-climatico/publicaciones/publicaciones/folletos.aspx>, Date accessed: 07/05/2018

¹⁷¹⁹ MAPAMA, 2016, Quinto Informe del IPCC, URL: http://www.mapama.gob.es/es/ceneam/recursos/mini-portales-tematicos/Cclimatico/informe_ipcc.aspx, Date accessed : 07/05/2018

Sectoral ‘seminars’ are held regularly, developed by the OECC and the National Centre for Environmental Education (CENEAM) in the framework of the PNACC. The programme of seminars brings researchers, policymakers from central and regional administrations and civil society together. The seminars examine research results and the outcomes of sectoral vulnerability assessments, and discuss their use by policymakers and further priorities for informing policies. Seminars have been held on: conservation of biodiversity (2010), forestry (2011), forests and biodiversity (2013), agriculture (2014), marine environment (2015), planning and management of protected areas (2016), the insurance sector (2017) and herbaceous and industrial crops (2018).¹⁷²⁰

The PNACC is presented in many capacity building and training initiatives, including university courses and summer schools. For example, the OECC developed and ran a training course for civil servants in the central administration on 'Integration of adaptation to climate change in the policies of the Ministry for Agriculture and Environment'. Officials from the fields of biodiversity, water management, coastal areas, forestry, desertification, agriculture and farming were among the course participants.

The PNACC has evolved, since it was adopted, from an *ad hoc* approach to capacity building towards a more coordinated one. In WP2, 'mobilisation of key actors' was included and, in WP3, a more systematic approach to sectoral capacity and awareness-raising activities was adopted.

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

Preliminary assessment of climate impacts in Spain in 2005 (see Indicator 3c.) identified adaptation options conceived by specialists in charge of each of the sectoral chapters. The sectoral impact and vulnerability assessments carried out since then (e.g. for coastal areas, biodiversity, water resources, forestry, health, tourism) also sought to identify adaptation options.

Geographical specificities are considered in identifying adaptation options. WP3 added a set of geographical units to be considered in relation to sectoral assessments of impacts, vulnerability and adaptation: coastal areas, mountain areas, urban areas, rural areas, islands and marine environment.¹⁷²¹ Other reports and works carried out under the PNACC have also

¹⁷²⁰ MAPAMA, Seminarios del Plan Nacional de Adaptación al Cambio Climático (PNACC), URL: <http://www.mapama.gob.es/es/ceneam/grupos-de-trabajo-y-seminarios/seminarioPNACC/pnacc.aspx>, Date accessed: 15/05/2018

¹⁷²¹ Personal communication with MS contact.

identified existing planning and management practices and adaptation options (e.g. low-regret).

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

Stakeholders have been consulted about the selection of priority adaptation options for the PNACC. The sectoral ‘seminars’ described under Indicator 5b have been one of the tools used for this purpose, as they aim to:¹⁷²²

- Provide key stakeholders with information on projected impacts of climate change
- Present ideas and experiences on adaptation
- Provide an opportunity to debate and reflect on adaptation measures.

The PNACC work programmes identify that further developments are needed to enable cost-benefit analyses of adaptation options.

Different methods are being explored to identify adaptation priorities. For example, since 2016, the PIMA-Adapta Programme has been used to fund independent analysis of adaptation options undertaken by stakeholders. An example of this approach is the InfoAdapta-Agri initiative¹⁷²³, a project developed by the Spanish farmer’s union UPA to analyse from a farmer’s perspective 130 adaptation measures in agriculture.

Another pilot project (called Iniciativa ADAPTA¹⁷²⁴) has been developed by the OECC in collaboration with five main national companies that are pioneers in climate adaptation in key sectors of the Spanish economy: tourism, energy, transport, construction and food industry. Its main aim is to explore tools to incorporate consideration of risk, vulnerability and adaptation options into different business strategies. A second phase of this pilot project (ADAPTA-2¹⁷²⁵) recently concluded, which used a variety of methods to undertake cost-benefit analyses of adaptation measures in two main energy and infrastructure companies.

¹⁷²² MAPAMA, 2014, Plan Nacional de Adaptación al Cambio Climático, Tercer Programa de Trabajo 2014-2020, URL: http://www.mapama.gob.es/es/cambio-climatico/temas/mitigacion-politicas-y-medidas/3PT-PNACC-enero-2014_tcm30-70397.pdf, Date accessed: 15/05/2018

¹⁷²³ UPA, URL: <https://www.upa.es/camposeguro/servicios-camposeguro/cambio-climatico/>, Date accessed: 15/05/2018

¹⁷²⁴ MAPAMA, 2014, Integración de la adaptación al cambio climático en la estrategia Empresarial, URL: http://www.mapama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/Adapta_Impresa_20141003_iivi_tcm30-179515.pdf, Date accessed: 07-05-2018; IAGUA, Iniciativa Adapta: Integrando la adaptación al cambio climático en las estrategias empresariales, URL: <https://www.iagua.es/noticias/espana/magrama/15/06/19/iniciativa-adapta-integrando-adaptacion-al-cambio-climatico>, Date accessed: 07/05/2018

¹⁷²⁵ [Guía metodológica para el análisis y priorización de medidas de adaptación al cambio climático, http://www.adaptecca.es/sites/default/files/documentos/integracion_de_adaptacion_cc_estrategia_empresarial_guia_vol_ii_analisis_priorizacion_de_medidas.pdf](http://www.adaptecca.es/sites/default/files/documentos/integracion_de_adaptacion_cc_estrategia_empresarial_guia_vol_ii_analisis_priorizacion_de_medidas.pdf), Date accessed: 07/05/2018

The study on “Sections of the state network of land transport infrastructures to give priority attention to because of climate change” (2018) uses a method to identify priority sections including: current vulnerability to climate, future vulnerability (considering climate projections) and use made of the section.¹⁷²⁶

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / **In progress** / No

There are institutional frameworks and procedures in place for the coordination of disaster risk management and climate adaptation.

There is a National Committee on disaster risk reduction that includes institutions with complementary competences related to disasters. The OECC is a member of this Committee. Further planned coordination activities include: consideration of climate change risks in relation to strategic infrastructures (nuclear, waste treatment, energy); assessment of the lessons learnt after extreme events; assessment of climate impacts on forest fires; and assessment of climate impacts on the Insurance Compensation Consortium's Extraordinary Risks Cover. In addition, the Spanish Climate Change Office belongs and actively participates in the Spanish Committee of the International Strategy on Disaster Risk Reduction, coordinated by the Civil Protection Authority.

As yet, disaster risk reduction planning is yet to give sufficient consideration to climate impacts and projections, and the PNACC's WPs do not include sufficient disaster risk reduction measures. Recent consideration has been given to disaster risk reduction in climate adaptation planning at the national level. WP3 considers disaster risk reduction as a crosscutting issue across all sectors and territories and recognises the importance of enhancing coordination with the Civil Protection Authorities (Ministry of Internal Affairs).

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / In Progress / No

Since 2015, the framework of the PNACC provides a dedicated budget for adaptation projects. The PIMA Adapta (“Plan to Support the Environment for Adapting to Climate Change in Spain” in English) includes an investment of EUR 12.1 million for more than 46

¹⁷²⁶ Secciones de la red estatal de infraestructuras de transporte terrestre a las que prestar atención con prioridad por razón de la variabilidad y cambio climáticos, URL: http://www.adaptecca.es/sites/default/files/documentos/secciones-red-estatal-transporte-prioritarias-junio_2018.pdf, Date accessed: 07/05/2018

actions in a few sectors, i.e. the coast, the public water domain and the National Parks.¹⁷²⁷ In 2016-2017, PIMA-Adapta also invested EUR 2,490,000 in 68 small projects on adaptation.

The OECC mobilises funds from its partners (Fundación Biodiversidad, AEMET, CENEAM, regional authorities, etc.) to ensure the funding of cross-cutting and coordinated actions, such as the maintenance of the AdapteCCa website, the national programme for regionalisation of climate scenarios, the coordination of the PNACC, capacity building, science-policy forums, and the involvement of stakeholders.

While adaptation is financed in a few sectors and there is some funding for cross-cutting adaptation action, the relevant priority sectors do not receive consistent funding for implementation. Sectoral ministries or departments have financed one-off assessments of climate impacts and adaptation options, as well as other activities on an *ad hoc* basis (e.g. in relation to health, tourism, water, coasts). The implementation of actions in WP3 is explicitly conditional on the availability of funding, including from public, private, national and EU sources. WP3 contains extensive reference to EU funds as a potential source, and the timing of WP3 is aligned with the EU MFF 2014-2020.

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

The Strategic Environmental Assessment (SEA) Directive 2001/42/EC and the Environmental Impact Assessment (EIA) Directive 2014/52/UE) have been transposed into Spanish law by the Act 21/2013¹⁷²⁸ on environmental evaluation. Climate adaptation is considered in relation to both SEA for plans and programmes and to EIA for projects.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / **No**

¹⁷²⁷ Adaptaclima II, URL: <http://www.adaptaclima.eu/>, Date accessed: 07/05/2018
de 40 actuaciones para impulsar la adaptación al cambio climático en España, URL: http://www.mapama.gob.es/es/red-parques-nacionales/red-seguimiento/pima-adapta/garciatejerinapresentaplanpimaadapta_tcm7-364855_noticia_tcm30-61778.pdf, Date accessed: 07/05/2018; MAPAMA, Plan PIMA Adapta AGUA, URL: <http://www.mapama.gob.es/es/agua/planes-y-estrategias/plan-pima-adapta-agua.aspx>; MAPAMA, Plan de Impulso al Medio Ambiente para la Adaptación al Cambio Climático en la Red de Parques Nacionales, URL : <http://www.mapama.gob.es/es/red-parques-nacionales/red-seguimiento/pima-adapta/PIMA.aspx>, Date accessed: 07/05/2018

¹⁷²⁸ BOE, 2013, Ley 21/2013, de 9 de diciembre, de evaluación ambiental, URL: <https://www.boe.es/buscar/pdf/2013/BOE-A-2013-12913-consolidado.pdf>, Date accessed: 07/05/2018

The Government's civil protection mechanism does not address future climate extremes in its plans. However, WP3 introduced assessment of lessons learnt after extreme events.¹⁷²⁹ The OECC mainstreaming adaptation into some key policies and planning documents related to disaster risk management, such as Regulation 903/2010 for the evaluation and management of flood risk or drought plans. The OECC also actively participates in the Spanish Committee of the International Strategy on Disaster Risk Reduction, which is coordinated by the Civil Protection Authority.¹⁷³⁰

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / **No**

The national administration, and particularly the OECC, has made significant effort to integrate climate adaptation into land use and resource planning policies, where it has competence to act or where it has a coordination role. Integration of climate adaptation has been proposed in strategic national planning documents, including: the National Rural Development Programme for Spain¹⁷³¹ 2010-2014; the National Strategy for the Sustainable Modernization of Irrigation; the Strategic Plan on Natural Heritage and Biodiversity; the National for Renewable Energy Action 2011-2020¹⁷³²; and the Adaptation Strategy for Coastal Areas¹⁷³³. Additionally, climate adaptation has been integrated into plans and programmes of smaller geographic scope linked to land use or management. including plans for airports and ports, forestry plans, protected area management plans, urban land use and management plans, hydrologic plans of Spanish river basins, drought plans, and the National Action Programme to fight Desertification (PAND).

In practice, there is no evidence that land use and spatial and urban policies explicitly addressing climate impacts are followed at regional or local levels. Most land use and resources management planning policies are the responsibility of the regional administrations in Spain. There is no comprehensive overview of progress with integration of climate change considerations at this level, where most decisions are made.

¹⁷²⁹ Climate-ADAPT, Home / Countries, regions and cities / Country Information / Spain, Sectors & Actions, URL: <https://climate-adapt.eea.europa.eu/countries-regions/countries/spain>, Date accessed: 15/05/2018

¹⁷³⁰ Climate-ADAPT, Home / Countries, regions and cities / Country Information / Spain, Sectors & Actions, URL: <https://climate-adapt.eea.europa.eu/countries-regions/countries/spain>, Date accessed: 15/05/2018

¹⁷³¹ EC, Factsheet on 2014-2020 National Rural Development Programme for Spain, URL: https://ec.europa.eu/agriculture/sites/agriculture/files/rural-development-2014-2020/country-files/es/factsheet_en.pdf, Date accessed: 07/05/2018

¹⁷³² MAPAMA . Estrategia Nacional para la Modernización Sostenible de los Regadíos, Horizonte 2015, URL: http://www.mapama.gob.es/es/calidad-y-evaluacion-ambiental/participacion-publica/pp_2009_p_019.aspx, Date accessed: 07/05/2018

¹⁷³³ BOE, 2013, Ley 2/2013, de 29 de mayo, de protección y uso sostenible del litoral y de modificación de la Ley 22/1988, de 28 de julio, de Costas, URL: <https://www.boe.es/buscar/doc.php?id=BOE-A-2013-5670>, Date accessed: 07/05/2018

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / **In progress** / No

WP3 addresses adaptation actions during the period 2014-2020 in the following sectors: biodiversity, forestry, water, soils, agriculture, fishing, aquaculture, tourism, health, finances/ insurance, energy, industry, transport, urbanism and building, hunting and inland fishing. Under the PNACC, an evaluation of entry points for climate adaptation in key environmental regulations was carried out. A similar exercise was undertaken for health regulations and policies. Some significant progress has been made with integration of climate adaptation into national sectoral policy instruments. Progress is opportunistic, except in environment-related policies, where a more systematic approach has been adopted. Significant cases where mainstreaming has taken place are in Law 2/2013 for the protection and sustainable use of Coasts, Law 41/2010 for the protection of the marine environment, the Royal Decree 903/2010 on assessment and management of flood risks, and Law 33/2011 on public health.¹⁷³⁴ For other sectoral policies see Indicator 8c.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

Adaptation is not mainstreamed in insurance or alternative policy instruments except for some risk signalling capacity of insurance in the agricultural sector. A framework agreement exists with the agriculture authorities and universities, which includes a plan to mainstream climate change in the Spanish Agricultural Insurance System. WP3 also includes five activities for the insurance sector during the period 2014-2020 that provide a foundation for full integration of adaptation within the sector. In terms of private property, so far the only effective action in place is close collaboration with the Compensation Consortium's Extraordinary Risks Cover, in order to assess climate impacts on the insurance of extreme events.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In progress** / No

National adaptation activities in Spain have focused on the development of reports assessing impacts and vulnerability, capacity building actions and mainstreaming. All but two regions have adaptation plans and for more than a decade in some cases; most adaptation plans were

¹⁷³⁴ MAPAMA, Integración en la normativa de la adaptación al cambio climático, URL: http://www.mapama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/plan-nacional-adaptacion-cambio-climatico/int_nor_adap_cc.aspx, Date accessed: 07/05/2017

approved in the period 2007-2013 (see Sections A2 and B2).¹⁷³⁵ Implementation is supported by EU LIFE, as part of the EU Adaptation Strategy (2013-2020), and through national funding, as part of the PIMA-Adapta¹⁷³⁶ initiative, which has financed adaptation projects in relation to water resources, coastal areas and biodiversity in National Parks since 2015. There are no other specific national projects or programmes systematically focused on implementing adaptation measures, despite the fact that many activities to manage natural resources may contribute to adaptation. Adaptation options are usually listed but not evaluated in relation to their costs, time or other criteria.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / No

Spain has strong coordination and cooperation mechanisms, with regions, local authorities and other stakeholders, for fostering and supporting adaptation (see Indicator 1c). A significant amount of the work carried out under the framework of the PNACC aims to further develop cooperation mechanisms with administrations, sectoral ministries, private entities and other stakeholders.¹⁷³⁷

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / No

The integration of climate change into EIA and SEA legislation has been supported by the publication of procedures or guidelines¹⁷³⁸ to assess the effects of climate change on major projects or programmes and facilitate the choice of alternatives.

The Spanish Association of Environmental Impact Assessment has created a website on “Resources to integrate climate change in environmental assessments”¹⁷³⁹. This website compiles 50 existing tools and conceptual frameworks from different countries, including Spain, categorised by sector. The project has been funded by the OECC and Fundación Biodiversidad. A study was also produced for the Government in 2013 to analyse

¹⁷³⁵ AdapteCCa, URL: <http://www.adaptecca.es/administracion-autonomica-local/comunidades-autonomas>, Date accessed: 07/05/2018; Committee of the Regions, 2016, Regional and Local Adaptation in the EU since the Adoption of the EU Adaptation Strategy in 2013, URL: <http://cor.europa.eu/en/documentation/studies/Documents/Local%20and%20regional%20adaptation.pdf>, Date accessed: 07/05/2018

¹⁷³⁶ MAPAMA, Plan PIMA Adapta en la Red de Parques Nacionales, URL: <http://www.mapama.gob.es/es/red-parques-nacionales/red-seguimiento/pima-adapta/PIMA-red-parques-nacionales.aspx>, Date accessed: 07/05/2018

¹⁷³⁷ MAPAMA, 2014, Plan Nacional de Adaptación al Cambio climático - Tercer Informe de Seguimiento, URL: http://www.mapama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/plan-nacional-adaptacion-cambio-climatico/planificacion_seguimiento.aspx, Date accessed: 07/05/2018

¹⁷³⁸ Climate-ADAPT, Home / Countries, regions and cities / Country Information / Spain, Assessments, URL: <https://climate-adapt.eea.europa.eu/countries-regions/countries/spain>, Date accessed: 07/05/2018

¹⁷³⁹ EIA, URL: <http://cambioclimatico.eia.es>, Date accessed: 07/05/2018

“Biodiversity in environmental assessments of transport infrastructure in the context of climate change”.¹⁷⁴⁰

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / **No**

The PNACC defines a strong collaborative framework for adaptation at various levels (see Indicator 1c) but the status of the adaptation cycle is not yet sufficiently advanced, so there is a lack of evidence of cooperative implementation of adaptation policies and measures. The OECC is responsible for implementation of the PNACC and performs its tasks together with other Units from several Ministries. Additionally, the OECC works in close collaboration with the Autonomous Communities, local administrations, research centres and other stakeholders to implement the WPs.¹⁷⁴¹ In this regard, GTIA was created in 2007, with representatives from the Central Administration and the Autonomous Communities, to coordinate adaptation strategies, plans and actions developed at national and regional level. The CNC, among others, drafts proposals and recommendations on climate policies in the areas of climate science, impacts and adaptation strategies, as well as strategies to limit GHG emissions. There have been some collaborative efforts in projects carried out at local level (e.g. LIFE-Act project¹⁷⁴²) or by NGOs (e.g. WWF), which could be the seeds for enhanced cooperation and stakeholder involvement in the future.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / No

A report implementation of the PNACC is published by the OECC every 3 years, the latest being the third assessment report from January 2014¹⁷⁴³ (previous reports were published in 2011 and 2008). Progress with WP actions, results achieved, and an overall assessment of the

¹⁷⁴⁰ El Ministerio de Agricultura, Alimentación y Medio Ambiente – CEDEX, 2013, La biodiversidad en la evaluación ambiental de infraestructuras de transporte en el contexto del cambio climático, URL: http://www.mapama.gob.es/es/cambio-climatico/publicaciones/documentos-de-interes/51-309-5-001%20A4-T117%20Febrero%202013_tcm30-178334.pdf, Date accessed: 15/05/2018

¹⁷⁴¹ Climate-Adapt, Countries, regions and cities / Country Information / Spain, Engaging Stakeholders, URL: <https://climate-adapt.eea.europa.eu/countries-regions/countries/spain>, Date accessed: 08/05/2018

¹⁷⁴² ACT, URL: <http://www.actlife.eu/EN/index.xhtml>, Date accessed: 07/05/2018; ACT, URL: <http://www.actlife.eu/EN/index.xhtml>, Date accessed: 07/05/2018; ACT, URL: <http://www.actlife.eu/EN/index.xhtml>, Date accessed: 07/05/2018

¹⁷⁴³ MAPAMA, 2014, Plan Nacional de Adaptación al Cambio climático - Tercer Informe de Seguimiento, URL: http://www.mapama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/plan-nacional-adaptacion-cambio-climatico/planificacion_seguimiento.aspx, Date accessed: 07/05/2018

WP are reported. Progress is presented per sector in a qualitative manner (e.g. activity in progress vs. finalised). Budget and actual expenditure are not reported.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

Monitoring of adaptation across sectors is achieved through the PNACC progress reports mentioned in relation to Indicator 10a. The progress reports provide a descriptive account of implementation of the priorities defined in the WPs and in relation to a set of qualitative process indicators.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / No

The PNACC progress reports provide an overview of implementation by the Spanish regions. Factsheets on the actions carried out at the regional level are included as Annexes. The reports are elaborated by the OECC, coordinated with the GTIA, adopted by the CCPCC and the CNC, and made publicly available on the OECC website.

The regional administrations provide their own regular reports on climate change activities, following a template, but there is no real integration of these reports into the PNACC progress reports. The adaptation platform AdapteCCa also has a specific section for regional information¹⁷⁴⁴.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

The PNACC progress reports are published every three years, most recently in 2014 (see indicator 10a). They have been used as an evaluation tool to review the WPs. Successive WPs with revised objectives have built upon these reports, the experience gathered and the growing engagement of specific stakeholders (e.g. the private sector). The OECC plans to review the PNACC in 2019-2020, after completing the current in-depth evaluation of the plan (2018-2019); reviews take place at the WP level.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / No

¹⁷⁴⁴ AdapteCCa, Visor de Escenarios de Cambio Climático, URL: <http://escenarios.adaptecca.es>, Date accessed : 07/05/2018

The monitoring and review process described above involves stakeholders at two stages: in the progress reports, which are the basis for the review, and in consideration of the draft WPs. This monitoring and review process is complemented by feedback from, and agreement with, the PNACC coordination bodies (see Indicators 1a and 1b). The review of WPs also seeks convergence and alignment with the EU's adaptation initiatives.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 Coordination structure		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	<u>Yes</u> / In progress / No
2 Stakeholders' involvement in policy development		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 Current and projected climate change		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	<u>Yes</u> / In progress / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No
4 Knowledge gaps		
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	<u>Yes</u> / In progress / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
5 <i>Knowledge transfer</i>		
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	<u>Yes</u> / In progress / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	<u>Yes</u> / In progress / No
Step C: Identifying adaptation options		
6 <i>Identification of adaptation options</i>		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	Yes / <u>In progress</u> / No
7 <i>Funding resources identified and allocated</i>		
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	<u>Yes</u> / In Progress / No
Step D: Implementing adaptation action		
8 <i>Mainstreaming adaptation in planning processes</i>		
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	Yes / <u>No</u>
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	Yes / <u>No</u>
8d	National policy instruments promote adaptation at	Yes / <u>In</u>

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	<u>progress</u> / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 <i>Implementing adaptation</i>		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	<u>Yes</u> / No
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	<u>Yes</u> / No
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	Yes / <u>No</u>
Step E: Monitoring and evaluation of adaptation activities		
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
11 <i>Evaluation</i>		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	<u>Yes</u> / No

Adaptation preparedness scoreboard for Sweden

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List of abbreviations

CAB	County Administrative Board
CBSS	Council of the Baltic Sea States
DRR	Disaster Risk Reduction
EUSBSR	European Union macro-regional Strategy for the Baltic Sea Region
FMH	Public Health Agency of Sweden (Folkhälsomyndigheten)
HaV	Marine and Water Management (Havs- och vattenmyndigheten)
MSB	Swedish Civil Contingencies Agency (Myndigheten för samhällsskydd och beredskap)
NAS	National Adaptation Strategy
RVA	Risk and Vulnerability Assessment
SGU	Geological Survey of Sweden (Statens geologiska undersökning)
SKL	Swedish Association of Local Authorities and Regions (Sveriges Kommuner och Landsting)
SMHI	The Swedish Meteorological and Hydrological Institute (Sveriges meteorologiska och hydrologiska institut)

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

The Swedish Government adopted a national adaptation strategy (NAS) in March 2018, which was discussed in the Parliament in June 2018, as a part of a Government bill. Previously, the Swedish overall policy for climate adaptation was laid out in “En sammanhållen energi och klimatpolitik - Klimat”¹⁷⁴⁵ bill of 2008. Adaptation policy efforts are supported by a range of evaluation and strategic documents and implemented at national, regional and local levels.

The Swedish Commission on Climate and Vulnerability was appointed by the Swedish Government in 2005 to assess regional and local climate impacts, including costs. The 2007 vulnerability report¹⁷⁴⁶ of the Commission makes recommendations, including increased responsibility for municipalities and County Administrative Boards (CABs), and facilitates Government financial support for large-scale, high-cost initiatives. Since then, the adaptation efforts in Sweden have been stepped up by various means, such as the assignments announced in “En sammanhållen energi och klimatpolitik - Klimat”¹⁷⁴⁷ where the Government's overall policy for climate adaptation was laid out. Acknowledging the 2013 Council Conclusion on an EU Adaptation Strategy¹⁷⁴⁸, the Swedish Government announced, in February 2016, that a national adaptation strategy (NAS) would be completed in 2018¹⁷⁴⁹. The Swedish Government appointed an inquiry with regard to financing and responsibilities to support the development of the NAS. The inquiry focused its mission on the built environment and natural climate-related hazards. The report “Vem har ansvaret”¹⁷⁵⁰, which was resulted from the climate adaptation inquiry, was presented to the Government on 29 May 2017 and underpins the new NAS together with other reports, such as the “Kontrollstation 2015”¹⁷⁵¹ from the Swedish Meteorological and Hydrological Institute (Sveriges meteorologiska och hydrologiska institut, SMHI) and the report “Med miljömålen i focus – hållbar användning av

¹⁷⁴⁵ Govt. Bill 2008/09:162, En sammanhållen energi och klimatpolitik - Klimat, URL:

<http://www.regeringen.se/contentassets/cf41d449d2a047049d7a34f0e23539ee/en-sammanhallen-klimat--och-energipolitik--klimat-prop.-200809162>

¹⁷⁴⁶ Swedish Ministry of the Environment and Energy, 2007, Sweden Facing Climate Change – threats and opportunities, ID: SOU 2007:60, URL: <http://www.government.se/legal-documents/2007/12/sou-200760/>

¹⁷⁴⁷ Govt. Bill 2008/09:162, En sammanhållen energi och klimatpolitik - Klimat, URL:

<http://www.regeringen.se/contentassets/cf41d449d2a047049d7a34f0e23539ee/en-sammanhallen-klimat--och-energipolitik--klimat-prop.-200809162>

¹⁷⁴⁸ Council of the European Union, 2013, Conclusion on an EU strategy on adaptation to climate change, URL: http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/envir/137508.pdf

¹⁷⁴⁹ Regeringskansliet, 2016, Kontrollstation för de klimat- och energipolitiska målen till 2020 samt klimatanpassning, URL: [Skr. 2015/16:87.http://www.regeringen.se/rattsdokument/skrivelse/2016/02/skr.-20151687/](http://www.regeringen.se/rattsdokument/skrivelse/2016/02/skr.-20151687/)

¹⁷⁵⁰ Swedish Government Official Reports, 2017, Vem har ansvaret?, ID: SOU 2017:42, URL: <http://www.regeringen.se/49c4a3/contentassets/7931dd4521284343b9224e9322539e8d/vem-har-ansvaret-sou-201742>

¹⁷⁵¹ SMHI, 2015, Underlag till kontrollstation 2015, URL: <https://www.smhi.se/tema/nationellt-kunskapscentrum-for-klimatanpassning/nyheter-fran-kunskapscentrumet/underlag-till-kontrollstation-2015-for-anpassning-till-ett-forandrat-klimat-1.79820>

mark och vatten¹⁷⁵². The proposals for the NAS were developed in accordance with the general process of Swedish legislation and the development of policy guidelines. Proposals have been developed by the independent inquiries listed above and SMHI in cooperation with other national authorities. These are then referred to a large number of referral bodies and form the basis of the Government's proposal.

The Government adopted the NAS on 8 March 2018, as a part of the Bill 2017/18:163 “Nationell strategi för klimatanpassning”¹⁷⁵³. The Bill will be debated in Parliament in June and the Parliament will vote on the legislative propositions. The Bill contains two proposed changes to the Planning and Building Act (Plan- och bygglagen) (2010:900)”, which aim to improve the adaptation preparedness of the municipalities. If adopted, the legal changes will enter into force on 1 August 2018. The NAS itself was adopted by the Government in March 2018 and is, thus, already in force.

The Ministry of the Environment and Energy is responsible for the Government’s overarching policy work concerning climate, including climate adaptation. Each ministry is then responsible for climate adaptation within its respective area; accordingly, work on adaptation is divided among several government agencies. SMHI plays an important role among the national agencies, as it is responsible for the Swedish National Knowledge Centre for Climate Change Adaptation. This National Knowledge Centre provides tools and information to help society cope with a changing climate, and is a hub for science, policy and practice on adaptation. The Centre also runs the Swedish portal for climate adaptation, in cooperation with several Swedish authorities. As stated in the NAS, SMHI will establish a cross-sectoral expert group on adaptation and SMHI will also have a special role in following up on the work on adaptation in Sweden. As a result of the NAS the Government has decided that the National Board on Planning, Building and Housing should coordinate adaptation within physical planning¹⁷⁵⁴.

The NAS outlines the main principles for Sweden’s work on climate adaptation. These guiding principles are sustainable development, reciprocity, scientific basis, the precautionary principle, integration of adaptation measures, flexibility, management of factors of insecurity and risk, time-perspective and transparency. The NAS also aims at clarifying responsibilities, improving coordination and establishing a policy cycle for monitoring, evaluation and revision¹⁷⁵⁵.

A2. Adaptation strategies adopted at subnational levels

Since 2009, the administrative boards of the regions, CABs, are responsible for coordinating climate adaptation at regional level¹⁷⁵⁶. They also support the adaptation work of the local

¹⁷⁵² Swedish Government Official Reports, ID SOU 2014:50, Med miljömålen i fokus, 2014 url: <https://www.regeringen.se/rattsliga-dokument/statens-offentliga-utredningar/2014/06/sou-201450/>

¹⁷⁵³ Regeringen, 2018, Govt. bill 2017/2018:163 Nationell strategi för klimatanpassning, URL: http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

¹⁷⁵⁴ Regeringen, 2018, M2018/01716/Kl, Uppdrag att samordna det nationella klimatanpassningsarbetet för den byggda miljön.

¹⁷⁵⁵ Regeringen, 2018, Govt. Bill 2017/2018:163 Nationell strategi för klimatanpassning, URL: http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

¹⁷⁵⁶ Klimatanpassningsportalen, 2017, Vem har ansvaret?, URL: <http://klimatanpassning.se/roller-och-ansvar/vem-har-ansvaret/vem-har-ansvaret-1.25819>, Date accessed: 15/05/2018

authorities, who have the main responsibility for climate adaptation at the local level. Since 2013, the CABs have additional responsibilities regarding climate adaptation, such as the development of regional action plans, in cooperation with relevant stakeholders, to guide the local and regional climate adaptation efforts¹⁷⁵⁷. Many of the regional adaptation plans (see B2) are also strategic in nature, but there are no specific regional adaptation strategies.

Adaptation action plans

B1. National adaptation plan

There is no national adaptation plan. Instead, the 21 CABs have developed regional adaptation plans and the CABs and 32 national authorities are assigned through an ordinance to develop action plans within their own areas of responsibility.

B2. Adaptation plans adopted at sub-national level

Climate impact assessment studies have been carried out for all 21 regions; most of them were performed by the SMHI, following a decision by the Government in 2015¹⁷⁵⁸. Following a government decision, all 21 CABs have adopted regional adaptation plans¹⁷⁵⁹. These plans cover the whole of Sweden, with nearly 800 proposed actions¹⁷⁶⁰. The main actions proposed in the plans concern flood protection, protection of drinking water, shoreline protection, infrastructure (roads, railways), adaptation of agriculture and forestry, resilience to heat waves and health care. An overview of the regional adaptation plans is available as a summary and some of the CABs have updated their adaptation plans since 2016¹⁷⁶¹.

There is considerable coordination and exchange activity between the 21 CABs, partly through the National Network for Adaptation (Myndighetsnätverket för klimatanpassning, for more see Indicator 1b)¹⁷⁶².

Much of the responsibility for climate adaptation action lies with the municipalities. The municipalities are responsible for water supply, waste management, urban planning and disaster risk reduction. The engagement around adaptation questions at municipal level is, according to the CABs, increasing, but there is still substantive work to be done at the municipal level (see Indicator 9a below).

¹⁷⁵⁷ Regeringen, Social Departementet, 2013, Regeringsbeslut IV:7, Regleringsbrev, 39. Regionala planer for klimatanpassningsarbetet, URL: <https://www.esv.se/statsliggaren/regleringsbrev/?RBID=14887>

¹⁷⁵⁸ Regeringen, Miljödepartementet, 2015, Regleringsbrev för budgetåret 2015 avseende Sveriges meteorologiska och hydrologiska institut, URL: <https://www.esv.se/statsliggaren/regleringsbrev/?RBID=16410>

¹⁷⁵⁹ Regeringen, Social Departementet, 2013, Regeringsbeslut IV:7, Regleringsbrev, 39. Regionala planer for klimatanpassningsarbetet, URL: <https://www.esv.se/statsliggaren/regleringsbrev/?RBID=14887>

¹⁷⁶⁰ Government Offices of Sweden, Ministry of the Environment and Energy, 2017, Sweden's Seventh National Communication on Climate Change, p. 92, URL: http://unfccc.int/files/national_reports/annex_i_natcom/application/pdf/6950713_sweden-nc7-1-swe_nc7_20171222.pdf

¹⁷⁶¹ Klimatanpassningsportalen, 2018, Regionala handlingsplaner for klimatanpassning, URL: <http://www.klimatanpassning.se/roller-och-ansvar/vem-har-ansvaret/regionala-handlingsplaner-for-klimatanpassning-1.77455>, Date accessed: 15/05/2018

¹⁷⁶² Klimatanpassningsportalen, 2017, Verksamhetsbeskrivning, URL: http://www.klimatanpassning.se/polopoly_fs/1.114883!/Verksamhetsbeskrivning%20Myndighetsn%C3%A4tverket%20f%C3%B6r%20Klimatanpassning.pdf

In the NAS, the Government states that the needs in relation to different levels of responsibility and coordination, including the responsibilities of the CABs, should be clarified¹⁷⁶³.

In June 2018, the Riksdag approved two amendments to the Planning and Building Act (2010:900), which aims to improve the preparedness of the municipalities for climate change. One of the amendments requires municipalities to give their opinion in the Municipal Comprehensive Plan on the risk of damage to the built environment from floods, landslides and erosion caused by climate change, as well as on how such risks can be reduced or eliminated. This is a step towards local action plans for adaptation, integrated into the ordinary processes of the municipality.

B3. Sectoral adaptation plans

Within the existing adaptation framework, work is largely organised into relevant sectors, which is being undertaken in a considerable number of them. A number of government agencies (about 30) are actively working on climate adaptation and, by June 2018, 32 national authorities and the CABs were assigned through an ordinance to develop action plans within their own areas of responsibility.

Seventeen national agencies have already developed, or are in the process of developing, action plans for the sectors for which they are responsible¹⁷⁶⁴. These are; the National Electrical Safety Board (Elsäkerhetsverket), The Swedish Agency for Marine and Water Management (Havs- och vattenmyndigheten, HaV), the Swedish national heritage board (Riksantikvarieämbetet), the Sami Council (Sametinget), the Swedish Forest Board (Skogsstyrelsen), Swedish Geotechnical Institute (Statens geotekniska institut), the Swedish Board for Agriculture (Statens jordbruksverk), the National Veterinary Institute (Statens veterinärmedicinska anstalt), the Geological Survey of Sweden (Statens geologiska undersökning, SGU), the Swedish Agency for Economic and regional Growth (Tillväxtverket), the Swedish transport administration (Trafikverket), the Swedish Transport Agency (Transportstyrelsen), the Public Health Agency of Sweden (Folkhälsomyndigheten, FMH), the Swedish Environmental Protection Agency (Naturvårdsverket), Swedish Meteorological and Hydrological Institute (SMHI), the Swedish Armed Forces (Försvarsmakten) and the National Food Agency (Livsmedelsverket).

The Government also delegates various adaptation-related assignments to sectoral agencies. In 2018, a number of agencies were tasked with creating a sectoral adaptation plan or report on their adaptation work, including the Swedish Armed Forces (Försvarsmakten), FOI (Totalförsvarets forskningsinstitut), Swedish Energy Agency (Statens energimyndighet), Swedish grids (Svenska kraftnät), the National Electrical Safety Board, SMHI, Swedish Environment Protection Agency (Naturvårdsverket), the Swedish Agency for Marine and Water Management, the Swedish transport administration, the Swedish Marine Administration (Sjöfartsverket) and Swedish Civil Contingencies Agency (Myndigheten för samhällsskydd och beredskap, MSB). As most adaptation issues are multidisciplinary, they

¹⁷⁶³Regeringen, 2018, Govt. bill 2017/2018:163 Nationell strategi för klimatanpassning, URL: http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

¹⁷⁶⁴Regeringen, 2018, Regeringens proposition 2017/2018:163 Nationell strategi för klimatanpassning, http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

are largely addressed in collaboration between different actors and sectors at the national, regional and local level.

An overview of the remits of national agencies and their completed¹⁷⁶⁵ and ongoing¹⁷⁶⁶ adaptation activities is available at the climate adaptation portal.

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

In Sweden, the Ministry of the Environment and Energy has overall responsibility for coordinating the Government's policy work on climate mitigation and adaptation.

The responsibility for implementing climate adaptation policy lies with the CABs and the local authorities, as well as with a number of the Government's ministries and agencies¹⁷⁶⁷.

In the NAS, the Government states that the responsibilities relating to climate adaptation policy will be clarified and that national agencies shall initiate, support and evaluate climate adaptation actions within their area of responsibility¹⁷⁶⁸. The Government decided on a new ordinance giving such a mandate to 32 national authorities and the CABs in June 2018.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

The Ministry of the Environment and Energy has overall responsibility for coordinating the Government's policy work on climate mitigation and adaptation.

Horizontal coordination within the Government also takes place through regular working arrangements between the Government offices, in which the Government's decisions are taken by consensus.

¹⁷⁶⁵ Klimatanpassningsportalen, Vad har gjorts på myndigheterna, URL: <http://www.klimatanpassning.se/roller-och-ansvar/genomforda-aktiviteter/vad-har-gjorts-pa-myndigheterna-1.100055>, Date accessed: 15/05/2018

¹⁷⁶⁶ Klimatanpassningsportalen, På gång från myndigheterna 2018, URL: <http://www.klimatanpassning.se/roller-och-ansvar/kommande-underlag/pa-gang-fran-myndigheterna-2018-1.134104>, Date accessed: 15/05/2018

¹⁷⁶⁷ Klimatanpassningsportalen, Vem har ansvaret <http://www.klimatanpassning.se/roller-och-ansvar/vem-har-ansvaret/nationellt-1.26917>, Date accessed: 15/05/2018

¹⁷⁶⁸ Regeringen, 2018, Regeringens proposition 2017/2018:163 Nationell strategi för klimatanpassning, http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

Each ministry is responsible for climate adaptation within its respective area of responsibility¹⁷⁶⁹. Accordingly, the work on climate adaptation is divided among several government agencies, based on their respective sectoral responsibilities. Agencies also have responsibilities for emergency-response management.

During 2016, the previous network of authorities behind the climate adaptation portal was transformed into the National Network for Adaptation, with a wider remit. Nineteen national agencies with responsibilities for adaptation, as well as the 21 CABs participate in the network, which aims to increase societal resilience to climate change¹⁷⁷⁰. The secretariat for the Network is provided by SMHI.

The participants in the Network work together to strengthen the adaptive capacity of all elements of society. The cooperation includes development of information and data, increased engagement to spread information, sharing information, education, evaluation and impact assessment, and coordination around identified needs and finance.

There are a number of sectoral networks and delegations. These include networks for coastal erosion, drinking water, hillside erosion and landslides, animal health and husbandry and water flow in dams¹⁷⁷¹.

The Government has established a national expert council for climate adaptation to follow up work on climate adaptation and secure a holistic picture of the work under way. It is intended that this council should have a broad mandate from society and have contact with representatives from academia, business and sectoral organisations, national and regional authorities and the Swedish Association of Local Authorities and Regions. The council is also expected to identify knowledge gaps and be a part of the evaluation and revision of the NAS¹⁷⁷².

The NAS further clarifies the sectoral responsibility of the national agencies. As a result of the NAS, the Government has decided on an ordinance that stipulates that 32 agencies should initiate, support and evaluate climate adaptation work within their sector¹⁷⁷³. The strategy clarifies which agencies have responsibilities for adaptation measures and coordination and calls for the establishment of new mechanisms for coordination, monitoring and evaluation.

¹⁷⁶⁹Regeringskansliet, 2017, Vem har ansvaret?, ID: SOU 2017:42, URL:

<http://www.regeringen.se/49c4a3/contentassets/7931dd4521284343b9224e9322539e8d/vem-har-ansvaret-sou-201742>

¹⁷⁷⁰Government Offices of Sweden, Ministry of the Environment and Energy, 2017, Sweden's Seventh National Communication on Climate Change, p. 92,

http://unfccc.int/files/national_reports/annex_i_natcom/application/pdf/6950713_sweden-nc7-1-swe_nc7_20171222.pdf

¹⁷⁷²Regeringen, 2018, Regeringens proposition 2017/2018:163 Nationell strategi for klimatanpassning, URL:

http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

¹⁷⁷³Regeringen, 2018, Regeringens proposition 2017/2018:163 Nationell strategi for klimatanpassning, URL:

http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / **In progress** / No

The roles and responsibilities of climate adaptation in Sweden are divided across different levels – from local and regional to national (see Sections A1, A2, B1).

The CABs have a regional network, which aims to facilitate coordination of adaptation¹⁷⁷⁴.

At the municipal level, the Swedish Association of Local Authorities and Regions coordinates a virtual network, which gathers local authorities to exchange about best practices and challenges in relation to climate adaptation¹⁷⁷⁵. The aim is to support local authorities in their adaptation work, and to provide a forum for dialogue and exchange of experiences.

Since 2009, the CABs provide an annual report to the Government on their progress with climate adaptation¹⁷⁷⁶. The CABs have also been active in preparing reports and commenting, as referral bodies, on the reports “Med miljömålen i fokus – hållbar användning av mark och vatten¹⁷⁷⁷”, “Vem har ansvaret?¹⁷⁷⁸” and “Kontrollstation 2015” by SMHI. Representatives from the Government Offices working with adaptation also take part in the CABs national meetings twice per year.

The CABs follow up on the adaptation work carried out at local level and have the power to review and examine decisions on physical planning taken by the local authorities. Inter-municipal and transboundary aspects, such as floods, are also being coordinated.

There is a network for sustainable cities, “Hållbar stad”, involving actors from different levels, which aims to share knowledge, best practices and create new opportunities linked to urban adaptation¹⁷⁷⁹.

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

¹⁷⁷⁴Regeringskansliet, 2017, Vem har ansvaret?, ID: SOU 2017:42, URL:

<http://www.regeringen.se/49c4a3/contentassets/7931dd4521284343b9224e9322539e8d/vem-har-ansvaret-sou-201742>

¹⁷⁷⁵Sveriges Kommuner och Landsting, Nätverk, klimatanpassning, URL:

<https://skl.se/samhallsplaneringinfrastruktur/planerabygga/klimatanpassning/natverkklimatanpassning.3497.html>, Date accessed: 08/05/2018

¹⁷⁷⁶Regeringen, 2018, Regeringens proposition 2017/2018:163 Nationell strategi för klimatanpassning, URL:

http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

¹⁷⁷⁷SOU 2014:50

¹⁷⁷⁸SOU 2017:42

¹⁷⁷⁹Hållbarstad, URL: <https://hallbarstad.se/om-oss/>, Date accessed: 10/05/2018

Stakeholder involvement is an established practice in Sweden; stakeholders are involved in developing adaptation plans at the county and municipal level, as well as in various research projects exploring sectoral adaptation policy options, e.g. in forestry. Numerous stakeholders contribute to Sweden's adaptation policy landscape. The overall Swedish policy is to actively support dialogue, participation and the creation of networks between relevant actors at all levels. Stakeholders engaged are typically from the public bodies (including academic experts) as well as from private companies. Each sector is responsible for their area of work and for ensuring that actions are taken by different stakeholders concerned. The level of progress across sectors differs; some sectors have come a long way while others are just starting. Four dialogue events with representatives of private companies were organised in 2014. Such events were also held in 2015, as part of SMHI's work on the report "Underlag till kontrollstation 2015 för anpassning till ett förändrat klimat". In addition, there is on-going sector-specific dialogue between national agencies and various stakeholders.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

Sweden is one of the leading countries in the context of the EU Macro-Regional Strategy for the Baltic Sea Region¹⁷⁸⁰, and there is exchange of information with other Nordic Countries mainly at the scientific level. The climate agenda is driven by the active work of the Baltic 2030 Unit of the Council of the Baltic Sea States (CBSS) Secretariat¹⁷⁸¹ which is in charge of the EUSBSR Horizontal Action CLIMATE¹⁷⁸². The EUSBSR is a front runner in the area of climate change. The Baltadapt project¹⁷⁸³ formulated a Strategy and Action Plan on Adaptation to Climate Change in the Baltic Sea Region. The governance mechanisms, such as the Baltic Sea Region Climate Dialogue Platform¹⁷⁸⁴, involve all countries around the Baltic Sea and their various levels of governance thereby helping to advance climate adaptation in the Baltic Sea countries. There are many significant projects on adaptation being implemented under the EUSBSR, e.g. iWater Integrated Storm Water Management (2015–2018)¹⁷⁸⁵.

During its presidency of the Arctic Council in 2011-2013, Sweden initiated work with the Arctic Resilience Report. The goal was to integrate work on resilience into the actions of the Arctic Council, something that is now a reality even if there is space for improvement.

¹⁷⁸⁰ EUSBSR, EU Strategy for the Baltic Sea Region, URL: <http://www.balticsea-region-strategy.eu/>, Date accessed 16/05/2018

¹⁷⁸¹ Council of the Baltic Sea States, EUSBSR Horizontal Action Climate, URL: <http://www.cbss.org/strategies/horizontal-action-climate/>, Date accessed 16/05/2018

¹⁷⁸² Council of the Baltic Sea States, 2015, Cooperation on sustainable development in the Baltic Sea Region – climate change adaptation case study, UL: <http://www.cbss.org/wp-content/uploads/2015/11/CBSS-PL-PRES-non-paper-on-sustainable-development-and-climate-change-adaptation.pdf>

¹⁷⁸³ Balt adapt, URL: <http://www.baltadapt.eu/>, Date accessed 16/05/2018

¹⁷⁸⁴ Council of the Baltic Sea States, EUSBSR Horizontal Action Climate, URL: <http://www.cbss.org/strategies/horizontal-action-climate/>, Date accessed 16/05/2018

¹⁷⁸⁵ Integrated storm water, URL <http://www.integratedstormwater.eu/>, Date accessed 16/05/2018

Sweden holds the presidency in the Barents cooperation in 2018-2019 and the Swedish Government has decided to prioritise climate mitigation and adaptation during its presidency¹⁷⁸⁶.

In the NAS, there is a section describing current transboundary cooperation to address common climate adaptation challenges and a general acknowledgement of the importance of transboundary cooperation, especially in relation to food production. However, the NAS does not outline and actions relating to transboundary cooperation¹⁷⁸⁷.

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / **In progress** / No

SMHI and its Rossby Centre collects observational data¹⁷⁸⁸ nationally on the atmosphere, rivers and surrounding seas. These data are quality controlled and used in weather forecasting, climate modelling and assessments. SMHI has also produced climate indicators to show changes or to illustrate complex phenomena in a simple way. The common measures are yearly, seasonal or monthly values for different parameters that describe the climate. SMHI's Rossby Centre pursues research on climate processes and the behaviour of the climate system. The principal tools are global and regional climate models developed within the research unit.

The Swedish Environmental Protection Agency is responsible for coordinating environmental monitoring. This monitoring not only helps those concerned to follow climate impacts on all biogeochemical systems but also how adopted measures affect ecosystems and society in the long term.

A database of natural disasters is kept by the Civil Contingencies Agency but does not contain information about costs. Some monitoring on economic impacts is carried out by the industry association for insurers, Swedish Assurance.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

SMHI's Rossby Centre presents climate scenarios¹⁷⁸⁹ as maps, diagrams and downloadable data, with scenarios extending to 2100. The four scenarios presented and adapted for Sweden

¹⁷⁸⁶ Regeringen, 2018, Regeringens proposition 2017/2018:163 Nationell strategi for klimatanpassning, URL: http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

¹⁷⁸⁷ Regeringen, 2018, Regeringens proposition 2017/2018:163 Nationell strategi for klimatanpassning, URL: http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

¹⁷⁸⁸ SMHI, Climate indicators, <http://www.smhi.se/en/climate/climate-indicators/climate-indicators-1.91461>, Date accessed: 9/05/2018

¹⁷⁸⁹ SMHI, Climate scenarios, <https://www.smhi.se/en/climate/climate-scenarios>, Date accessed: 9/05/2018

are based on representative concentration pathways (RCP2.6, RCP 4.5 and RCP 8.5) from the IPCC Fifth Assessment Report (AR5) as well as A1B from IPCC AR4¹⁷⁹⁰. There is also information explaining the results and the models on which they have been based. An introduction to climate scenarios is available¹⁷⁹¹, as well as guidance¹⁷⁹², that provides support for interpreting and using climate scenarios. Reports from SMHI provide geographically-detailed information about climate trends in Sweden, depending on future levels of greenhouse gases.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

Since 2015, a number of sectoral action plans have been developed (see Section B3 for a list). Many of these also contain risks and vulnerability assessments and in some sectors are translated into actions. An ordinance adopted by the Government in June 2018 stipulates that 32 national authorities within different sectors (such as agriculture, biodiversity, construction, defence, energy, fisheries, forestry, health, industry, and water), as well as the CABs, shall undertake climate risk and vulnerability assessments and develop action plans based on them. Many adaptation actions are already happening. Examples include the National Board of Housing, Building and Planning (Boverket), which is developing updated building standards based on climate assessments¹⁷⁹³, and the Swedish transport administration, which has integrated risk and impact assessment in its work with transport systems. Adaptation actions are highly sector-driven but initiated and evaluated at national government level.

In the NAS, the Government outlines that specific risk areas in relation to erosion, landslides and floods will be identified in terms of probability, potential consequences and specific circumstances and these risk areas will be prioritised. In addition, the NAS states that responsibilities in relation to flooded agricultural lands will be analysed.¹⁷⁹⁴

In June 2018, the Riksdag approved the Government proposal in the Bill 2017/18:163 to make it compulsory for local authorities to undertake comprehensive climate risk assessments and use them as a basis when creating master plans¹⁷⁹⁵.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

¹⁷⁹⁰ SMHI, Climate scenarios, <https://www.smhi.se/en/climate/climate-scenarios#sc=rcp85>, Date accessed: 9/05/2018

¹⁷⁹¹ SMHI, Klimatscenarier, <https://www.smhi.se/klimat/framtidens-klimat/2.2248/2.2252/2.2274>, Date accessed: 9/05/2018

¹⁷⁹² SMHI, Klimatscenarier, <https://www.smhi.se/klimat/framtidens-klimat/2.2248/2.2252/2.2274/haag.html#natvar>, Date accessed: 9/05/2018

¹⁷⁹³ Boverket, URL: <http://www.boverket.se/en/start-in-english/>, Date accessed: 11/05/2018

¹⁷⁹⁴ Regeringen, 2018, Regeringens proposition 2017/2018:163 Nationell strategi for klimatanpassning, URL: http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

¹⁷⁹⁵ Regeringen, 2018, Regeringens proposition 2017/2018:163 Nationell strategi for klimatanpassning, URL: http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

Climate risk and vulnerability assessments sometimes take transboundary risks into account where relevant, usually in research projects. In the Nordic region, collaboration is under way on the national web portal for climate adaptation and on the development of climate services. Swedish researchers are involved in many international research projects and programmes that address adaptation, such as: JPI Climate; the Nordic Top-Level Research Initiative (TRI) Collaboration Projects Green Growth in an Era of Climate Change; and the Nordic Centre of Excellence (NCoE) NORD-STAR, which aims to develop tools to help the Nordic countries address a warmer climate and its policy impacts. Through work in the Baltic Sea Region¹⁷⁹⁶ (see Indicator 2b), there is also regional cooperation to address transboundary risks.

While these examples demonstrate that there are a significant number of transboundary projects, they have not yet reached the stage of planning for actual transboundary adaptation initiatives.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / In progress / No

Based on the Government's research proposition 2017¹⁷⁹⁷, the Swedish Research Council – Formas was commissioned to set up a ten-year national research programme on climate and another on sustainable urban development. The programmes will promote community-relevant research on, among other things, climate adaptation¹⁷⁹⁸.

Climate change and preserving biodiversity, the marine environment and a non-toxic environment are the Government's top environmental priorities¹⁷⁹⁹. Various institutions fund climate adaptation research, notably the Swedish Foundation for Strategic Environmental Research (MISTRA), the Swedish Research Council (Vetenskapsrådet) and the Swedish Environmental Protection Agency. Public and private stakeholders are encouraged or required to be engaged in many of the funded projects (notably MISTRA, Swedish Environmental Protection Agency), with the project teams and with the advisory boards.

In setting priorities for programming, the emphasis is on involving representatives from the science administration rather than from societal stakeholder groups or policy makers. Prioritisation of knowledge gaps often takes place on an ad hoc basis rather than systematically in a formal setting. Identified knowledge gaps are used to prioritise public funding for research on climate impacts, vulnerabilities and adaptation. MISTRA has recently

¹⁷⁹⁶ EUSBSR, EU Strategy for the Baltic Sea Region, URL: <http://www.balticsea-region-strategy.eu/>, Date accessed 16/05/2018

¹⁷⁹⁷ Regeringen, Proposition 2016/17:50, Kunskap i samverkan – för samhällets utmaningar och stärkt konkurrenskraft, URL: <http://www.regeringen.se/4adad0/contentassets/72faaf7629a845af9b30fde1ef6b5067/kunskap-i-samverkan--for-samhallets-utmaningar-och-starkt-konkurrenskraft-prop.-20161750.pdf>

¹⁷⁹⁸ Regeringen, Proposition 2016/17:50, Kunskap i samverkan – för samhällets utmaningar och stärkt konkurrenskraft, URL: <http://www.regeringen.se/4adad0/contentassets/72faaf7629a845af9b30fde1ef6b5067/kunskap-i-samverkan--for-samhallets-utmaningar-och-starkt-konkurrenskraft-prop.-20161750.pdf>

¹⁷⁹⁹ Altogether, there are 24 strategic research areas identified, including climate models, effects on natural resources, ecosystem services and biodiversity, and research on the marine environment.

asked an international group of experts to evaluate MISTRA's climate research and advise on knowledge gaps and future research priorities.

Knowledge gaps have also been identified and addressed in other ways, for example, in some of the national agencies' action plans. For example, the Environment Protection Agency has analysed research challenges presented by storm water¹⁸⁰⁰.

The Government highlights in the NAS that there is a need for more research on climate impacts, which it emphasises needs to be made available for use in climate adaptation and development¹⁸⁰¹.

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / In progress / No

SMHI's Rossby Centre collects, develops and disseminates information about climate change through publications, seminars, lectures, films, education material for schools, etc. SMHI also runs the portal for climate adaptation, "Klimatanpassningsportalen"¹⁸⁰², an initiative by the National Network for Adaptation. The portal supports those who work on adaptation issues at all levels of Swedish society. A dialogue is maintained between the agencies to gradually develop the portal at regular intervals. Every agency is responsible for their area of expertise and the combination provides a broad spectrum of information. The portal provides information on potential impacts in a wide variety of sectors; energy, spatial planning and housing, cultural heritage, agriculture and forestry, natural environment and ecosystems, land and soil, water and sewerage, health care. It also provides information on the impact on Sweden of global changes. The portal contains information about risk management, how an adaptation plan can be developed and examples of how climate adaptation can be integrated in daily work. The information is intended to support both short and long-term adaptation. There is a special emphasis on content for municipalities and county administrative boards. The portal includes a lot of useful materials, including case studies that offer insights that can be transferred to other areas. It also includes tools, such as VisAdapt, which aims to increase Nordic homeowners' adaptive capacity to climate change by guiding them as to how they can reduce weather-related impacts. There is ongoing communication with the other Nordic portals and the EU portal, Climate-ADAPT.

There are also a number of sector-specific information portals and websites, for example, the Flood portal¹⁸⁰³ and the map service for landslides and erosion¹⁸⁰⁴ from the Swedish

¹⁸⁰⁰ Naturvårdsverket, 2017, Analys av kunskapsläget för dagvattenproblematiken, URL: <http://www.naturvardsverket.se/upload/miljoarbete-i-samhallet/miljoarbete-i-sverige/regeringsuppdrag/2017/analys-kunskapslaget-dagvattenproblematiken.pdf>

¹⁸⁰¹ Regeringen, 2018, Regeringens proposition 2017/2018:163 Nationell strategi för klimatanpassning, URL: http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

¹⁸⁰² Klimatanpassningsportalen, URL: <http://www.klimatanpassning.se/>, Date accessed: 12/05/2018

¹⁸⁰³ MSB, Översvämning, <https://www.msb.se/sv/Forebyggande/Naturolyckor/Oversvamning/>, Date accessed: 11/05/2018

¹⁸⁰⁴ SGI, Kartvisningstjänst för vägledning ras, skred, erosion, <http://www.swedgeo.se/sv/produkter--tjanster/kartor-data-och-verktyg/vagledning-ras-skred-erosion/>, Date accessed: 11/05/2018

Geotechnical Institute. These more general analyses have been used as a basis for the NAS¹⁸⁰⁵.

There are numerous knowledge centres in Sweden for climate information that promote active dialogue for the purpose of providing knowledge and high-quality decision support in the area of climate mitigation and adaptation for the public and business sectors as well as for citizens, such as the Swedish Environmental Protection Agency, Swedish Energy Agency, Swedish Consumer Agency, Swedish Forest Agency, Swedish Board of Agriculture, SMHI, Swedish Transport Administration, Swedish Defence Research Agency and, notably, the Swedish Civil Contingencies Agency, which has a national database for natural hazards.

In the NAS, the Government emphasises the need for accurate climate information to enable decision making and planning. There is a specific emphasis on the need for mapping and data collection¹⁸⁰⁶.

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / In progress / No

The work of the Rosaby Centre is guided by the Government's instructions, which accord with strategic priorities that are identified by systematic analysis of stakeholder requirements, for example, with the help of the national network on adaptation, and informed by SMHI's climate expertise and research.

The Centre collects, develops and shares research, information from authorities and learning examples to facilitate sound decision making. The Centre also offers lectures and customised training courses on climate change for companies, local authorities and Government agencies. Interactions with counties, municipalities and businesses (see Indicator 2a) could be regarded as having a capacity-building element.

In addition, there are several examples of innovative approaches to disseminating knowledge about adaptation. One example is the on-line courses offered by the National Board of Housing, Building and Planning through their online academy¹⁸⁰⁷. Another example is production of specific films for certain target groups, for example, on adaptation to heat waves, offered by the Public Health Authority¹⁸⁰⁸.

¹⁸⁰⁵ Regeringen, 2018, Regeringens proposition 2017/2018:163 Nationell strategi for klimatanpassning, URL: http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

¹⁸⁰⁶ Regeringen, 2018, Regeringens proposition 2017/2018:163 Nationell strategi for klimatanpassning, URL: http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

¹⁸⁰⁷ Boverket, Klimatanpassning i planeringen, URL: <https://boverket.onlineacademy.se/external/play/2331>, Date accessed: 10/05/2018

¹⁸⁰⁸ Folkhälsomyndigheten, Beredskap vid värmebölja, URL: <https://www.folkhalsomyndigheten.se/livsvillkor-levnadsvanor/miljohalsa-och-halsoskydd/beredskap-vid-varmebolja/>, Date accessed: 16/05/2018

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

The adaptation options are based on early analysis in the 2007 report, which identifies both climate risks and corresponding adaptive measures to reduce the vulnerability of each sector concerned. This was updated in 2015 by SMHI in the report “Basis for Check point 2015 (for adaptation to a changing climate?)”¹⁸⁰⁹. The report was developed in cooperation with a large number of government agencies and other stakeholders from, among others, private companies. About 30 government agencies covering key vulnerable sectors¹⁸¹⁰ are working with different actions, such as developing guidelines or altering existing policies. A total of 17 national agencies and the CABs have or are in the process of developing sectoral action plans, which include risk assessments and identification of adaptation options (see Section B3). As a result of the NAS, the Government has mandated 32 national authorities and the CABs to initiate, support and follow up climate adaptation within their area of responsibility, to assess climate vulnerabilities and develop adaptation action plans. Adaptation options have also been identified by the CABs in the regional adaptation plans.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

Since selection of priority adaptation options is taking place at the local, regional and sectoral levels, it is difficult to assess the basis of their selection in general terms. However, actions highlighted in the regional action plans are selected and prioritised based on expert judgement and stakeholder consultation. The same is true for the national sectoral action plans.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / In progress / No

Sweden has a framework for disaster risk reduction, which includes working in forums¹⁸¹¹ on crisis preparedness; work that is coordinated by the MSB. The CABs are responsible for

¹⁸⁰⁹ SMHI, 2015, Underlag till kontrollstation 2015 för anpassning till ett förändrat klimat
URL: http://www.smhi.se/polopoly_fs/1.86329!/Menu/general/extGroup/attachmentColHold/mainCol1/file/Klimatologi%20Nr%2012.pdf

¹⁸¹⁰ Klimatanpassningsportalen, Vad har gjorts på myndigheterna, URL: <http://www.klimatanpassning.se/roller-och-ansvar/genomforda-aktiviteter/vad-har-gjorts-pa-myndigheterna-1.100055>, Date accessed: 10/05/2018

¹⁸¹¹ MSB, 2014, Swedish Forums for Crisis Preparedness, URL: <https://www.msb.se/RibData/Filer/pdf/27455.pdf>

acting as coordinators with regard to disaster risk reduction within their geographical area. No evidence is provided on how climate adaptation practitioners are involved in such forums.

All counties, municipalities and other local authorities are required to carry out a risk and vulnerability assessment (RVA)¹⁸¹². Climate adaptation is an integral part of an RVA. The MSB supports municipalities and county administrative boards to integrate climate adaptation in their work. MSB has developed a number of pieces of guidance on how to integrate climate adaptation in the municipal RVAs. Several risk scenarios, such as on heat waves, floods and cloud bursts, are made available to be used in planning crisis preparedness.

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / In progress /No

While no specific budget is attached to the NAS, funding is available for adaptation actions.

For 2018-2020, the Government has proposed SEK461 million (app. EUR 44.8 million¹⁸¹³) of public funding for climate adaptation and climate services, capacity building, the Swedish National Knowledge Centre for Climate Change Adaptation and the portal for climate adaptation¹⁸¹⁴. Through this allocation, resources are also provided to a number of public agencies, such as SMHI, MSB, the Swedish Mapping, Cadastral and Land Registration Authority and the Swedish Geotechnical Institute to further develop knowledge in the area of adaptation. Activities financed include flood mapping, mapping of landslides and erosion, mapping of heavy rainfall and a national elevation model. From 2018, funding has also been earmarked for work on preventing landslides in a particularly vulnerable area of Sweden.

In addition to the above-mentioned allocation for adaptation, national government funding is made available to prevent or mitigate the negative consequences of natural hazards. SEK75 million (app. EUR 7.3 million¹⁸¹⁵) was made available in 2017 for municipalities to take disaster risk reduction or prevention measures.

The municipalities are requesting increased government funding for adaptation measures at the municipal level¹⁸¹⁶.

¹⁸¹² MSB, Förebyggande kresberedskap, Risk och sårbarhetsanalyser, URL:

<https://www.msb.se/sv/Forebyggande/Krisberedskap/Risk--och-sarbarhetsanalyser/>, Date accessed: 10/05/2018

¹⁸¹³ XE.com, Date accessed: 16/05/2018

¹⁸¹⁴ Regeringen, 2018, Regeringens proposition 2017/2018:163 Nationell strategi for klimatanpassning, URL: http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

¹⁸¹⁵ XE.com, Date accessed: 16/05/2018

¹⁸¹⁶ Swedish Government Official Reports, 2017, Vem har ansvaret?, ID: SOU 2017:42, URL:

<http://www.regeringen.se/49c4a3/contentassets/7931dd4521284343b9224e9322539e8d/vem-har-ansvaret-sou-201742>

Step D: Implementing adaptation action

8 Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

In the Swedish Environmental Act (Miljöbalken, 1998:10¹⁸¹⁷), climate is included as one of the aspects of environment that might be affected by an action, which must undergo an environmental impact assessment or a strategic environmental assessment. In Sweden the definition of an environmental impact assessment is a strategic environmental assessment (SEA) or a specific environmental impact assessments (EIA). The Swedish Parliament broadened the scope of environmental impact assessments to include climate impact, by approving the Bill 2016/17:200 in 2017¹⁸¹⁸. In the Environmental Impact Ordinance (Miljökonsekvensförelöning 2017:966¹⁸¹⁹), Paragraph 18, it is further clarified that the environmental impacts as a consequence of the actions climate vulnerability need to be included in the assessment.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / No

Since 2007, Sweden has had a National Platform for Disaster Risk Reduction. In 2016, a summary of risk areas and scenario analyses for 2012–2015 was published by the MSB, which covered climate-related risks¹⁸²⁰. The report presents an overall compilation of various types of risks facing Sweden that can lead to serious consequences.

The MSB's website contains information on many climate risks¹⁸²¹, such as floods, heat waves, landslides, coastal erosion, forest fires and other that are relevant for crisis preparedness. A new portal providing an overview with flood maps has been developed. These maps are an important basis for climate adaptation, spatial planning and risk management. MSB conducts regular research¹⁸²² in the area of natural disasters and climate adaptation and has also developed tools for local authorities on how climate impact

¹⁸¹⁷ Svensk Förelöningssamling, Miljöbalken (1998:808), URL: <http://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/sfs-1998-808/#K6>

¹⁸¹⁸ Riksdagen, 2017, Govt. bill 2016/17:200, URL: http://www.riksdagen.se/sv/dokument-lagar/dokument/proposition/miljobedomningar_H403200/html

¹⁸¹⁹ Svensk Förelöningssamling, Miljöbedömningsförelöning (2017:966), URL: <http://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/sfs-2017-966>

¹⁸²⁰ MSB, Strategier och styrande dokument för klimatanpassning och katastrofriskreducering, URL: <https://www.msb.se/RibData/Filer/pdf/26229.pdf>

¹⁸²¹ MSB, Översvänningskartering, URL: <https://www.msb.se/sv/Forebyggande/Naturolyckor/Oversvanning/Oversiktlig-oversvanningskartering/>, Date accessed: 16/05/2018

¹⁸²² MSB, Forskning om klimat och naturolyckor, URL: <https://www.msb.se/sv/Forebyggande/Naturolyckor/Forskning/>, Date accessed: 16/05/2018

projections can be taken into consideration when developing disaster risk management plans¹⁸²³.

SMHI provides early warnings of hazardous meteorological, hydrological and oceanographic events.

Although risk analyses of future climate extremes are conducted, it is unclear how these analyses are factored in to disaster risk management plans.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / No

In the Planning and Building Act (2010:900¹⁸²⁴) and the Planning and Building Ordinance (2011:338¹⁸²⁵),) it is stipulated that built environment and construction works must be located on land that is suitable for the purpose, and that the risk of accidents, flooding and erosion must be taken into account. The Act also highlights that planning must give due regard to environmental and climate aspects. Municipal plans should play a key role in climate adaptation, and environmental and climate aspects must be considered in planning and in reviewing other types of applications. According to a recent study from Lund University, 40% of 15 municipalities studied have integrated climate adaptation in their risk and vulnerability analysis.

As a result of the NAS the Government has decided that the National Board for Planning, Building and Housing should have a stronger coordinator role in relation to adaptation within physical planning¹⁸²⁶. The strategy also clearly states that the responsibility to protect property lies with the owner, public or private. The same applies for the responsibility to prevent and repair damage caused because of extreme weather or other climate-related events¹⁸²⁷.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / In progress / No

Sweden's climate adaptation work is to a large extent organised into sectors. Since 2015, several national agencies have developed or are currently developing action plans. A total of 14 of these have been developed using funds made available by SMHI to support the development of action plans and policy instruments for adaptation, according to the appropriation directions in 2016 and 2017. Prioritised sectors have been food production,

¹⁸²³ MSB, 2011, Vägledning för Kommunala handlingsprogram, URL:

<https://www.msb.se/RibData/Filer/pdf/25931.pdf>

¹⁸²⁴ Boverket, Planning and Building Act (2010:900), URL:

<http://www.boverket.se/globalassets/publikationer/dokument/2016/legislation.pdf>

¹⁸²⁵ Boverket, Planning and Building Act (2010:900), URL:

<http://www.boverket.se/globalassets/publikationer/dokument/2016/legislation.pdf>

¹⁸²⁶ Regeringen, M2018/01716/Kl, Uppdrag att samordna det nationella klimatanpassningsarbetet för den byggda miljön.

¹⁸²⁷ Regeringen, 2018, Regeringens proposition 2017/2018:163 Nationell strategi för klimatanpassning, URL:

http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

human health, national environmental objectives and planning/construction. So far, sectors that have received funds include forestry, human health, construction/land use and reindeer herding/Sami culture. Using the same funds, tools to assist with adaptation work have been developed. These include tools to handle uncertainties in adaptation work, nature-based methods to prevent flooding and designs to prevent beach erosion.

The NAS emphasises the sectoral responsibility of the national agencies. Each agency should take responsibility for, initiate, support and evaluate climate adaptation work within its sector. The Government has regulated this through an ordinance¹⁸²⁸.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

There is little relevant information available about incentives for investments in risk prevention in insurance or alternative policy instruments.

The Insurance Contracts Act (2005:104) is based insurance companies deciding for themselves which risks they are prepared to accept. An insurance policy in Sweden is a comprehensive product that covers many types of accidents and damages. Thus, damage from natural disasters is usually included in the insurance companies' regular products. This also means that the part of the premium relating to damage caused by natural disasters is difficult to distinguish.

In some cases, adjustment of a premium can be made in certain cases after damage has occurred. For example, a customer can avoid an increased premium by taking preventive measures. However, this is normally an agreement between the customer and the insurance policy, and is not made public.

There are a number of streams of Government funding for climate risk mapping and prevention¹⁸²⁹. There is also a system of "green loans", initiated by the state, where local authorities can borrow money for climate adaptation and risk prevention. This is financed by "green obligations" in which private investors are encouraged to invest¹⁸³⁰.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In progress** / No

¹⁸²⁸ Regeringen, 2018, Regeringens proposition 2017/2018:163 Nationell strategi for klimatanpassning, URL: http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

¹⁸²⁹ Klimatanpassningsportalen, Hur kan klimatanpassnings finansieras i kommuner, URL: <http://www.klimatanpassning.se/atgarda/2.2183/hur-kan-klimatanpassning-finansieras-i-kommuner-1.126972>,

Date accessed: 14/05/2018

¹⁸³⁰ Klimatanpassningsportalen, Hur kan klimatanpassnings finansieras i kommuner, URL:

<http://www.klimatanpassning.se/atgarda/2.2183/hur-kan-klimatanpassning-finansieras-i-kommuner-1.126972>,

Date accessed: 14/05/2018

Action plans have been developed for a number of sectors (see B3), and the work to implement the measures in the plans has started. Some sectors are still in the process of developing action plans. According to the ordinance regulating the national authorities work on adaptation, the SMHI will provide guidance on how to report as well as following up on reporting. On the portal for climate adaptation there is a list of government agencies working on climate adaptation as well as information on the work¹⁸³¹. The actions are very varied and depends on the tasks given by the Government.

There has also been feedback from the CABs that it should be clarified in the sectoral adaptation plans how national authorities support adaptation at the local level.

At the regional level, all 21 CABs have action plans with identified measures of action. These are being implemented, and are followed up yearly. Recommendations have been developed and are being used for guiding the planning processes in municipalities. The SMHI report from 2015¹⁸³² concludes that there is a discrepancy between the CABs in relation to the implementation of the action plans. The implementation this far has largely focused on knowledge gathering and capacity building. The dialogue work with the municipalities has also started and most CABs have established communication between the relevant actors on climate adaptation. Some of the implementation of the action plans has also focused on physical planning. However, the road to implementing climate adaptation measures based on identified risks is generally seen as very long. Local authorities are often of the view that there is a need for additional funding on local level as well as improved coordination and a clearer division of responsibilities.

At the local level, reporting by the CABs show that adaptation is to an increasing extent taken into account in planning processes, particularly when it comes to physical planning, risk- and vulnerability analysis and care for cultural heritage. This can also be seen in projects and developments, some of which are presented on the portal for climate adaptation. Larger cities tend, in general, to have come further in their adaptation work than small cities and towns. The focus of the work is also largely guided to the geographical context, as this often determines the risks and opportunities that face the municipalities. In relation to the municipalities, there is still substantive work to be done. In a 2017 survey, 184 (total 202 replies) out of 290 municipalities answered that they are working with climate adaptation. From the respondents only 50% communicate that there have been political decisions taken regarding climate adaptation, 40% have allocated human resources to climate adaptation and 30% have either allocated financial resources or/and created action plans for climate adaptation¹⁸³³.

Sweden's municipalities are obliged to carry out risk and vulnerability assessments as a basis for coping with extraordinary events and crises under the Act on municipal and county

¹⁸³¹ Klimatanpassningsportalen, 2017, Vad har gjorts på myndigheterna?, URL: <http://www.klimatanpassning.se/roller-och-ansvar/genomforda-aktiviteter/vad-har-gjorts-pa-myndigheterna-1.100055>, Date accessed: 30/05/2018

¹⁸³² SMHI, 2012, URL: http://www.smhi.se/polopoly_fs/1.86326!/Menu/general/extGroup/attachmentColHold/mainCol1/file/Klimatologi%20Nr%2012.pdf

¹⁸³³ Regeringen, 2018, Regeringens proposition 2017/2018:163 Nationell strategi for klimatanpassning, URL: http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

council measures prior to and during extraordinary events in peacetime and during periods of heightened alert. Such risk assessments often lead to the development and implementation of adaptation measures in vulnerable locations.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / No

The roles and responsibilities for climate adaptation in Sweden are divided across different levels – from local and regional to national. Collaboration between the different sectors and levels is essential to achieve the adaptation targets. The CABs are responsible for coordinating climate adaptation at the regional level¹⁸³⁴. There are climate adaptation coordinators in each county that have the mission to assist the municipalities in their county. Each CAB produces reports, analysis and other material on climate adaptation available on its website.

The coordination of the cooperation and the responsibilities is though not very clear and the implementation work would highly benefit some a clarified division of responsibilities and an enhanced coordination.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / No

The Swedish portal for climate adaptation contains guidance materials for planning and implementing adaptation measures but there are no formal guidelines. Some sectoral portals may include some suggestions for assessment tools. The CABs have developed several guides, for example, guidance on climate adaptation in physical planning¹⁸³⁵ and “Health Effects of Climate Change – risks and actions in Stockholm County”¹⁸³⁶, which outlines appropriate human health-related actions based on climate scenarios for the region until the year 2100. Currently, the CABs are working on regional action plans for green infrastructure, which are to be completed in 2018. In 2014, Sweden adopted a strategy on strengthening biodiversity¹⁸³⁷ and securing ecosystem services, which promotes green infrastructure and notes links with climate change, but a formal link with climate adaptation or disaster risk reduction is not apparent.

¹⁸³⁴Klimatanpassningsportalen, Vem har ansvaret?, URL: <http://www.klimatanpassning.se/roller-och-ansvar/vem-har-ansvaret/regionalt-1.26916>, Date accessed: 14/05/2018

¹⁸³⁵Länsstyrelserna, 2012, Klimatanpassning i fysisk planering – vägledning från länsstyrelserna, URL: <http://www.lansstyrelsen.se/stockholm/SiteCollectionDocuments/Sv/publikationer/2012/klimatanpassning-fysisk-planering.pdf>

¹⁸³⁶Länsstyrelsen i Stockholms Län, 2012, Hälsoeffekter av ett förändrat klimat + risker och åtgärder i Stockholms län, URL: <http://www.lansstyrelsen.se/stockholm/SiteCollectionDocuments/Sv/publikationer/2012/halsoeffekter-av-ett-forandrat-klimat.pdf>

¹⁸³⁷Regeringen, 2014, A Strategy for Biodiversity and Ecosystem Services, a translation of relevant parts of Government bill on biodiversity and ecosystem services A Swedish strategy for biodiversity and ecosystem services Gov. Bill 2013/14:141, URL: <https://www.cbd.int/doc/world/se/se-nbsap-v3-en.pdf>

Climate change is taken into account in a systematic way for large infrastructure projects, for example, the rebuilding of Slussen in Stockholm and for the construction of a railway tunnel underneath the city of Gothenburg. such consideration of climate change is achieved through project-specific collaborations between public bodies and private companies.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / No

On a national level there are a number of non-public administration bodies actively participating in the implementation of adaptation policies. Examples include a cooperation project between companies and academia identifying possible climate threats and opportunities to the economy and business, Swedish Insurance actively contributing with information and ideas linked to climate adaptation and the national association for property owners sharing guidelines and best practises on how to “climate-proof” property¹⁸³⁸.

Many of the actions identified in the regional action plans on adaptation are to be implemented by different stakeholders. The means of involvement vary between the CABs, but most include developing and sharing information, guidelines and best practises and in this work involving the relevant interest groups¹⁸³⁹.

For the sectoral action plans, examples include the forestry and agriculture sector, where landowners are the target of knowledge dissemination measures and will in turn carry out the implementation activities.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / **No**

No monitoring of the NAS has yet taken place, as it has been only recently adopted.

The NAS establishes a five-year policy cycle, which includes implementation, follow-up, evaluation and revision¹⁸⁴⁰. The NAS outlines that SMHI, in cooperation with other relevant agencies, will be tasked to continue the development of a system for monitoring and evaluation.

To date, monitoring and reporting has been carried out in other ways. The CABs report annually to the Government on the implementation of their regional action plans. National

¹⁸³⁸ Klimatanpassningsportalen, Roller och ansvar/Nätverk, URL: <http://klimatanpassning.se/roller-och-ansvar/natverk/naringsliv-i-sverige-1.100112>, Date accessed: 10/05/2018

¹⁸³⁹ Klimatanpassningsportalen, Roller och ansvar/Kommande underlag, URL: <http://klimatanpassning.se/roller-och-ansvar/kommande-underlag/pa-gang-fran-lansstyrelserna-2018-1.134148>, Date accessed: 14/05/2018

¹⁸⁴⁰ Regeringen, 2018, Regeringens proposition 2017/2018:163 Nationell strategi for klimatanpassning, URL: http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

agencies that receive funds from the allocation “Adaptation to climate change” report annually on their actions. A short summary of actions taken is included in the budget bill to the Parliament. CABs are to some extent following up on the adaptation activities carried out by the municipalities and local authorities.

In 2016, a study¹⁸⁴¹ was carried out by the SMHI in order to propose a system for evaluating and monitoring adaptation actions in Sweden. The proposed evaluation model focuses on three main pillars: 1) What processes are needed for efficient adaptation actions on the ground? To what extent are adaptation actions integrated in the Swedish governance system? 2) What has been implemented to reduce negative climate impacts and vulnerabilities? Which are the priority sectors and what challenges have been addressed? 3) What progress can be seen in reducing negative climate impacts?

The conclusion of the study was that a strategic national framework for climate adaptation is needed to achieve effective and continuous implementation. The framework should be based on a policy cycle in line with the EU Adaptation Strategy.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

Ongoing sectoral adaptation actions are published on the adaptation website¹⁸⁴². The level of adaptation action in sectors seem to vary. Sectoral bodies with adaptation action plans have included monitoring mechanisms. Some specific monitoring tasks have also been allocated. For example, the Public Health Agency is tasked with monitoring the health of the population, including factors related to climate change.

The NAS also outlines that all agencies working on climate adaptation shall initiate, support and evaluate the work on climate adaptation within its area of responsibility. There will shortly be a new ordinance outlining this cycle¹⁸⁴³.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / No

As noted under Indicator 10a, CAB’s are required by the Government to formal annual reviews of the regional action plans that they have prepared. A recent list of activities carried out by the national authorities is available¹⁸⁴⁴. In addition to the formal monitoring and

¹⁸⁴¹ SMHI, 2016, Förslag till en metod för uppföljning av det nationella klimatanpassningsarbetet, URL: <https://www.smhi.se/publikationer/publikationer/forslag-till-en-metod-for-uppfoljning-av-det-nationella-klimatanpassningsarbetet-redovisning-av-ett-regeringsuppdrag-december-2016-1.113425>

¹⁸⁴² Klimatanpassningsportalen, Roller och ansvar, URL: <http://www.klimatanpassning.se/roller-och-ansvar/kommande-underlag/pa-gang-fran-myndigheterna-2017-1.119693>, Date accessed: 10/05/2018

¹⁸⁴³ Personal communication with MS contact

¹⁸⁴⁴ Klimatanpassningsportalen, Roller och ansvar, URL: <http://www.klimatanpassning.se/roller-och-ansvar/kommande-underlag/pa-gang-fran-myndigheterna-2017-1.119693>, Date accessed: 14/05/2018

evaluation processes, a report is published on an annual basis¹⁸⁴⁵ by Swedish Insurance and IVL, reviewing and ranking municipalities' progress on adaptation.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

The report "Basis for Check point 2015"¹⁸⁴⁶ assesses the progress of Swedish adaptation measures to ensure that they are proceeding towards the same goal, addressing the questions: What are the priorities? How can cross-sectoral work be further developed? What are the appropriate governance arrangements? This is not a formal periodic review but gives useful insights on the progress made in Sweden in implementing adaptation actions and formed the basis for the new NAS.

In the NAS, the Government outlines a five-year evaluation cycle for the strategy. The first step will be a climate and vulnerability analysis, monitoring and evaluation of the implementation of the NAS and proposals for revisions of the Strategy by SMHI for 2019-2022. This will be followed by an updated NAS proposal from the Government to the Parliament in 2023. After that, an updated Strategy will be presented every five years¹⁸⁴⁷.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / **No**

The Expert Council, announced in the NAS, will be tasked with monitoring and evaluating its implementation and providing evidence for how national work on climate change should be focused when the Strategy is revised. In order to ensure that different perspectives are integrated, the Council will consult with representatives from the research community, industry, interest associations, national and regional authorities, as well as the Swedish Association of Local Authorities and Regions. The composition of the Expert Council is not yet decided but unless it includes a wide range of stakeholders, it will only be seen as consulting stakeholders or providing them with information, rather than as involving them in the process of assessment, evaluation and review. In the NAS, SMHI is tasked with further developing the Strategy's evaluation and review system and at this point there is not enough information available about how this process will be implemented to justify a score of "Yes" in relation to this indicator.

¹⁸⁴⁵IVL Svenska Miljöinstitutet och Svensk Försäkring, 2017, Klimatanpassning 2017 Så långt har kommunerna kommit, URL:

<http://www.ivl.se/download/18.21c9e44015c64dbb1b4159/1496844140532/Klimatanpassning%202017.pdf>

¹⁸⁴⁶SMHI, 2012, URL:

http://www.smhi.se/polopoly_fs/1.86326!/Menu/general/extGroup/attachmentColHold/mainCol1/file/Klimatologi%20Nr%2012.pdf

¹⁸⁴⁷Regeringen, 2018, Regeringens proposition 2017/2018:163 Nationell strategi för klimatanpassning, URL:

http://www.regeringen.se/494483/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 <i>Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	Yes / <u>In progress</u> / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	Yes / <u>In progress</u> / No
2 <i>Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 <i>Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	Yes / <u>In progress</u> / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No
4 <i>Knowledge gaps</i>		
4a	Work is being carried out to identify, prioritise and	<u>Yes</u> / In progress / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	address the knowledge gaps	
5	<i>Knowledge transfer</i>	
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	<u>Yes</u> / In progress / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	<u>Yes</u> / In progress / No
Step C: Identifying adaptation options		
6	<i>Identification of adaptation options</i>	
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	Yes / <u>In progress</u> / No
7	<i>Funding resources identified and allocated</i>	
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	<u>Yes</u> / In progress / No
Step D: Implementing adaptation action		
8	<i>Mainstreaming adaptation in planning processes</i>	
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	Yes / <u>No</u>
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the	<u>Yes</u> / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	impacts of climate change	
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	<u>Yes</u> / In progress / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 <i>Implementing adaptation</i>		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	<u>Yes</u> / No
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	<u>Yes</u> / No
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	<u>Yes</u> / No
Step E: Monitoring and evaluation of adaptation activities		
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	Yes / <u>No</u>
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
11 <i>Evaluation</i>		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	Yes / <u>No</u>

Adaptation preparedness scoreboard for The United Kingdom

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List of abbreviations

ARCC	Adaptation research produced by the Adaptation and Resilience in the Context of Change
ARP	Adaptation Reporting Power
ASC	Adaptation Sub-Committee
BEIS	Department for Energy and Industrial Strategy (UK government)
CCA	Climate Change Act
CCC	Committee on Climate Change
CCRA	Climate Change Risk Assessments
CIC	Community Interest Company
COSLA	Convention of Scottish Local Authorities
CRSS	Climate Ready Support Service
DAB	Domestic Adaptation Board
DAERA	Department of Agriculture, Environment and Rural Affairs (Northern Ireland government)
Defra	Department for Environment, Food and Rural Affairs (UK government)
DRM	Disaster risk management
DRR	Disaster Risk Reduction
EA	Environment Agency
EIA	Environmental Impact Assessment
EOF	Environmental Observations Forum
EUCP	European Climate Prediction system
FFCUL	Fundação da Faculdade de Ciências da Universidade de Lisboa (Faculty of Sciences, University of Lisbon)
GCOS	Global Climate Observing System
HMG/ HM Government	Her Majesty's Government

IEMA	Institute of Environmental Management and Assessment
JHWSs	Joint Health and Wellbeing Strategies
JSNAs	Joint Strategic Needs Assessments
LAAP	Local Adaptation Advisory Panel
LAAP	Local Adaptation Advisory Panel
LEPS	Local Enterprise Partnerships
LGA	Local Government Association
LWEC	Living With Environmental Change
MCCIP	Marine Climate Change Impacts Partnership
MOHC	Met Office Hadley Centre
MSCC	Marine Science Coordination Committee
NAP	National Adaptation Programme
NCIC	Met Office National Climate Information Centre
NDF	National Development Framework
NERC	Natural Environment Research Council
NI	Northern Ireland
NICCAP	Northern Ireland Climate Change Adaptation Programme
NIEA	Northern Ireland Environment Agency
NPPF	National Planning Policy Framework
NRN – LCEE	National Research Network for Low Carbon Energy & Environment
NRW	Natural Resources Wales
PLACARD	PLATform for Climate Adaptation and Risk reduction
PSBs	Public Service Boards
RDS	Regional Development Strategy
RIDE	Research & Innovation for the Dynamic Environment
SCCAP	Scottish Climate Change Adaptation Programme

SEA	Strategic Environmental Assessment
SEPA	Scottish Environment Protection Agency
SPPS	Strategic Planning Policy Statement
UKCIP	UK Climate Impacts Programme
UKCP	UK Climate Projections

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

In the United Kingdom, there is a legal requirement to develop a national adaptation programme (NAP) under the Climate Change Act (CCA, 2008)¹⁸⁴⁸. The NAP must establish objectives relating to climate adaptation and time-scaled proposals and policies for meeting those objectives. Accordingly, in 2013 the first NAP was published. As the political and administrative structure is devolved in the UK, the NAP primarily concerns England, and separate programmes have been developed by the devolved administrations (for Scotland, Wales, and Northern Ireland). The NAP does, however, include some elements affecting the devolved administrations (i.e. non-devolved matters referred to as reserved or excepted matters)¹⁸⁴⁹, and provides a framework to share areas of common interest and facilitate consistency (Her Majesty's Government, 2013)¹⁸⁵⁰. A second NAP is under development and publication is planned for 2018.¹⁸⁵¹

Under the CCA (2008)¹⁸⁵², Northern Ireland is required to prepare an adaptation programme and has since published the Northern Ireland Climate Change Adaptation Programme (NICCAP, 2014)¹⁸⁵³. Wales is also obliged to do so under the CCA (2008) and has published an Adaptation Delivery Plan under the Climate Change Strategy for Wales (CCSW, 2010)¹⁸⁵⁴, which covers climate adaptation. The second Welsh Adaptation Delivery Plan is planned for publication in 2018. The Welsh Government has since strengthened these legislative requirements through the Wellbeing of Future Generations (Wales) Act (2015)¹⁸⁵⁵ and

¹⁸⁴⁸ Climate Change Act (CCA), 2008, Part 4 – Impact of and adaptation to climate change. Section 58 and 60. URL: http://www.legislation.gov.uk/ukpga/2008/27/pdfs/ukpga_20080027_en.pdf. Date accessed: 11/05/2018.

¹⁸⁴⁹ Reserved and excepted matters are decisions concerning government policy taken by the UK government even though they have an effect in Scotland, Wales, and Northern Ireland. In Scotland and Wales the list of matters is explicitly defined by legislation. Reserved matters include: the constitution, international relations and defence, national security, nationality and immigration, nuclear energy, broadcasting, the UK tax system, employment and social security (except Northern Ireland).

¹⁸⁵⁰ Her Majesty's Government, 2013, The National Adaptation Programme: Making the country resilient to a changing climate, paragraph 25. URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/209866/pb13942-nap-20130701.pdf. Date accessed: 11/05/2018.

¹⁸⁵¹ CCC: Introduction to the CCRA. URL: <https://www.theccc.org.uk/tackling-climate-change/preparing-for-climate-change/uk-climate-change-risk-assessment-2017/introduction-to-the-ccra/>. Date accessed: 11/05/2018.

¹⁸⁵² Climate Change Act (CCA), 2008, Part 4 – Impact of and adaptation to climate change. Section 60 and 66. URL: http://www.legislation.gov.uk/ukpga/2008/27/pdfs/ukpga_20080027_en.pdf

¹⁸⁵³ Department of Agriculture, Environment and Rural Affairs (DAERA), 2014, Northern Ireland Climate Change Adaptation Programme (NICCAP). URL: <https://www.daera-ni.gov.uk/sites/default/files/publications/daera/Northern%20Ireland%20Climate%20Change%20Adaptation%20Programme.pdf>. Date accessed: 11/05/2018.

¹⁸⁵⁴ Welsh Assembly Government, 2010, Climate Change Strategy for Wales. URL: <http://gov.wales/docs/desh/publications/101006ccstratfinalen.pdf>. Date accessed: 11/05/2018.

¹⁸⁵⁵ Welsh Assembly Government, 2015, Well-being of Future Generations (Wales) Act 2015. URL: <https://futuregenerations.wales/wp-content/uploads/2017/01/WFGAct-English.pdf>

Environment (Wales) Act (2016)¹⁸⁵⁶. Although these two acts do not require the development of a new climate change strategy or action plan, the Wellbeing of Future Generations (Wales) Act 2015 specifies ‘a Resilient Wales’ as a wellbeing goal to be fulfilled in pursuit of sustainable development¹⁸⁵⁷. Requirements for Scotland are established by the Climate Change (Scotland) Act 2009¹⁸⁵⁸, which requires the Scottish Government to develop an Adaptation Programme. The Scottish Climate Change Adaptation Programme¹⁸⁵⁹ was published in 2014. The publication of the second SCCAP is planned for 2019, following the fourth progress report¹⁸⁶⁰ which was published in May 2018.

A2. Adaptation strategies adopted at subnational levels

The UK NAP and the adaptation programmes adopted by the devolved administration cover the complete territories of the UK. Beyond the devolved administrations, there is no further regional sub-division of UK governance before the level of cities or councils/local authorities. As such, there has been no UK-wide assessment of adaptation strategies that are below the level of the devolved administrations of Scotland, Wales and Northern Ireland.

At a local level, in England, the Secretary of State for Environment, Food, and Rural affairs has the discretionary power to direct reporting authorities (public bodies and public service organisations, i.e. private sector owners or operators of infrastructure, such as railways, energy distribution and communications networks) to develop adaptation reports, which include setting out adaptation actions at a local level. This power however is not currently used. A voluntary approach has been adopted in England since 2012. Adaptation reports identify current and projected climate change impacts, establish time-scaled proposals and policies for meeting those objectives, and report on the progress of implementation (CCA, 2008)¹⁸⁶¹. This is referred to as the Adaptation Reporting Power (ARP)¹⁸⁶². The reports should build on the issues identified in the NAP and are later used by the Government for the development of updates to the NAP. This reporting requirement only concerns devolved administrations in relation to non-devolved, reserved and excepted matters (Her Majesty’s

¹⁸⁵⁶ Welsh Assembly Government, 2016, Environment (Wales) Act 2016. URL: <http://www.legislation.gov.uk/anaw/2016/3/contents>. Date accessed: 11/05/2018.

¹⁸⁵⁷ Welsh Assembly Government, 2015, Well-being of Future Generations (Wales) Act 2015. Section 4: The well-being goals. URL: <http://www.legislation.gov.uk/anaw/2015/2/section/4/enacted>. Date accessed: 11/05/2018.

¹⁸⁵⁸ Scottish Parliament, 2009, Climate Change (Scotland) Act 2009. URL: <http://www.legislation.gov.uk/asp/2009/12/contents>. Date accessed: 11/05/2018.

¹⁸⁵⁹ Scottish Government, 2014, Climate Ready Scotland Scottish Climate Change Adaptation Programme. URL: <http://www.gov.scot/Publications/2014/05/4669>. Date accessed: 11/05/2018.

¹⁸⁶⁰ Scottish Government: Climate Change. URL: <http://www.gov.scot/Topics/Environment/climatechange>. Date accessed: 11/05/2018.

¹⁸⁶¹ Climate Change Act (CCA), 2008, Part 4 – Impact of and adaptation to climate change. Section 62. URL: http://www.legislation.gov.uk/ukpga/2008/27/pdfs/ukpga_20080027_en.pdf. Date accessed: 11/05/2018.

¹⁸⁶² The ARP aims to ensure that organisations of a public nature with climate-sensitive responsibilities are taking appropriate action to adapt to the impacts of climate change. It does this both directly, through engaging organisations in reporting, and indirectly, through raising awareness, building capacity in organisations, and making examples of good practice publicly available.

Government, 2013)¹⁸⁶³. Although the CCA (2008)¹⁸⁶⁴ stipulates that Welsh Ministers have the discretionary power to direct reporting authorities to prepare adaptation reports, the decision was made not to invoke the power but to encourage voluntary action in the first instance. Nevertheless, under the Wellbeing of Future Generations (Wales) Act (2015) Public Service Boards are required to develop wellbeing assessments and plans. The assessments must give due regard to the latest climate change risk assessments (CCRA), while assessing the state of the economic, social, environmental and cultural well-being in each Local Authority area. The resulting plans set objectives that are designed to maximise their contribution to the well-being goals. No equivalent reporting power is permitted to Ministers in Northern Ireland under the CCA (2008). In Scotland, a duty is placed on public bodies to carry out the functions of the adaptation programme under the Climate Change (Scotland) Act (2009); however, this does not include adaptation reporting by public bodies.

Adaptation action plans

B1. National adaptation plan

As previously indicated, the respective adaptation programmes also set out the proposals and policies that must be implemented to meet the objectives of the programme; for example, the UK NAP (2013) describes over 370 actions¹⁸⁶⁵ (see detail in Section A1). The actions included in the programmes focus on the highest order risks identified, guided by the magnitude, confidence, and urgency scores assigned during the analysis which underpinned the respective CCRA.

B2. Adaptation plans adopted at sub-national level

As set out under A2, in England, the Secretary of State for Environment, Food, and Rural affairs has the discretionary power to direct reporting authorities (organisations with functions of a public nature and statutory undertakers) to develop adaptation reports, which include setting out adaptation actions at a local level. This power however is not currently used. Adaptation reporting relies on a voluntary approach at present, and involves engagement with key stakeholders to support them through the reporting process. Welsh Ministers have the same discretionary power but, as for England, the power is currently not used. The same does not apply to reporting authorities in Scotland and Northern Ireland (see A2 for more detail).

¹⁸⁶³ HM Government, 2013, Adapting to Climate Change: Ensuring Progress in Key Sectors. 2013 Strategy for exercising the Adaptation Reporting Power and list of priority reporting authorities. Section 8. URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/209875/pb139_45-arp-climate-change-20130701.pdf. Date accessed: 11/05/2018.

¹⁸⁶⁴ Climate Change Act (CCA), 2008, Part 4 – Impact of and adaptation to climate change. Section 67. URL: http://www.legislation.gov.uk/ukpga/2008/27/pdfs/ukpga_20080027_en.pdf. Date accessed: 11/05/2018.

¹⁸⁶⁵ BEIS, 2017, 7th National Communication. Chapter 5 – Vulnerability assessment, climate change impact and adaptation measures. URL: [http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/19603845_united_kingdom-nc7-br3-1-gbr_nc7_and_br3_with_annexes_\(1\).pdf](http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/19603845_united_kingdom-nc7-br3-1-gbr_nc7_and_br3_with_annexes_(1).pdf). Date accessed: 11/05/2018.

B3. Sectoral adaptation plans

The NAP is split into the following thematic areas: the Built Environment; Infrastructure; Healthy and Resilient Communities; Agriculture and Forestry; the Natural Environment; and Business. There is a seventh cross-cutting theme concerning Local Government. Policies, initiatives and actions to support adaptation are set out for each theme (HM Government, 2013). Building on the approach taken for the NAP, the devolved administrations have also established adaptation plans according to thematic areas, as follows:

- **Scotland:** The SCCAP (2014)¹⁸⁶⁶ sets out actions according to three thematic areas: the Natural Environment; Buildings and Infrastructure Networks; and Society (relating to the resilience of communities).
- **Wales:** The Adaptation Delivery Plan (2011)¹⁸⁶⁷ describes the actions that will fulfil the objectives of the Welsh Adaptation Framework across five sectors: Natural Environment, Infrastructure, Communities, Business and Tourism and Health. While workshops and consultations began in 2015, by June 2017 a completed sector action plan was only available for Health¹⁸⁶⁸. In the light of the new legislative context in Wales, and new evidence on risks to sectors in Wales identified by the UK Committee on Climate Change, the Welsh Government is developing a new adaptation plan for Wales.
- **Northern Ireland:** The NICCAP (2014)¹⁸⁶⁹ sets out government action, policies and proposals for a five-year timeframe across four areas: flooding, water, natural environment, agriculture and forestry.

In addition, seven UK cities¹⁸⁷⁰ are now signatories to the EU Covenant of Mayors for Climate and Energy in relation to adaptation. Of these cities, all except Greater Manchester have submitted adaptation action plans and are now in the monitoring phase.

¹⁸⁶⁶ Scottish Government, 2014, Climate Ready Scotland Scottish Climate Change Adaptation Programme. URL: <http://www.gov.scot/Publications/2014/05/4669>. Date accessed: 11/05/2018.

¹⁸⁶⁷ Welsh Assembly Government, 2011, Climate Change Strategy for Wales: Adaptation Delivery Plan. URL: <http://gov.wales/docs/desh/publications/101006ccstratdeliveryadaptationen.pdf>. Date accessed: 11/05/2018.

¹⁸⁶⁸ Climate Change Commission for Wales: Adaptation. URL: <http://www.theccw.org.uk/adaption/>. Date accessed: 11/05/2018.

¹⁸⁶⁹ DAERA, 2014, Northern Ireland Climate Change Adaptation Programme (NICCAP). URL: <https://www.daera-ni.gov.uk/publications/northern-ireland-climate-change-adaptation-programme>. Date accessed: 11/05/2018.

¹⁸⁷⁰ Reporting at 08/05/2018: Aberdeen City, Birmingham, Edinburgh, Glasgow, Greater Manchester, Leicester, Newcastle upon Tyne, Stirling. Covenant of Mayors for Climate and Energy, Covenant community, URL: <http://www.covenantofmayors.eu/about/covenant-community/signatories.html>. Date accessed: 08/05/2018.

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

Responsibility for climate adaptation is split between the four countries of the UK, with national governments in Northern Ireland, Wales and Scotland responsible for adaptation in all devolved policy areas. Her Majesty's Government is responsible for adaptation in England and reserved matters for the UK.

The overarching responsibilities defined by the CCA (2008)¹⁸⁷¹ are: a climate change risk assessment (CCRA) to be carried out every five years, a national adaptation programme (NAP) to address the priority risks identified in the CCRA, and a reporting mandate. The CCA (2008) also defines the central administration body as an independent Adaptation Sub-Committee (ASC) of the Climate Change Committee (CCC) to provide advice and assistance in relation to implementation of the CCA.

England & reserved matters: Whilst adaptation is embedded within key policy areas across UK government, the Department for Environment, Food and Rural Affairs (Defra) coordinates the UK government's work on adaptation in England, and throughout the UK on a number of reserved matters, including cross-cutting action required under the CCA. Some reserved matters, such as defence, are primarily addressed independently of this coordination.

Scotland: Lead devolved responsibility for climate change policy in Scotland rests with the Minister for Environment, Climate Change and Land Reform¹⁸⁷². A Cabinet sub-committee on climate change¹⁸⁷³ ensures that delivery is coordinated across portfolios and that climate change considerations are reflected at the very highest level of the Scottish Government.

Wales: Responsibility for ensuring adaptation and resilience across Wales in areas of devolved responsibility sits with Welsh Ministers. A cross-government response to climate adaptation is co-ordinated by the Department for Environment and Rural Affairs.

¹⁸⁷¹ Climate Change Act (CCA), 2008, Part 4 – Impact of and adaptation to climate change. URL: http://www.legislation.gov.uk/ukpga/2008/27/pdfs/ukpga_20080027_en.pdf. Date accessed: 11/05/2018.

¹⁸⁷² Scottish Government: Cabinet Secretary for the Environment, Climate Change and Land Reform. URL: <https://beta.gov.scot/about/who-runs-government/cabinet-and-ministers/cabinet-secretary-environment-climate-change-land-reform/>. Date accessed: 11/05/2018.

¹⁸⁷³ The Scottish Parliament: Environment, Climate Change and Land Reform Committee. URL: <http://www.parliament.scot/parliamentarybusiness/CurrentCommittees/environment-committee.aspx>. Date accessed: 11/05/2018.

The Well-being of Future Generations Act¹⁸⁷⁴ has established a Future Generations Commissioner¹⁸⁷⁵ for Wales who has a specific remit to provide advice or assistance on climate change to public bodies, including the Welsh Government.

Northern Ireland: The Climate Change Unit, in the Department of Agriculture, Environment and Rural Affairs (DAERA)¹⁸⁷⁶, is responsible for the co-ordination of cross-departmental response to requirements of the CCA on adaptation. The Unit leads on development, implementation and monitoring of the NICCAP¹⁸⁷⁷, though responsibility for action on Northern Ireland's climate change risks is shared with all government departments.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

Adaptation is embedded within key policy areas across the UK governments of England, Wales, Scotland and Northern Ireland. The respective adaptation programmes set out the roles of the different government departments, including their delivery bodies and partners (set out below).

England and reserved matters: The Domestic Adaptation Board (DAB), chaired by Defra, is the horizontal coordination body. It oversees cross-government action and has members from most government departments, the devolved administrations and the Environment Agency (EA). The role involves:

- Providing senior-level leadership in relation to the statutory CCRA and NAP, helping to develop and maintain a clear vision and direction
- Highlighting upcoming policies in their departments, which can support adaptation outcomes and capacity building in key sectors
- Promoting effective collaboration across government departments and key agencies and managing interdependencies with other issues, such as climate change mitigation and resilience agendas
- Monitoring overall progress with the CCRA and NAP; assisting in identifying risks and removing barriers, and doing horizon scanning
- Monitoring overall progress on adaptation delivery and identifying gaps or opportunities

¹⁸⁷⁴ Welsh Assembly Government, 2015, Well-being of Future Generations (Wales) Act 2015. URL: <https://futuregenerations.wales/wp-content/uploads/2017/01/WFGAct-English.pdf>.

¹⁸⁷⁵ Future Generations Commission for Wales, URL: <https://futuregenerations.wales/>. Date accessed: 11/05/2018.

¹⁸⁷⁶ DAERA: Climate Change Unit. URL: <https://www.daera-ni.gov.uk/contacts/climate-change-unit>. Date accessed: 11/05/2018.

¹⁸⁷⁷ DAERA, 2014, Northern Ireland Climate Change Adaptation Programme (NICCAP). URL: <https://www.daera-ni.gov.uk/publications/northern-ireland-climate-change-adaptation-programme>. Date accessed: 11/05/2018.

- Considering key sources of challenge and insight, e.g. outputs from key research projects, such as the Economics of Climate Resilience and the latest reports and advice from the ASC.

Scotland: Within the Scottish Government policy sectors contribute updates on actions set out in the SCCAP, these are reported annually. The most recent progress report, Climate Ready Scotland: Scottish Climate Change Adaptation Programme - Fourth Annual Progress Report, was published in May 2018. A new Programme Board will oversee the development of the second SCCAP.

Wales: The Welsh Government has established a Core Internal Adaptation Group to support the development of its latest Adaptation Delivery Plan and its future delivery. This Group represents policy areas across the Welsh Government, and members use their stakeholder networks to engage the wider society on development of the plan.

Northern Ireland: The Cross-Departmental Working Group on Climate Change is charged with the preparation and delivery of a cross-departmental adaptation programme, including recommendations and/or decisions on adaptation issues.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.

Yes / In progress / No

England & reserved matters: Local government responsibilities should be considered in the context of the Localism Act 2011 and the Cities and Local Government Devolution Act 2016, which gives local government functions, freedoms and flexibilities, as well as responsibilities and governance. UK government engages on adaptation with local government, including the availability of tools and guidance via different forums or groups, such as the Local Adaptation Advisory Panel (LAAP), the Core Cities group and the Local Government Association. Online tools and best practice for councils are available through the sites of delivery agents, such as Climate UK/London Climate Change Partnership, to enable councils to improve and develop their ability to adapt to climate change. For instance, there is a template business case available for councils.

Although the LAAP is not comprehensively representative of the views of all local government, it was instrumental in providing council views on the NAP prior to it being published. The NAP contains a cross-cutting chapter that focuses on local government and contains a ‘Cities Commitment’ from the nine largest cities across England.¹⁸⁷⁸ The LAAP operates on an *ad hoc* basis.

¹⁸⁷⁸ Defra, 2013, Letter request for information: Local adaptation advisory panel. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/263042/DOC031213-03122013115022.pdf. Date accessed: 11/05/2018.

In addition, the ARP establishes a legal framework for vertical coordination between reporting authorities in England (CCA, 2008)¹⁸⁷⁹. The framework facilitates lower levels of administration to feedback into the policymaking process through regular reporting (Street et al., 2017)¹⁸⁸⁰.

Scotland: The Climate Change (Scotland) Act (2009) requires public bodies and local authorities to carry out the functions of the adaptation programme. This includes the duty to contribute to climate adaptation and to report annually on compliance with their climate change duties. The SCCAP provides a framework for coordination between the delivery bodies. Adaptation Scotland, funded by Scottish Government and managed by Sniffer, a sustainability charity, provides advice and support to help Scotland be prepared and resilient to the effects of climate change. Key public service delivery bodies, such as Scottish Environment Protection Agency (SEPA), Scottish Natural Heritage, Historic Environment Scotland, Forestry Commission Scotland and Marine Scotland, are important contributors to Scotland's national Adaptation Programme and its annual reports on progress. Examples of key city and city-region initiatives resulting from this coordination include: Edinburgh Adapts, Aberdeen Adapts and Climate Ready Clyde.

In addition, the Convention of Scottish Local Authorities (COSLA)¹⁸⁸¹ acts as the representative voice of Scottish local government at national and international level and has an environment and economy team responsible for a wide range of policy and council services, including climate change. COSLA contributed to the European Commission consultation on the preparation of the EU Adaptation Strategy¹⁸⁸².

Wales: The Well-being of Future Generations Act established Public Service Boards (PSBs)¹⁸⁸³ in Wales to replace the voluntary Local Service Boards in each local authority area. Each board is required to assess the state of economic, social, environmental and cultural well-being in its area and set objectives that are designed to maximise the PSBs contribution to the well-being goals¹⁸⁸⁴. The PSBs are required to consider climate change impacts in their well-being assessments. Additionally, PSBs must take account of future trends in climate

¹⁸⁷⁹ Climate Change Act (CCA), 2008, Part 4 – Impact of and adaptation to climate change. Section 62. URL: http://www.legislation.gov.uk/ukpga/2008/27/pdfs/ukpga_20080027_en.pdf. Date accessed: 11/05/2018.

¹⁸⁸⁰ Street, R.B., Hayman, V. and Wilkins, T.M., 2017, Understanding the value of the Adaptation Reporting Power process to the reporting organisations involved. UKCIP, University of Oxford. URL: <https://arcc.ouce.ox.ac.uk/wp-content/pdfs/ARP-report-for-Defra-04-2017.pdf>. Date accessed: 11/05/2018.

¹⁸⁸¹ COSLA: Environment and Economy. URL: <http://www.cosla.gov.uk/about/how-we-work/environment-and-economy>. Date accessed: 11/05/2018.

¹⁸⁸² COSLA, n.d., Consultation on the preparation of the EU adaptation strategy. Response from the Convention of Scottish Local Authorities. URL: http://www.cosla.gov.uk/sites/default/files/documents/eu_adaptation_strategy_-_cosla_consultation_reponse.pdf. Date accessed: 11/05/2018.

¹⁸⁸³ Welsh Government: Public Services Boards. URL: <http://gov.wales/topics/improvementservices/public-services-boards/?lang=en>. Date accessed: 11/05/2018.

¹⁸⁸⁴ Welsh Government, 2015, Well-being of Future Generations (Wales) Act 2015: The Essentials. URL: <http://gov.wales/docs/dsjlg/publications/150623-guide-to-the-fg-act-en.pdf>. Date accessed: 11/05/2018.

change, alongside other trends set out in the annually updated Future Trends Report¹⁸⁸⁵, in the preparation of local well-being plans.

The statutory members of each PSB are:

- The local authority
- The Local Health Board
- The Fire and Rescue Authority
- Natural Resources Wales (NRW)

In addition to the statutory members, each PSB will invite the following people to participate:

- Welsh Ministers
- Chief Constables
- The police and crime commissioner
- Certain Probation Services
- At least one body representing relevant voluntary organisations

PSBs will also be able to invite other public service organisations to participate.

The Adaptation Framework established support mechanisms to work with local businesses and communities. Local authorities, Local Service Boards, Spatial Plan Area Groups and the Climate Change Commission for Wales are central to helping their local stakeholders adapt to climate change.

Northern Ireland: The Climate Change Unit in DAERA is responsible for the co-ordination of the cross-departmental response to the CCA on adaptation and responsibility for climate change actions falls to each department under CCA. There is not a statutory vertical coordination mechanism within Northern Ireland as no such legal obligation is stipulated by the CCA.

DAERA are working with Climate NI¹⁸⁸⁶ to ensure engagement with Local Government and all other sectors on the impacts of climate change, sharing best practice and promoting adaptation action within these sectors to address the impacts of climate change, including managing climate change risks and responding to opportunities.

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

¹⁸⁸⁵ Welsh Government, 2017, Future Trends Report 2017. URL: <http://gov.wales/docs/statistics/2017/170505-future-trends-report-2017-en.pdf>. Date accessed: 11/05/2018.

¹⁸⁸⁶ Climate Northern Ireland. URL: <http://www.climatenorthernireland.org.uk/>. Date accessed: 11/05/2018.

Stakeholders are involved in the preparation of the UK CCRA. The process is established at a UK level and additional detail is developed at national level¹⁸⁸⁷. The CCRA forms the basis of the respective adaptation programmes developed.

The first CCRA and NAP were drawn up by the Government, industry and other non-government organisations working together. Stakeholder engagement was coordinated through a series of workshops with around 700 organisations and there were two informal consultations led by the UK government. Businesses, local councils and community groups were involved. These stakeholders helped to identify the most important areas for action and allowed other stakeholders from across the sectors concerned to comment on the draft objectives of the NAP report.

The first UK NAP identified the many stakeholders that need to be involved in developing the national adaptation response. It also identified actions and their owners. Key stakeholder engagement remains a crucial component of the policy approach in the ongoing development of the second NAP.

For the development of the second CCRA and NAP, stakeholder engagement has involved: a call for evidence (in 2014); two workshops with 100 stakeholders present each time; working groups (with between 10 and 20 stakeholders present each time); and a peer review process.¹⁸⁸⁸

The preparation of the second NAP builds on the first and, as such, has been developed in a way that reflects the progress that has been made in integrating climate adaptation within policies and programmes across the UK Government. Engagement with stakeholders has been ongoing throughout the period of the NAP. This has often been through groups or implementing actions in the first NAP and developing and updating them as progress has been made, so that ongoing or new actions are already in place or planned across a broad range of policies and programmes. The second NAP will reflect that progress and integrate consideration of climate change risks. Examples of the ongoing engagement that will contribute to the preparation of the NAP include: ongoing engagement with local government and preparation of guidance through groups such as the Local Adaptation Advisory Panel (LAAP); extensive engagement with key stakeholders over a number of years in the preparation of the UK Government's 25 Year Environment Plan, which was published in 2018 and includes mitigating and adapting to climate change as one of its ten priority goals and targets; ongoing extensive consultation with a broad range of sectoral businesses and organisations on the implementation of the second round of adaptation reporting and the development of the strategy for the third round of reporting. Stakeholder engagement is repeated across government in many policy areas where climate risks are considered. This approach to ongoing stakeholder engagement and the integration of climate adaptation, as a

¹⁸⁸⁷ CCC: National summaries. URL: <https://www.theccc.org.uk/tackling-climate-change/preparing-for-climate-change/uk-climate-change-risk-assessment-2017/national-summaries/>. Date accessed: 11/05/2018.

¹⁸⁸⁸ CCC: Review and engagement. URL: <https://www.theccc.org.uk/tackling-climate-change/preparing-for-climate-change/uk-climate-change-risk-assessment-2017/review-and-engagement/>. Date accessed: 11/05/2018.

consideration across all policies, programmes and actions, will continue as part of the implementation of the second NAP.

Where relevant, additional information concerning stakeholder engagement by the devolved administrations is set out below.

England & reserved matters: In addition to the process set out above, stakeholder involvement is facilitated through ongoing voluntary reporting by public authorities (in the context of the ARP, as described in Section A2).

Scotland: Adaptation Scotland continues to support organisations, businesses and communities to adapt to the impacts of climate change through connecting science and practice and building strong partnerships for planning and action (Scottish Government, 2017).¹⁸⁸⁹ Most recently, three workshops have been held with policy sectors, government agencies and other stakeholders to develop the structure of the second SCCAP.

Wales: A number of stakeholder groups were involved in the preparation of the Climate Change Strategy. An internal cross-government group has been established for the preparation of the new adaptation plan for Wales. The group members are individually responsible for external engagement across multiple sectors to ensure interested groups are represented during its development. The Welsh Government is committed to engaging externally on the development of policy due to the five ways of working under the Wellbeing of Future Generations (Wales) Act. A number of engagement events will be held during the development of the plan and post publication to stimulate effective delivery.¹⁸⁹⁰

Northern Ireland: Climate NI¹⁸⁹¹ is a partnership of external and government stakeholders from a range of key sectors who provide advice and support to Government and other sectors with the aim of increasing the understanding of the impacts of climate change, sharing best practice and promoting action to address the impacts of climate change across all sectors.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

The UK has only one land boundary with another country, which is with Ireland. The NAP and the CCA do not contain any elements supporting transboundary cooperation with other neighbouring countries. However, transboundary cooperation with Ireland is led by the British-Irish Council, which supports collaboration across the whole of the United Kingdom and Ireland on a range of social, economic and environmental topics. These include

¹⁸⁸⁹ Scottish Government, 2017, Climate Ready Scotland: Scottish Climate Change Adaptation Programme. Third annual report 2017. Annex – Background Information. URL: <http://www.gov.scot/Publications/2017/05/3941/6>. Date accessed: 11/05/2018.

¹⁸⁹⁰ Personal communication with MS contact.

¹⁸⁹¹ Climate Northern Ireland. URL: <http://www.climatenorthernireland.org.uk/>. Date accessed: 11/05/2018.

collaborative work on climate adaptation, as well as a range of other activities that take account of climate change risks and adaptation (e.g. British-Irish Council, 2018)¹⁸⁹².

Moreover, there is close collaboration between the UK Government and the devolved administrations on adaptation issues, e.g. on flood risk. Where there is a need to work across administrative boundaries, there are joint flood risk management plans, which in turn link to river basin management plans and to the UK's Marine Strategy (Environment Agency, 2016)¹⁸⁹³.

More broadly the UK cooperates extensively through wider international arrangements and agreements to address climate risks. This includes work undertaken through OSPAR, which addresses climate change impacts affecting the marine environment that is part of the boundary between the UK and other neighbouring countries.

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / In progress / No

The UK's National Meteorological Service (Met Office)¹⁸⁹⁴ holds the nation's weather and climate records. Climate-related impacts are monitored at local level in relation to changes in: temperature and the frequency of heatwaves, seasonal rainfall patterns resulting in drought and water stress or flooding, storm frequency, sea level rise and coastal flooding. In addition, the Met Office National Climate Information Centre (NCIC) keeps track of all UK records and notes extremes and exceptional weather in each year, producing case studies¹⁸⁹⁵.

The records and case studies are summarised at regional level in the annual State of the UK Climate report¹⁸⁹⁶, which provide an accessible, authoritative and up-to-date assessment of UK climate trends, variations and extremes. The NCIC has also analysed recent UK extreme

¹⁸⁹² British-Irish Council, 2018, Communique: 15th Ministerial meeting of the Environment work sector, 23 March 2018. URL: <https://www.britishirishcouncil.org/sites/default/files/Communique%2015th%20BIC%20Environment%20Ministerial.pdf>. Date accessed: 11/05/2018.

¹⁸⁹³ Environment Agency, 2016, Flood risk management plans (FRMPs: 2015 to 2021). URL: <https://www.gov.uk/government/collections/flood-risk-management-plans-frmps-2015-to-2021>. Date accessed: 11/05/2018.

¹⁸⁹⁴ UK Climate Projections. URL: <http://ukclimateprojections.metoffice.gov.uk/>. Date accessed: 11/05/2018.

¹⁸⁹⁵ Met Office: UK climate – Extremes. URL: <https://www.metoffice.gov.uk/public/weather/climate-extremes/#?tab=climateExtremes>. Date accessed: 11/05/2018.

¹⁸⁹⁶ Met Office: State of the UK Climate. URL: <http://www.metoffice.gov.uk/climate/uk/about/state-of-climate>. Date accessed: 11/05/2018.

weather events and concluded that there had been a marked increase in the number of heat-related and heavy rainfall-related extremes (Kendon, 2014)¹⁸⁹⁷.

A key output from monitoring by the NCIC is the identification of weather-related thresholds, geographic hotspots and other specific climate-related risks. The Met Office has worked with relevant government bodies and stakeholders to put this monitoring data into context and thereby enhance understanding of climate-related impacts. The range of impacts include those on: the rail and road sectors, the energy sector (including small-scale wind power), the water sector, social welfare, defence, animal disease, national infrastructure (including the Thames Barrier). Information on these impacts is part of the forthcoming UK Climate Projections in 2018 (UKCP18)¹⁸⁹⁸.

While the Met Office is the lead agency for making and collecting meteorological and atmospheric observations¹⁸⁹⁹, observations are also made by others, including the Natural Environment Research Council (NERC) research centres and other delivery partners. Collection of oceanographic and marine observations is widely distributed throughout the UK, with many institutions involved. Terrestrial observations are made or coordinated by the Natural Environment Research Council (NERC), EA, NRW, SEPA, the Northern Ireland Environment Agency (NIEA), the Forestry Commission and others.

The Environmental Observations Forum (EOF)¹⁹⁰⁰ is a Living With Environmental Change (LWEC) Partnership programme founded in 2008 to support better communication and sharing of information across the observations community. LWEC has since been reformed as the Research & Innovation for the Dynamic Environment (RIDE) Forum. The EOF has prepared the reports: ‘Coordinating Climate Science and Risk Assessment Observations’ and ‘Consultation Responses to the Global Climate Observing System (GCOS) Implementation Plan’, to assist in gaining a national overview of systematic observation activities.

Another important coordination mechanism is the Marine Science Coordination Committee (MSCC)¹⁹⁰¹, which was formed in 2008 to develop and implement a Marine Science Strategy for the UK, and to improve UK marine science co-ordination.

¹⁸⁹⁷ Kendon, M., 2014, Has there been a recent increase in UK weather records? *Weather*, Volume 69, Issue 12. <https://rmets.onlinelibrary.wiley.com/doi/full/10.1002/wea.2439>. Date accessed: 11/05/2018.

¹⁸⁹⁸ Met Office: UK Climate Projections Impacts. URL: <https://www.metoffice.gov.uk/research/collaboration/ukcp/impacts>. Date accessed: 01/06/2018.

¹⁸⁹⁹ The Met Office Hadley Centre Climate Programme provides world-leading climate science and led the production of the latest UK Climate Projections (UKCP09). UKCP09 gives projections of future changes to the climate in the UK to the end of this century. Met Office Hadley Centre Climate Programme. URL: <https://www.metoffice.gov.uk/services/public-sector/climate-programme>. Date accessed: 11/05/2018.

¹⁹⁰⁰ UK Environmental Observations Forum EOF: <http://www.ukeof.org.uk/>. Date accessed: 11/05/2018.

¹⁹⁰¹ Marine Science Coordination Committee <https://www.gov.uk/government/groups/marine-science-co-ordination-committee>. Date accessed: 11/05/2018.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

The Met Office Hadley Centre (MOHC) Climate Programme provides advanced climate science and led the production of the current UK Climate Projections (UKCP09)¹⁹⁰². UKCP09 projects future climate changes in the UK to the end of this century. Projections are provided on a 25km spatial scale for a range of climate variables, providing several indicators relevant for climate change evaluations (e.g. seasonal and daily averages, daily maxima). They also include an assessment of uncertainty, making them suitable for risk-based assessments. Other organisations, such as the English EA, supported the development of UKCP09 in technical review, by funding marine scenario work that provided projections of storm surge and sea-level rise for UK waters and in providing case studies to show how UKCP09 can be used in decision making.

One of the key outputs of the MOHC Climate Programme will be an updated set of UK Climate Projections in 2018 (UKCP18). These will update the UKCP09 projections of climate change over UK land areas and projections of sea-level rise. They will provide greater regional detail, further analysis of both national and global climate risks and more information on potential extremes and impacts of climate change. UKCP18 will support the preparation of the third CCRA. The new projections will also be an important source of information for UK organisations that need to ensure that their assets and operations are resilient to future climate and weather extremes. UKCP18 will be available in November 2018 (Met Office, 2017)¹⁹⁰³.

There is some experience of using scenarios to test and direct the suitability of future actions and strategies. For example, in England, EA undertook a simplified screening assessment of organisational duties in relation to a climate impact scenario. This was used to advise and direct adaptation commitments in their statutory report to the Government under the ARP.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

Based on UKCP09, the first CCRA for the UK was published in January 2012. It identified over 700 risks and opportunities to the UK from a changing climate over the next century, under three different emissions scenarios, and focused on around 100 of the risks and opportunities in further detail.

¹⁹⁰² UK Climate Projections. URL: <http://ukclimateprojections.metoffice.gov.uk/>. Date accessed: 11/05/2018.

¹⁹⁰³ Met Office, 2017, UK climate projections: A project overview. URL: <https://www.metoffice.gov.uk/binaries/content/assets/mohippo/pdf/uk-climate/uk-cp/ukcp18-project-overview-final.pdf>. Date accessed: 11/05/2018.

The second CCRA was laid before Parliament in January 2017. It is underpinned by an evidence report prepared independently by the ASC and published in July 2016. The evidence report analyses around 60 key present-day climate risks and opportunities and current levels of adaptation. It assesses how climate and socio-economic change may alter those risks and opportunities in the 2020s, 2050s and 2080s. The evidence report has taken a policy-focused approach to presenting the results, using the concept of urgency to prioritise the risks and opportunities. It considers where additional action is needed in the next five years, considering current and planned policies, and identifies six priority risk areas (flooding, water scarcity, overheating, impacts on natural capital, food security, and pests and diseases). The evidence report considers impacts on a number of large sectors, including infrastructure, people and the built environment, and business and industry. Within these sectors, a range of sub-sectors is considered, for instance, the business sub-sectors for which impacts of climate change are more relevant are given as: engineering and consulting, tourism, insurance and other finance products, agriculture, and food and utilities.¹⁹⁰⁴ Evidence summaries were also produced for England, Wales, Scotland and Northern Ireland to describe the risks and opportunities specific to each part of the UK.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

The latest CCRA (2017) contains a chapter on the international dimensions of climate change, addressing both risks and opportunities (CCC, 2017)¹⁹⁰⁵. The forthcoming adaptation programmes will be developed on the evidence presented in the CCRA and may reflect this international dimension. However, there is no evidence of transboundary risks in relation to Ireland.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / In progress / No

The 2013 NAP highlights the importance of further research to shape UK adaptation activity. Research activity has been identified at the UK level in the 2013 NAP and includes:

¹⁹⁰⁴ UK Climate Change Risk Assessment 2017, July 2016, <https://www.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Synthesis-Report-Committee-on-Climate-Change.pdf>. Date accessed: 11/05/2018.

¹⁹⁰⁵ CCC, 2017, UK Climate Change Risk Assessment Evidence Report. Chapter 7: International dimensions. URL: <https://www.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Chapter-7-International-dimensions.pdf>. Date accessed: 11/05/2018.

- LWEC¹⁹⁰⁶ report cards: LWEC brought together 22 public sector organisations that fund, carry out and use environmental research and observations. Since its inception, LWEC has evolved into the RIDE Forum. Partners include the UK Research Councils, government departments with environmental responsibilities, devolved administrations and government agencies. Private sector input is sought on an issue-by-issue basis, rather than a formalised standing business board. The partnership has among its two core objectives the alignment of research agendas, i.e. work such as road mapping, co-ordination of funding partners, co-design of innovative cross-disciplinary programmes, developing and implementing national research strategies.
- The UK Marine Climate Change Impacts Partnership¹⁹⁰⁷ (MCCIP) report cards¹⁹⁰⁸: MCCIP is a forum that involves the major marine science-funding government departments, the devolved administrations, the key marine-science providers and independent members, and defines as a priority area 'responding to climate change and its interaction with the marine environment'. The report cards look at climate change and marine biodiversity legislation, with a focus on the legislation used to establish various types of marine protected areas.
- Adaptation research produced by the Adaptation and Resilience in the Context of Change¹⁹⁰⁹ (ARCC) Network is managed by the UK Climate Impacts Programme (UKCIP), and hosted by the Environmental Change Institute, University of Oxford. The network supports the creation of robust built environment and infrastructure sectors within the UK. The project has ended but the website remains active.

The UK Met Office¹⁹¹⁰ undertakes core research into climate science, observations, projections and impacts in support of practical decision-making. This includes assessments of the potential global and regional impact of climate change.

Additionally, the National Flood Resilience Review (HM Government, 2016)¹⁹¹¹, established to assess how the UK can be better protected from future flooding and extreme weather events, recommended a long-term action to improve modelling of flooding from all sources, which the EA and Met Office have picked up.

The devolved administrations have also dedicated additional resources to identify, prioritise and address the knowledge gaps, as follows:

¹⁹⁰⁶ NERC: Research & Innovation for our Dynamic Environment (RIDE) Forum. URL: <http://www.lwec.org.uk/>. Date accessed: 11/05/2018.

¹⁹⁰⁷ MCCIP. URL: <http://www.mccip.org.uk/>. Date accessed: 11/05/2018.

¹⁹⁰⁸ MCCIP, 2015, Marine climate change impacts: Implications for the implementation of marine biodiversity legislation. URL: http://www.mccip.org.uk/media/1611/mccip_special_topic_report_card_-2015.pdf. Date accessed: 11/05/2018.

¹⁹⁰⁹ Adaptation and Resilience in the Context of Change network (ARCC). URL: <http://www.arcc-network.org.uk/>. Date accessed: 11/05/2018.

¹⁹¹⁰ Met Office: Climate services for the UK. URL: <http://www.metoffice.gov.uk/services/climate-services>. Date accessed: 11/05/2018.

¹⁹¹¹ HM Government, 2016, National Flood Resilience Review. URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/551137/national-flood-resilience-review.pdf. Date accessed: 11/05/2018.

- **Scotland:** The Scottish Government is embedding climate adaptation into the development of a robust evidence base, including £1m annual funding to the ClimateXChange¹⁹¹² adaptation research programme.
- **Wales:** One of the key themes of the National Research Network for Low Carbon Energy & Environment (NRN – LCEE) addresses the impacts of climate change focusing specifically on coastline and agriculture ecosystem resilience. The Welsh Government is currently assessing suitable research routes to ensure it addresses the evidence gaps identified in the second CCRA evidence report.
- **Northern Ireland:** The latest UK CCRA identified a number of gaps in evidence for Northern Ireland climate change risks. Work is ongoing across all government departments to address the gaps in evidence. Climate NI¹⁹¹³ have recently commenced an exercise to provide information about non-government work (i.e. outside central government) and research that is completed, underway or scheduled which could help address the priority risks facing Northern Ireland, as identified by the UK CCRA.

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / In progress / No

Until the end of March 2016, the UK Government funded the EA to provide a Climate Ready Support Service (CRSS) for England, which supported organisations in adapting to climate change. By 2016, the majority of NAP actions to which the CRSS Service was contributing were either complete or ongoing without the need for further support from the service. The CRSS produced or supported a range of tools and products to help organisations in preparing for climate change. Although these are no longer supported through a central web portal, they can be found on a number of organisation's websites, which are now embedded within the Climate-ADAPT UK page¹⁹¹⁴.

The Met Office offers comprehensive information about climate and climate change through its website¹⁹¹⁵. Climate projections for the UK are offered to all kinds of potential users through a specific and dedicated website¹⁹¹⁶. It offers information on climate projections that can be tailored to different profiles, levels of expertise, etc. The website contains abundant guidance material and tools to help users find the information and use it. Updated and improved climate projections are due to be released in November 2018 via UKCP18 (Met Office, 2017)¹⁹¹⁷. A Climate Guide section provides information about climate, climate

¹⁹¹² ClimateXChange. URL: <http://www.climateexchange.org.uk/>. Date accessed: 11/05/2018.

¹⁹¹³ Climate NI <https://www.climateinireland.org/>. Date accessed: 11/05/2018.

¹⁹¹⁴ See 'b. Adaptation capacity, dissemination, education, training': <http://climate-adapt.eea.europa.eu/countries-regions/countries/united-kingdom>. Date accessed: 11/05/2018.

¹⁹¹⁵ Met Office: Climate guide. URL: <http://www.metoffice.gov.uk/climate-guide>. Date accessed: 11/05/2018.

¹⁹¹⁶ UK Climate Projections. URL: <http://ukclimateprojections.metoffice.gov.uk/>. Date accessed: 11/05/2018.

¹⁹¹⁷ Met Office, 2017, UK climate projections: A project overview. URL: <https://www.metoffice.gov.uk/binaries/content/assets/mohippo/pdf/uk-climate/uk-cp/ukcp18-project-overview-final.pdf>. Date accessed: 11/05/2018.

change and climate science. The Met Office hosts the National Climate Information Centre, which holds national and regional climate information for the UK, summarised in tables, maps, figures and summaries. Information is available on averages, extremes, climate anomalies, etc. The Met Office website also contains 'Climate Services'¹⁹¹⁸ and 'Climate Service UK'¹⁹¹⁹ sections, where consultancy training services are offered to help national and international users accurately interpret the available climate information. It aims to provide business and society with a range of products and services that provide the vital information, tools and advice needed to help manage climate variability and change, and build capacity in developing countries.

The UK Environment Agency provides a website with specific advice and support to key sectors to help them build resilience to climate change, particularly on water resources and environment, coastal erosion, and floods¹⁹²⁰.

UKCIP's website¹⁹²¹ offers a wide set of tools, information, and other contents to support organisations, sectors and governments to adapt to the changing climate through practice-based research, and by providing direct support and advice.

Targeted information is available for Scotland via Adaptation Scotland¹⁹²², which offers free access to data on climate trends and their impacts in Scotland, as well as access to tools, guidance and advice on adapting to the impacts. Sniffer¹⁹²³, a third sector organisation, delivers the Adaptation Scotland Programme offering free access to data on climate trends and access to tools, guidance and advice on adaptation.

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / In progress / No

Several initiatives in the UK contribute to build capacity across the UK amongst a range of audiences and actors.

Climate UK, until the end of 2016, operated for five years as a sub-national network of climate change partnerships to support local organisations to manage their climate risks and respond to opportunities. The network covered England, Wales, Scotland and Northern Ireland. It shared knowledge and lessons learned about tackling the consequences of climate change in the UK. Although Climate UK Community Interest Company (CIC) will cease operations, the informal Climate UK network, which existed for more than 10 years prior to

¹⁹¹⁸ Met Office: International climate services. URL: <http://www.metoffice.gov.uk/services/climate-services>. Date accessed: 11/05/2018.

¹⁹¹⁹ Met Office: Climate service UK. URL: <http://www.metoffice.gov.uk/services/climate-services/climate-service-uk>. Date accessed: 11/05/2018.

¹⁹²⁰ Environment Agency: Flood and coastal erosion risk management research development. URL: <http://evidence.environment-agency.gov.uk/FCERM/en/Default/FCRM.aspx>. Date accessed: 11/05/2018.

¹⁹²¹ UKCIP: Supporting effective climate adaptation. URL: <http://www.ukcip.org.uk/>. Date accessed: 11/05/2018.

¹⁹²² Adaptation Scotland, URL: <https://www.adaptationscotland.org.uk/>. Date accessed: 04/05/2018.

¹⁹²³ Sniffer, URL: www.sniffer.org.uk. Date accessed: 04/05/2018.

the establishment of the CIC, will continue. Other local partnerships and networks have been brought into the fold, and opportunities for knowledge sharing and collaboration continue.

England & reserved matters: Until the end of March 2016, UK Government funded EA to provide a CRSS¹⁹²⁴ for England which supported organisations in adapting to climate change. By 2016, the majority of NAP actions to which the CRSS was contributing were either complete or ongoing without the need for further support from the service. The CRSS produced or supported a range of tools and products to help organisations in preparing for climate change.

Natural England and the Royal Society for the Protection of Birds, in partnership with the CRSS and the Forestry Commission, published the 'Climate change adaptation manual: evidence to support nature conservation in a changing climate' to support conservation practitioners in adapting to climate change¹⁹²⁵.

UK Government supported LWEC to develop Climate Change Impact Report Cards¹⁹²⁶. There are report cards on Biodiversity, Water, Agriculture & Forestry, Health and Infrastructure, with more in development. The cards provide a summary of the latest scientific research on the impacts of climate change on the UK. This work is now taken forward by LWEC's successor, the RIDE Forum.

The NAP recognises the concerns of long-term investors, such as pension and insurance providers, that there is insufficient understanding of the effects of climate change risk on future economic growth. The NAP plans to work with these investors to explore further research needs around how investments and insurance sectors may take into account climate risks and what opportunities exist to support the sectors in managing them, from 2015.

The NAP also recognises the Government's role in helping businesses to understand the potential risks and opportunities through capacity building, awareness raising, developing and disseminating tools and guidance, and encouraging businesses to review their strategic frameworks and models.

Scotland: Adaptation Scotland offers free access to the best available data on climate trends and their impacts in Scotland, as well as access to tools, guidance and advice on adapting to the impacts. Adaptation Scotland provides the latest information to support adaptation planning and action, including past climate trends and future climate projections.

¹⁹²⁴ Environment Agency: Climate Ready. URL: <http://webarchive.nationalarchives.gov.uk/20140328084915/http://www.environment-agency.gov.uk/research/137557.aspx>. Date accessed: 11/05/2018 [website archived]

¹⁹²⁵ Natural England et al., 2015, Climate Change Adaptation Manual - Evidence to support nature conservation in a changing climate. URL: <http://publications.naturalengland.org.uk/publication/5629923804839936>. Date accessed: 11/05/2018.

¹⁹²⁶ RIDE Forum – Climate change impacts report cards, URL: <https://nerc.ukri.org/research/partnerships/ride/lwec/report-cards/>. Date accessed: 04/05/2018.

Wales: The Welsh Government's Knowledge Transfer Programme¹⁹²⁷ was established as a key exchange process between the Welsh Government and its key stakeholders in Wales. Its aims were to build resilience against the impacts of climate change through the exchange of knowledge, skills and resources, whilst understanding stakeholder's needs and requirements to enable effective action against the impacts of climate change. The programme has focused on how to embed adaptation within organisations and developed tools and resources to help sectors and organisations adapt to the impacts of climate change. The new adaptation plan will include strategic action in this area, building on the lessons from this work.

Northern Ireland: DAERA funds and works with Climate NI to build adaptation capacity e.g. through information dissemination workshops and seminars. Climate NI is dedicated to increasing adaptation awareness and understanding across sectors and equipping these sectors with the information that they need for climate adaptation. It provides a primary point of contact and delivers a vital link to local government, the environmental Non-Government Organisations, businesses and other sectors acting as a conduit of information between these sectors and central government.

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

England & reserved matters: The NAP sets out actions that leading businesses, councils and communities, as well as the Government, are taking to tackle climate threats and take advantage of new opportunities. It aligns the risks identified in the CCRA to actions being undertaken or to be undertaken and the timescales according to each theme. This covers buildings and infrastructure, health and emergency services, the natural environment, businesses and the agriculture and forestry sectors. Geographical issues are considered, for instance, in relation to agriculture and fisheries.

Scotland: The first SCCAP (2014)¹⁹²⁸ aims to increase the resilience of Scotland's people, environment and economy to the impacts of climate change. Over 130 impacts on Scotland have been identified. While the majority of these represent potential threats for Scotland, some present potential opportunities. The impacts vary in character and whilst some have been quantified, others rely on expert elicitation or a narrative based on literature. This information and other data, where available, has been used to inform those impacts that the Scottish Government considers require early adaptation action¹⁹²⁹. The Scottish Government

¹⁹²⁷ Welsh Government Knowledge Transfer Programme, URL: <https://gov.wales/topics/environmentcountryside/climatechange/knowledge-transfer-programme/?lang=en>. Date accessed: 04/05/2018.

¹⁹²⁸ Scottish Government, 2014, Climate Ready Scotland Scottish Climate Change Adaptation Programme. URL: <http://www.gov.scot/Publications/2014/05/4669>. Date accessed: 11/05/2018.

¹⁹²⁹ Scottish Government, 2014, Climate Ready Scotland Scottish Climate Change Adaptation Programme. URL: <http://www.gov.scot/Publications/2014/05/4669>. Date accessed: 11/05/2018.

published a non-statutory Adaptation Framework in 2009, accompanied by 12 Adaptation Sector Summaries, followed by updated Sector Action Plans in 2011.

Wales: The Adaptation Delivery Plan¹⁹³⁰ sets out the specific policies and programmes expected to be implemented in delivering the Adaptation Framework. There were 24 actions in the first edition of the Delivery Plan addressing the following categories:

- Strategic actions
- Natural environment
- Infrastructure
- Communities
- Health
- Business and tourism

In light of the evidence on risk contained in the second CCRA, and the new legislative framework established by the Well-being of Future Generations Act, a new Adaptation Plan for Wales is being developed.

Northern Ireland: To take account of cross-cutting issues to the climate change risks and opportunities being brought forward in the Adaptation Programme, four primary areas for action were identified:

- Flooding
- Water
- Natural Environment; and
- Agriculture and Forestry

DAERA is currently working on obtaining Northern Ireland adaptation information and data that could be used, along with the findings of the CCRA Northern Ireland Summary, in the development of the next Northern Ireland Adaptation Programme, which is due to be laid in the Northern Ireland Assembly in 2019.

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

England & reserved matters: The NAP addresses the risks identified as most urgent. The NAP document is supported by the economic annex 'Economics of the NAP' (HM Government, 2013)¹⁹³¹, which builds on the CCRA and the Project 'The Economics of

¹⁹³⁰ Welsh Assembly Government, 2011, Climate Change Strategy for Wales: Adaptation Delivery Plan. URL: <http://gov.wales/docs/desh/publications/101006ccstratdeliveryadaptationen.pdf>. Date accessed: 11/05/2018.

¹⁹³¹ HM Government, 2013, The National Adaptation Programme: Making the country resilient to a changing climate. URL:

Climate Resilience' (Frontier Economics Ltd, 2012)¹⁹³². This annex outlines the roles of society and the Government in adaptation efforts, the challenges of uncertainty, the costs and benefits of climate change, and the impacts of climate change on productivity and growth. It also provides recommendations on where future economic research work should focus attention.

An analytical framework for assessment was developed within the work on the Economics of Climate Resilience¹⁹³³. The work was advised by an expert panel and benefited from input collected from around 200 semi-structured interviews with stakeholders across industry, the voluntary sector, the health service, local authorities, scientists, policy-makers, Non-Government Organisations, Non-Departmental Public Bodies, academia, researchers, trade associations and regulators, among others.

Scotland: Assessment of options included an economic assessment of adaptation options in relation to those risks highlighted by the CCRA.

Wales: The Adaptation Framework states that the guidance provided does not prescribe a specific methodology for assessing risk or for developing a programme of adaptation measures. It seeks to inform reporting authorities about climate adaptation and to support related planning processes. The guidance is intended to help reporting authorities develop a structured approach to adaptation.

Additional guidance was published to support investment decisions concerning flood and coastal risk management measures (Natural Resources Wales, 2018)¹⁹³⁴.

Northern Ireland: Stakeholder consultations with all departments and engagement with external stakeholders has identified the priority adaptation options for Northern Ireland from the UK CCRA.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / In progress / No

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/209866/pb13942-nap-20130701.pdf. Date accessed: 11/05/2018.

¹⁹³² Frontier Economics Ltd, 2012, Economics of Climate Resilience (ECR) - CA0401. URL: <http://randd.defra.gov.uk/Default.aspx?Module=More&Location=None&ProjectID=18016>. Date accessed: 11/05/2018.

¹⁹³³ HM Government, 2013, The National Adaptation Programme Report: Analytical Annex. Economics of the National Adaptation Programme. URL: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/209867/pb13942a-nap-annex-economics.pdf. Date accessed: 11/05/2018.

¹⁹³⁴ Natural Resources Wales, 2018, Adapting to Climate Change: Guidance for Flood and Coastal Erosion Risk Management Authorities in Wales. URL: <https://gov.wales/topics/environmentcountryside/epq/flooding/nationalstrategy/guidance/climateguide/?lang=en>. Date accessed: 11/05/2018.

The Natural Hazards Partnership is the public-sector body responsible for the development of the UK risk register and ensuring that adaptation actions are considered within the modelled data to inform it¹⁹³⁵.

The NAP's Chapter 4 'Healthy and resilient communities' defines a series of objectives (11 to 14) to develop mechanisms to further link and coordinate disaster risk management with adaptation. An assembly of actions aims to enhance the preparation of communities and individuals to cope with severe weather events and other impacts of climate change, and the resilience of emergency services and local capability to be resilient to a changing climate. This chapter, explicitly links to other NAP elements (Chapter 2 on the built environment and Chapter 6 on the natural environment), aims at improving the prevention, preparedness and emergency management capacity in relation to weather and climate events, including consideration of a shift in their frequency and intensity. Health risks from changing weather patterns, extreme events (extreme temperatures, wildfires, drought, cold snaps, floods), and a focus on the most vulnerable communities, are the pillars of Chapter 4. Actions to achieve them involve the health sector, a Cabinet Office-chaired cross-government Communities Prepared National Group, the local resilience forums, the communities and civil society groups, the emergency planning and civil protection institutions and the emergency services (ambulance, fire and rescue services).

Flood insurance is recognised as a key tool to help households manage the potential consequences of extreme events linked to climate change. The Government is committed to ensuring the continued availability and affordability of flood insurance to high-risk households. There is a specific NAP action that aims to secure new arrangements for flood insurance beyond 2013, which was followed up by a number of recommendations in the first ASC progress report of the NAP in 2015. The ASC report included future strategies and recommendations on Flood Re, a recent public-private initiative that became operational. Flood Re could potentially become more relevant to incentivising climate adaptation in the future.

The Platform for Climate Adaptation and Risk reduction (HO2020 PLACARD) project 2015-20 aims to support the coordination of climate adaptation and disaster risk reduction communities by:

- 1) Providing a common 'space' where climate adaptation and disaster risk reduction communities can come together, share experiences and create opportunities for collaboration
- 2) Facilitating communication and knowledge exchange between both communities; and
- 3) Supporting the coordination and coherence of climate adaptation and disaster risk reduction research, policy and practice.

¹⁹³⁵ Natural Hazards Partnership: Who are we? URL: <http://www.naturalhazardspartnership.org.uk/about-us/who-are-we/>. Date accessed: 01/06/2018.

UKCIP is one of the original proponents of PLACARD, with a commitment to second the lead proponent (FFCUL) and play a leading or key role in a number of the work packages (WP):

- WP1: Setting up an interchange platform for multi-stakeholder dialogue involving researchers, policy-makers and practitioners in climate adaptation and disaster risk reduction – shaping the climate adaptation and disaster risk reduction research and innovation agenda (led by UKCIP); supporting climate adaptation and disaster risk reduction institutions and networks (led by UKCIP)
- WP5: Reflecting on, evaluation and learning from the PLACARD project – evaluation and learning (led by UKCIP)
- WP6: Includes developing and evaluating the PLACARD communication and dissemination plan (led by UKCIP)

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / **In progress** /No

It is apparent that funding is available to increase climate resilience based on the progress reported of implemented actions (see Indicator 10a). However, there is no comprehensive information source setting out funding accessed, and available funding at a UK level or at the level of the devolved administrations.

While a specific budget is not attached to the current NAP at a UK level, the Government provides funding for developing the UK Climate Projections, the national climate change risk assessment (including the national perspectives)¹⁹³⁶, the maintenance of the ASC, the climate services websites, and other research and cross-cutting actions needed to implement the respective NAPs and coordinate action nationally¹⁹³⁷. Funding is also available through a number of funding mechanisms for improved climate resilience, primarily where climate risks are taken into account as part of wider funding mechanisms. For example, the Industrial

¹⁹³⁶ Almost £1.5 million was spent on CCRA2. CCRA2 was carried out by the Adaptation Sub-Committee of the UK Committee on Climate Change, an independent expert body advising the UK Government on adaptation. This, along with lessons learned from the first CCRA1, brought considerable efficiencies and savings compared to CCRA1 delivering much greater value for money. CCRA2 focused on a smaller number of prioritised key risks. The innovative urgency framework used in CCRA2 to prioritise risk and opportunities and translate into recommendations for government was found to be a more useful and effective way to communicate results than CCRA1. The research carried out was funded largely by an additional contribution from the Natural Environment Research Council of £400k.

¹⁹³⁷ CCC, 2016, UK Climate Change Risk Assessment Evidence Report 2016. Method document, Version 1.0. URL: <https://documents.theccc.org.uk/wp-content/uploads/2014/12/CCRA-METHOD-V1-0.pdf>. Date accessed: 11/05/2018.

Strategy¹⁹³⁸ and the Strength in Places Fund (£115 million) support research and innovation in local networks with a component examining climate change and resilience to extreme weather events; and the flood risk management strategy also disburses funds for reducing flood risk (£3 billion).

In addition, the Government Chief Scientific Advisor's Environmental Observations Committee was set up in 2013. Its aim is to ensure that appropriate funding mechanisms are in place for priority programmes and that a coherent and robust environmental monitoring infrastructure exists to meet national needs, including to secure sustained funding for long-term observation activities.

England & reserved matters: Limited information concerning resource allocation was reported in the 2017 progress report. Significant resources have been made available for flood protection infrastructure and capacity building with £2.6 billion allocated between 2017 and 2023 in flood and coastal erosion risk management (CCC, 2017)¹⁹³⁹.

The 2017 progress report acknowledges that there will be implications for funding because of the UK leaving the EU, indicating that the European Structural Investment Funds are an important source of funding. However, no details concerning this source of funding are provided in the report.

Scotland: The Scottish Government currently funds adaptation through:

- The development of a robust evidence base, such as Government research programmes;
- Scottish Government funding of Adaptation Scotland to develop adaptive capacity; and
- Policy-specific actions, such as the development of River Basin Management Plans through SEPA

Wales: The Welsh Government's funding of climate adaptation is distributed across various portfolios. Flood and Coastal Risk Management is a priority investment area for the Welsh Government, announcing an investment of over £54 million across Wales over a four-year time period. The investment is planned to facilitate effective planning and provide certainty of funding from one year to the next. The Coastal Risk Management Programme provides the opportunity for local authorities to invest up to £150 million in coastal infrastructure protecting Welsh coastal communities, adapting to the challenge of climate change and sea-level rise and achieving wider benefits.

¹⁹³⁸ HM Government, 2017, Industrial Strategy: Building a Britain fit for the future. URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664563/industrial-strategy-white-paper-web-ready-version.pdf. Date accessed: 11/05/2018.

¹⁹³⁹ CCC, 2017, Progress in preparing for climate change. 2017 Report to Parliament. URL: <https://www.theccc.org.uk/wp-content/uploads/2017/06/2017-Report-to-Parliament-Progress-in-preparing-for-climate-change.pdf>. Date accessed: 11/05/2018.

Northern Ireland: The Government funds adaptation through policy specific actions such as the development and delivery of Flood Risk Management Plans, River Basin Management Plans, conservation management plans etc. The Government (DAERA) funds and works with Climate NI to increase adaptation awareness and understanding across sectors and equipping these sectors with the information they need to adapt to climate change. Climate NI also promotes and supports adaptation engagement and climate resilience capacity building within NI across all sectors.

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

The transposition of SEA Directive 2001/42/EC and the Environmental Impact Assessment (EIA) Directive 2014/52/EU are devolved matters in the UK and each of the devolved administrations is responsible for preparing its own regulations. The requirements of these directives have been transposed to the following pieces of legislation and accordingly stipulate that an EIA shall identify, describe and assesses climate impacts, among other environmental impacts. Note that in the case of Scotland, one Act covers both directives and extends the legislation of the SEA Directive ‘to cover all qualifying public plans, programmes and strategies’.

- **England:** The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (the ‘2017 Regulations’)¹⁹⁴⁰
- **Scotland:** Environmental Assessment (Scotland) Act 2005¹⁹⁴¹
- **Wales:** The Town and Country Planning (Environmental Impact Assessment (Wales) Regulations 2016¹⁹⁴²; The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004¹⁹⁴³
- **Northern Ireland:** The Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2017¹⁹⁴⁴; The Environmental Assessment of Plans and Programmes Regulations (Northern Ireland) 2004¹⁹⁴⁵. 2004 No. 280

¹⁹⁴⁰ The Town and Country Planning (Environmental Impact Assessment) Regulations 2017. Statutory Instruments 2017, No. 571, Town and Country Planning. URL:

<http://www.legislation.gov.uk/uksi/2017/571/introduction/made>. Date accessed: 11/05/2018.

¹⁹⁴¹ Environmental Assessment (Scotland) Act 2005. 2005 asp 15. URL:

<http://www.legislation.gov.uk/asp/2005/15/contents>. Date accessed: 11/05/2018.

¹⁹⁴² Town and Country Planning (Environmental Impact Assessment (Wales) Regulations 2016. 2016 No.58 (W.28). URL: <http://www.legislation.gov.uk/wsi/2016/58/contents/made>. Date accessed: 11/05/2018.

¹⁹⁴³ The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004. 2004 No. 1656 (W. 170). URL: <http://www.legislation.gov.uk/wsi/2004/1656/contents/made>. Date accessed: 11/05/2018.

¹⁹⁴⁴ The Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2017. Statutory Rules of Northern Ireland. 2017 No. 83, Planning. URL: <http://www.legislation.gov.uk/nistr/2017/83/made>. Date accessed: 11/05/2018.

Guidance on the integration of climate adaptation within the process of developing an EIA is limited. Only guidance developed by the Scottish devolved administration refers to the integration of climate adaptation within the process of developing an EIA (Scottish Natural Heritage, 2018)¹⁹⁴⁶.

A UK practical guide to the SEA Directive was published in 2005, which reflects climate adaptation needs (Office of the Deputy Prime Minister, 2005)¹⁹⁴⁷. It identifies how climate adaptation should be factored into planning (and specifies appropriate timescales). The guide lists sources of information to inform the development of the baseline used in the assessment and sets out indicators that could be used to quantify the baseline and monitor project impacts.

Further guidance for England and Wales was published in 2011, building on the 2005 guidance (Environment Agency, 2011)¹⁹⁴⁸. It provides more detail on the processes involved in SEA development and how climate adaptation could be considered in the various processes. Similarly, additional guidance for Scotland was published in 2010 (Scottish Government, 2010)¹⁹⁴⁹. It provides step-by-step guidance for the complete process, from screening, scoping, assessment, adoption to monitoring. It also sets out how climate adaptation could be considered in the various processes of SEA development.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / No

In accordance with the Civil Contingencies Act (2004), the UK Government publishes a National Risk Register of Civil Emergencies every five years to assess the risks of civil emergencies facing the country. Although the Civil Contingencies Act, from 2004, has not been modified to address the effects of climate change, risk assessments in the UK are required to respond quickly to changes in the risk environment, including climate change. In this context, climate change is recognised as a major concern that should be regularly

¹⁹⁴⁵ The Environmental Assessment of Plans and Programmes Regulations (Northern Ireland) 2004. 2004 No. 280. URL: <http://www.legislation.gov.uk/nisr/2004/280/contents/made>. Date accessed: 11/05/2018.

¹⁹⁴⁶ Scottish Natural Heritage, 2018, Environmental Impact Assessment Handbook. URL: <https://www.nature.scot/sites/default/files/2018-05/Publication%202018%20-%20Environmental%20Impact%20Assessment%20Handbook%20V5.pdf>. Date accessed: 11/05/2018.

¹⁹⁴⁷ Office of the Deputy Prime Minister, 2005, A Practical Guide to the Strategic Environmental Assessment Directive. Practical guidance on applying European Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment. Scottish Executive; Welsh Assembly; Department of the Environment, Northern Ireland; and Office of the Deputy Prime Minister. URL: <https://gov.wales/docs/desh/policy/150616-a-practical-guide-to-the-sea-directive-en.pdf>. Date accessed: 11/05/2018.

¹⁹⁴⁸ Environment Agency, 2011, Strategic environmental assessment and climate change: guidance for practitioners. URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/297039/geho0811buca-e-e.pdf. Date accessed: 11/05/2018.

¹⁹⁴⁹ Scottish Government, 2010, Consideration of Climatic Factors within Strategic Environmental Assessment (SEA). URL: <http://www.gov.scot/Publications/2010/03/18102927/0>. Date accessed: 11/05/2018.

reviewed in risk assessments (Cabinet Office, 2006)¹⁹⁵⁰. The current risk register (Cabinet Office, 2015)¹⁹⁵¹ factors in climate change projections and climate-related impacts based on historic events to identify anticipated consequences affecting the UK's capacity to respond to identified risks.

Other disaster risk related frameworks have been revised to integrate the effects of climate change. The Health and Social Care Act (2012) focuses on local planning and decision-making for setting and delivering local health priorities. Some basic tools include the Joint Strategic Needs Assessments (JSNAs) and subsequent strategies produced by health and wellbeing boards. The Statutory guidance on JSNAs and Joint Health and Wellbeing Strategies (JHWSs), produced by the Department of Health, demands consideration of the impacts of climate change when preparing them.

Two key risks identified for the UK are specifically addressed through national frameworks. The Heatwave Plan for England (2004) was revised in 2014 to better address the risks of climate change, including preparedness, alert and readiness. It has continued to be reviewed every year since 2014. The Flood and Water Management Act 2010 requires the preparation of national and local strategies for flood risk management, which have to consider the risks of climate change. The National Flood and Coastal Erosion Risk Management Strategy includes long-term planning, avoidance of inappropriate development in high risk areas, improved flood management infrastructure, increased public awareness and improved flood detection/warning.

The respective NAPs also comprehend several measures to reduce risks, complementary to the main disaster risk management regulations, to reduce climate risks, including spatial planning (see Indicator 8c), housing design, or the maintenance of performance of flood defences in the light of climate change impacts.

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / No

England & reserved matters: Support for the transition to a low carbon future in a changing climate is one of the core land-use planning principles set out in the National Planning Policy Framework (NPPF) for England¹⁹⁵². The principles are expected to underpin both plan-making and decision-taking, covering both land-use and marine planning decisions. Local

¹⁹⁵⁰ Cabinet Office, 2006, Emergency preparedness. Guidance on part 1 of the Civil Contingencies Act 2004, its associated regulations and non-statutory arrangements (Chapter 19, paragraph 19.9). URL: <https://www.gov.uk/government/publications/emergency-preparedness>. Date accessed: 11/05/2018.

¹⁹⁵¹ Cabinet Office, 2015, National Risk Register of Civil Emergencies. 2015 edition. URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/419549/20150331_2015-NRR-WA_Final.pdf. Date accessed: 11/05/2018.

¹⁹⁵² Ministry of Housing, Communities and Local Government, 2012, National Planning Policy Framework. URL: <https://www.gov.uk/guidance/national-planning-policy-framework/10-meeting-the-challenge-of-climate-change-flooding-and-coastal-change>. Date accessed: 11/05/2018.

authorities are expected to adopt proactive strategies to adapt to climate change in their Local Plans in line with the provisions and objectives of the CCA. They should co-operate with neighbouring authorities and other bodies to deliver cross-boundary strategic priorities, including climate adaptation. The Local Plan will need to reflect these requirements and enable the delivery of sustainable development in accordance with the policies in the NPPF, if it is to be found 'sound' at examination and before it can be adopted by the local authority. Neighbourhood plans must be in general conformity with the strategic policies of the Local Plan and should help achieve the sustainable development needed in their local area.

In addition to the statutory requirement to take the NPPF into account in the preparation of Local Plans, there is a statutory duty on local planning authorities to include policies in their Local Plan designed to contribute to adaptation to climate change. This complements the sustainable development duty on plan-makers. The NPPF recognises that responding to climate change is part of the economic, social and environmental dimensions of sustainable development. Guidance to Local Enterprise Partnerships (LEPs) were also developed to ensure that adaptation is embedded in local strategies (Ministry of Housing, Communities and Local Government, 2014)¹⁹⁵³ (Ministry of Housing, Communities and Local Government, 2014)¹⁹⁵⁴.

Scotland: The Climate Change (Scotland) Act 2009 requires Scotland to establish a national land-use strategy for sustainable land use (mindful of climate adaptation needs). At a national level, Scotland's Second Land Use Strategy sets out land-use policy for 2016-2021, covers objectives, principles and indicators for sustainable land use in business, the environment, and communities.¹⁹⁵⁵

Marine spatial planning is carried out at national and regional levels and closely linked to sectoral and terrestrial planning. Climate adaptation is inherent to all levels of planning¹⁹⁵⁶. However, a recent review reported that a conflict in planning between oil and gas and climate change has led to strategic ineffectiveness at times between 2015 and 2018 (Scottish Government, 2018)¹⁹⁵⁷.

Wales: Wales has adopted a plan-led system to land-use planning, which is carried out through up-to-date Local Development Plans. Detailed guidance is available to support land-use planning in Wales. Climate adaptation is one of the founding principles of the policy and features throughout the guidance along with a targeted section to explain the rationale and to

¹⁹⁵³ Ministry of Housing, Communities and Local Government, 2014, Guidance: Climate Change. URL: <https://www.gov.uk/guidance/climate-change>. Date accessed: 11/05/2018.

¹⁹⁵⁴ Ministry of Housing, Communities and Local Government, 2014, Guidance: Climate Change. URL: <https://www.gov.uk/guidance/climate-change>. Date accessed: 11/05/2018.

¹⁹⁵⁵ Scottish Government, 2016, Getting the best from our land: A land use strategy for Scotland 2016-2021. URL: <http://www.gov.scot/Publications/2016/03/5773/0>. Date accessed: 11/05/2018.

¹⁹⁵⁶ Marine (Scotland) Act 2010 (asp 5). URL: http://www.legislation.gov.uk/asp/2010/5/pdfs/asp_20100005_en.pdf. Date accessed: 11/05/2018.

¹⁹⁵⁷ Scottish Government, 2018, National Marine Plan Review 2018: Three Year Report on the implementation of Scotland's National Marine Plan (encompassing inshore and offshore waters). URL: <http://www.gov.scot/Publications/2018/03/2751>. Date accessed: 11/05/2018.

signpost to the relevant chapters in the guidance (Welsh Government, 2016)¹⁹⁵⁸. The Welsh Government is also working on the production of a National Development Framework (NDF). The NDF will set out a 20-year land-use framework for Wales and will replace the current Wales Spatial Plan. The NDF includes consideration of climate impacts.

The first national marine plan for Wales is under development; the draft report was released in March 2018 and a public consultation was subsequently conducted. Climate adaptation is embedded in the plan in relation to improving resilience of marine ecosystems and species and to coastal change and flooding. (Welsh Government, 2018)¹⁹⁵⁹

Northern Ireland: Regional guidelines for climate adaptation in land-use planning are defined in the Regional Development Strategy 2035 (RDS) (Department for Infrastructure, 2012)¹⁹⁶⁰. The RDS includes a spatial framework, which is designed according to sectors and geography, guidance at regional and sectoral levels, the identification of regionally significant economic infrastructure and an implementation plan. Furthermore, the Strategic Planning Policy Statement (SPPS), which is in general conformity with the RDS and was published in September 2015, provides that the planning system can further sustainable development by mitigating and adapting to climate change, whilst improving air quality. The SPPS is a strategic planning policy framework for the reformed two-tier planning system, which became operational on 1 April 2015. The SPPS must be taken into account in the preparation of Local Development Plans and by individual planning applications and appeals. The development and publication of the SPPS fulfils a commitment to build the resilience of the built and natural environment and to develop and implement sustainable strategies to explore, address and manage significant flood risk. The SPPS applies to the whole of Northern Ireland.

At the local level, all of Northern Ireland's 11 local councils are, currently, developing and preparing new local development plans to embed the plan-led system introduced by the Planning Act (Northern Ireland) 2011. It is expected that these plans will assist with the delivery of the Northern Ireland Executive's priorities, including the RDS and SPPS.

The first national marine plan for Northern Ireland is under development; the draft report was released in April 2018 and a public consultation was launched at the same time (18 April – 15 June 2018). Climate adaptation is embedded in the plan in relation to improving resilience of marine ecosystems and species and to coastal change and flooding (DAERA, 2018)¹⁹⁶¹.

¹⁹⁵⁸ Welsh Government, 2016, Planning Policy Wales. URL: <https://gov.wales/docs/desh/publications/161117planning-policy-wales-edition-9-en.pdf>. Date accessed: 11/05/2018.

¹⁹⁵⁹ Welsh Government, 2018, Draft Welsh National Marine Plan. URL: <https://beta.gov.wales/sites/default/files/consultations/2018-02/draft-plan-en.pdf>. Date accessed: 11/05/2018.

¹⁹⁶⁰ Department for Regional Development, 2012, Regional Development Strategy. URL: <https://www.infrastructure-ni.gov.uk/sites/default/files/publications/infrastructure/regional-development-strategy-2035.pdf>. Date accessed: 11/05/2018.

¹⁹⁶¹ DAERA, 2018: Consultation on the proposed Marine Plan. URL: <https://www.daera-ni.gov.uk/consultations/consultation-proposed-marine-plan>. Date accessed: 15/05/2018.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / In progress / No

England & reserved matters: The NAP promotes sectoral adaptation. The Government's policy has been to embed adaptation consideration into all relevant policies, and the NAP sets out the roles of the key government departments and their respective delivery bodies and partners. The most relevant policy instruments are identified, and the ways that they already promote adaptation (or actions to ensure that they will in the near future) are described. Adaptation is embedded as a consideration across the UK Government with coordination from the Domestic Adaptation Board. The Defra Climate Ready programme chaired the Domestic Adaptation Board and co-ordinated the UK Government's work on adaptation in England, and throughout the UK on a range of reserved matters. Defra policy officials continue this role.

Scotland: A senior cross-government Climate Change Delivery Board and Sector Action Plans assist in mainstreaming adaptation across policy areas. By providing co-ordination across boundaries of organisations' responsibilities, this encourages both private and public action and can ensure a long-term approach to public goods, such as natural resource protection. Co-ordination is provided through:

- Development of key national strategies, such as the Land Use Strategy and the National Planning Framework
- Establishment of forums such as the Rural Land Use Study; and
- Support of consistent public-sector advice through Adaptation Scotland

Wales: The Well-being of Future Generations (Wales) Act 2015 establishes the framework for integrating considerations of climate change into policy development and delivery across sectors. During policy development, there must be consideration of future climate trends, alongside other significant national and global trends identified in the Future Trends Report. Policies should be designed to maximise their contribution to the national well-being goals, thereby incorporating climate resilience into policy design.

At the time of reporting, work is also underway in Wales to develop a National Development Framework, which will establish a 20-year land-use planning system, nationally, regionally and locally, across sectors. Adaptation to climate change will be an underpinning consideration to the framework¹⁹⁶².

Northern Ireland: A Cross-Departmental Working Group on Climate Change has been established to facilitate the development of the government's climate change adaptation

¹⁹⁶² Welsh Government, 2017, National Development Framework for Wales. URL: <http://gov.wales/topics/planning/national-development-framework-for-wales/?lang=en>. Date accessed: 11/05/2018.

programme (policies and actions). This has been further driven by “the Northern Ireland Civil Service Work Programme’s Outcome 2”: “We live and work sustainably - protecting the environment”. This outcome is aligned with the Government’s commitment to implementing Goal 13 of the UN 2030 Sustainable Development Goals, which requires urgent action to combat climate change and its impacts. As a contribution to the delivery of Outcome 2 beyond government, DAERA funds and works closely with Climate Northern Ireland to ensure promotion of climate adaptation actions across all sectors, including awareness raising, climate change risk management, and responding to opportunities.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

Adaptation is not yet mainstreamed into insurance or other policy instruments incentivising investments in risk prevention, but the NAP contains significant elements that will facilitate integration in the short term. On incentives, one of the key declared drivers of the NAP is that, while it is important for the Government to help remove barriers to action, policy should be developed in such a way that it does not crowd out private investment in adaptation and keeps a clear focus on cost-effectiveness.

Flood insurance is recognised as a key tool to help households and private businesses manage the potential consequences of extreme events linked to climate change. Accordingly, the Government is committed to ensuring the continued availability and affordability of flood insurance to high-risk households. One of the NAP actions with this aim is securing new arrangements for flood insurance beyond 2013. It was followed up by a number of recommendations in review of the NAP progress by the ASC in 2015, including future strategies and recommendations on Flood Re, a recent public-private initiative that became operational¹⁹⁶³.

Flood Re is an important instrument, but not considered to convincingly incentivise adaptation. As part of Flood Re's transition plan, there are proposals to encourage households to better protect their properties, so that the chance of needing to make a claim is reduced. The aim is to allow insurance to remain available and affordable without the need for ongoing subsidies”¹⁹⁶⁴.

¹⁹⁶³ HM Government, 2015, Government response to the Committee on Climate Change. Progress on preparing for climate change (pp. 13, 14 and 18). URL: https://www.theccc.org.uk/wp-content/uploads/2015/10/DECC_CCC_Adaptation.pdf. Date accessed: 11/05/2018.

¹⁹⁶⁴ CCC, 2016, Scottish Climate Change Adaptation Programme: An independent assessment for the Scottish Parliament. Committee on Climate Change September 2016 (p.87). URL: <https://www.theccc.org.uk/wp-content/uploads/2016/09/Scottish-Climate-Change-Adaptation-Programme-An-independent-assessment-CCC-September-2016.pdf>. Date accessed: 11/05/2018.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In progress** / No

There are many sectoral policy instruments that have driven adaptation actions since integration of the consideration of climate change risks across all relevant instruments is part of the UK's approach to adapting to climate change. Examples of national plans at sector level include:

- The Government's strategic policy statements to sector regulators for water¹⁹⁶⁵ that place long-term resilience at the centre of business planning, influencing over £40 billion of water company investment in water and wastewater services
- A Forestry Sector Climate Change Working Group, established in 2015, which is working towards publishing an Action Plan for Forestry and Climate Change Adaptation in the UK¹⁹⁶⁶.

Furthermore, the respective adaptation programmes for England, Wales, Scotland and Northern Ireland define policies and measures to be implemented at several levels and identifies the actors to implement each of them. Each adaptation programme has a time horizon of five years, and provides tables identifying the timing for every action. Annual progress reports for the respective adaptation programmes indicate that many of the actions have been or are being implemented already (some were in place before the adoption of the adaptation programmes). The second NAP will provide information at sector level concerning all major infrastructure sectors and annual progress reports will continue to monitor implementation progress of the adaptation programmes.

England & reserved matters: A total of 51% of the actions included in the NAP were assessed as complete in 2017 and 35% were on track for completion (CCC, 2017)¹⁹⁶⁷.

Scotland: According to the 2016 ASC review of the SCCAP "Across the three themes of the SCCAP, policies and plans are generally in place and, other than in a few isolated cases, actions are taking place. However, evidence of progress being made is mixed."

¹⁹⁶⁵ Defra, 2017, The Government's strategic priorities and objectives for Ofwat. URL:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/661803/sps-ofwat-2017.pdf. Date accessed: 11/05/2018.

¹⁹⁶⁶ BEIS, 2017, 7th National Communication. Chapter 5 – Vulnerability assessment, climate change impact and adaptation measures. URL:

[http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/19603845_united_kingdom-nc7-br3-1-gbr_nc7_and_br3_with_annexes_\(1\).pdf](http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/19603845_united_kingdom-nc7-br3-1-gbr_nc7_and_br3_with_annexes_(1).pdf). Date accessed: 11/05/2018.

¹⁹⁶⁷ CCC, 2017, Progress in preparing for climate change. 2017 Report to Parliament. URL:

<https://www.theccc.org.uk/wp-content/uploads/2017/06/2017-Report-to-Parliament-Progress-in-preparing-for-climate-change.pdf>. Date accessed: 11/05/2018.

Furthermore, the review noted that “Objectives in support of climate adaptation are established in each of the SCCAP’s three themes, and almost all of the 148 policies and proposals mentioned in the programme are reported to be completed or “on track”.”¹⁹⁶⁸

Wales: To date there has not been an independent assessment of the country’s resilience to climate risks. However, the Welsh Government is reviewing implementation of actions in the 2010 Climate Change Adaptation Delivery Plan to ensure that they are taken forward, as appropriate, in the new plan.

Northern Ireland: An evaluation of the progress made to date is underway and the evaluation report will be included in Northern Ireland’s next Adaptation Programme due for publication in 2019.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / No

The respective NAPs identify and describe actions and proposals that are the responsibility of the Government and of other institutions outside the Government, such as local government, industry, communities and civil society. The NAPs also identify actions where several institutions have to be involved.

Across the devolved administrations, specific organisations have been established to facilitate cooperation. In Scotland, there are Community Planning Partnerships¹⁹⁶⁹ and the Scottish Climate Change Impacts Partnership, which help local stakeholders in local adaptation planning. In Wales, PSBs have been established to foster a collaborative approach to addressing local priorities¹⁹⁷⁰. While in Northern Ireland, an Adaptation Programme has been established to encourage adaptation responsibilities throughout society, including district councils.

In addition, the UK facilitates regional coordination through several initiatives including Core Cities. This group represents the UK’s 10 core cities, excluding London, and aims to unlock their full potential to create a stronger, fairer economy and society. Sub-nationally, Core Cities are active around adaptation. Core Cities collaborate at officer level (the Climate Resilience and Adaptation working group) and feed activity and learning up into the Core Cities Climate Low Carbon, Energy and Resilience Policy Hub and ultimately to the cabinet and chief executive levels. There have been some good examples of progress against NAP

¹⁹⁶⁸ See Key Messages and Executive Summary for overview: <https://www.theccc.org.uk/wp-content/uploads/2016/09/Scottish-Climate-Change-Adaptation-Programme-An-independent-assessment-CCC-September-2016.pdf>. Date accessed: 11/05/2018.

¹⁹⁶⁹ Community Planning Partnerships are operating in all 32 local authority areas and are responsible for developing and delivering a local development plan for its council area.

¹⁹⁷⁰ National Assembly for Wales, 2014, Well-being of Future Generations (Wales) Bill. URL: <http://www.senedd.assembly.wales/documents/s30083/WFG%2069%20Welsh%20Local%20Government%20Association%20WPGA.pdf>. Date accessed: 11/05/2018.

actions (and core cities principles) within Core Cities, and there are differences sub-nationally in areas where Core Cities operate more as city regions or as individual entities themselves.

As an example of city-level partnerships, the Leeds Climate Commission is a city-wide partnership with membership drawn from over 30 key public, private and third sector organisations. Led initially by the University of Leeds and Leeds City Council, its aim is to bring people and organisations together to shape the transition of Leeds to a low carbon, climate-resilient city and to mirror the strategic priorities of the Government's advisory CCC at a city scale.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / No

Through its Climate Ready Support Service, EA worked with partners to provide targeted advice, helping key sectors increase their resilience to all major climate risks and impacts. The guidance and tools were developed and road-tested with leading companies before being rolled out as a wider scheme. EA worked with a range of businesses/sectors (including land use/management planning sectors, such as forestry, agriculture and the water sector) to provide tools and guidance ranging from a simple business-resilience health-check tool through to full risk assessment methods for more complex aspects, such as understanding supply chain impacts:

- Guidance on business continuity¹⁹⁷¹, making the case for adapting the built environment¹⁹⁷², adaptation for health and social care¹⁹⁷³, the paper and pulp sector¹⁹⁷⁴, the food and drink sector¹⁹⁷⁵, farm business resilience¹⁹⁷⁶, and climate-proofing health and wellbeing strategies¹⁹⁷⁷, adaptation in the natural environment¹⁹⁷⁸, and a quick guide for small and medium-sized businesses¹⁹⁷⁹

¹⁹⁷¹ BSI: Adapting to Climate Change using your Business Continuity Management System. URL: <http://www.bsigroup.com/en-GB/forms/Adapting-to-Climate-Change-using-your-Business-Continuity-Management-System/>. Date accessed: 15/05/2018.

¹⁹⁷² Climate Change Adaptation: Official group of buildings performance. Articles. URL: <https://connect.innovateuk.org/web/climate-change-adaptation/article-view/-/blogs/guidance-for-making-the-case-for-climate-change-adaptation-in-the-built-environment>. Date accessed: 15/05/2018.

¹⁹⁷³ NHS, 2012, Adaptation to Climate Change for Health and Social Care organisations: "Co-ordinated, resilient, prepared.". URL: http://www.sduhealth.org.uk/documents/publications/adaptation_guidance_final.pdf. Date accessed: 11/05/2018.

¹⁹⁷⁴ Climate Ready, 2013, Preparing a climate change action plan: Paper and pulp sector guidance. URL: <http://www.paper.org.uk/documents/EA/Climate%20Ready%20Adaptation%20Guidance%20paper%20and%20pulp%20final%20181113.pdf>. Date accessed: 11/05/2018.

¹⁹⁷⁵ Climate Ready, 2013, Preparing a climate change action plan: Food and drink sector guidance. URL: <http://www.fdf.org.uk/publicgeneral/Climate-Ready-FDF-Adaptation-Guide.pdf>. Date accessed: 11/05/2018.

¹⁹⁷⁶ Farming Advice Service: Managing business risks in a changing climate. URL: <https://vimeo.com/123620498?lite=1>. Date accessed: 15/05/2018.

¹⁹⁷⁷ Climate Ready, 2015, Under the weather: Improving health, wellbeing and resilience in a changing climate. URL: http://www.sduhealth.org.uk/documents/publications/2015/09032015_-_Under_the_weather_-_Climate_Ready_-_version_2_-_Final_Master.pdf. Date accessed: 11/05/2018.

- Tools to better understand social vulnerability and climate change¹⁹⁸⁰, business resilience¹⁹⁸¹ and farm business resilience¹⁹⁸², analyse the costs and benefits of adaptation¹⁹⁸³, project climate change impacts on wetlands¹⁹⁸⁴.

In addition, the UKCIP has produced a range of guidelines over the years¹⁹⁸⁵.

The NAP details actions from the Institute of Environmental Management and Assessment (IEMA), which aim to ensure that climate change implications will be given consideration in all infrastructure works to be implemented from 2013 to 2016. This includes: reviews of IEMA's online hub on EIA and climate change, updating advice resources (information pages and advice notes) and other communication and awareness campaigns (e.g. webinars), and providing guidance on integrating climate change and biodiversity into the EIA and SEA process¹⁹⁸⁶.

The NPPF supports the use of green infrastructure. The Local Government Association (LGA) has recently issued reference guides and resources to help local authorities plan for and provide green infrastructure in developing their local environment in order to reduce and manage climate change impacts in urban areas.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / No

The actors responsible for the implementation of the adaptation actions are prescribed by the respective adaptation programmes. Nearly 100 organisations are listed against actions in the first NAP, many of which cover sectors with many members that would contribute to

¹⁹⁷⁸ Natural England, 2014, Climate Change Adaptation Manual – Evidence to support nature conservation in a changing climate (NE546). URL: <http://nepubprod.appspot.com/publication/5629923804839936>. Date accessed: 11/05/2018.

¹⁹⁷⁹ Defra and Environment Agency, 2013, Climate Week: Be Climate Ready. URL: <http://www.greensuffolk.org/assets/Greenest-County/Business/General-Files/Be-Climate-Ready-Guide.pdf>. Date accessed: 11/05/2018.

¹⁹⁸⁰ Climate Just. URL: <http://www.climatejust.org.uk/>. Date accessed: 15/05/2018.

¹⁹⁸¹ Business Resilience Health Check. URL: <http://www.businessresiliencehealthcheck.co.uk/>. Date accessed: 15/05/2018.

¹⁹⁸² Farm Business Resilience Healthcheck. URL: <http://www.farmbusinessresilience.co.uk/>. Date accessed: 15/05/2018.

¹⁹⁸³ Climate Ready, 2014, Business case for adaptation. URL: <http://www.fdf.org.uk/publicgeneral/cost-benefit-analysis-methodology.pdf>. Date accessed: 11/05/2018.

¹⁹⁸⁴ CEH, 2012, New tool helps project the impacts of climate change on wetlands. URL: <http://www.ceh.ac.uk/news-and-media/news/new-tool-helps-project-impacts-climate-change-wetlands>. Date accessed: 11/05/2018.

¹⁹⁸⁵ UKCIP: Decision-making for adaptation exchanging knowledge and ideas. Creative adaptation. URL: <http://www.ukcip.org.uk/publications/>. Date accessed: 15/05/2018.

¹⁹⁸⁶ IEMA, 2015, New EIA Guidance Will Speed Up Planning and Bring Down Costs. URL: <https://www.iema.net/news/news/2015/11/12/new-eia-guidance-will-speed-up-planning-and-bring-down-costs/>. Date accessed: 15/05/2018.

delivering against those actions and would have been engaged in developing the NAP. Stakeholders include: universities; research bodies; government departments and agencies (at a UK level as well as those of the devolved administrations); NGOs; city councils and authorities; the Crown Estate; trade associations; regional partnership bodies (CCC, 2017)¹⁹⁸⁷.

Advice and support concerning the implementation of adaptation actions is provided at a UK level, through Climate UK, which covers England, Scotland, Wales and Northern Ireland (see Indicator 1c.). Although Climate UK Community Interest Company (CIC) will cease operations, the informal Climate UK network, which existed for more than 10 years prior to the establishment of the CIC, will continue.

Through the ARCC and EA, the Government has also worked to establish and support networks of organisations that may share common risks on an *ad hoc* basis. One such example is the Infrastructure Operators Adaptation Forum, which provides a platform for stakeholders in the infrastructure sector to share best practices to reduce vulnerability to climate adaptation and identify opportunities (stakeholders include: operators, regulators, government bodies, trade associations and researchers)¹⁹⁸⁸.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / No

England & reserved matters: According to the CCA, each report of the UK's CCC must contain an assessment of the progress made towards implementing the objectives, proposals and policies set out in the programmes laid before the UK Parliament under the section 'adaptation to climate change'. Reporting needs to address the array of actions carried out at all levels and by different actors, and is supported by the ARP, which invites comprehensive reporting of actions from all relevant stakeholders.

Monitoring of adaptation action and sectoral integration is embedded in the NAP's monitoring scheme, as it contains priority sectoral activities and actors responsible for their implementation. The ASC developed an adaptation indicator framework, consisting of performance indicators for climate adaptation, which build on a series of annual progress reports.¹⁹⁸⁹

¹⁹⁸⁷ CCC, 2017, Progress in preparing for climate change. 2017 Report to Parliament. URL: <https://www.theccc.org.uk/wp-content/uploads/2017/06/2017-Report-to-Parliament-Progress-in-preparing-for-climate-change.pdf>. Date accessed: 11/05/2018.

¹⁹⁸⁸ ARCC: Infrastructure operators adaptation forum. URL: <https://www.arcc-network.org.uk/infrastructure/ioaf/>. Date accessed: 01/06/2018.

¹⁹⁸⁹ CCC: Publications. URL: <http://www.theccc.org.uk/publications/>. Date accessed: 15/05/2018.

Work is carried out across the Government to track implementation of the first NAP on a regular basis. Additionally, the ASC has a statutory duty to assess progress in implementing the NAP, reporting to Parliament in June 2015 and every two years thereafter. The ASC assesses all actions in the NAP, including those for councils and other local public bodies, business, and civil society, as well as central government.

The ASC's first report¹⁹⁹⁰ to the UK Parliament on the implementation of the NAP was published in June 2015. The Government's response¹⁹⁹¹ to the assessment was published in October 2015. In June 2017, the ASC published their second and final progress report on the first NAP¹⁹⁹². An official government response was due for publication in October 2017.

The progress reports do not contain comprehensive information concerning financial information on allocated budgets and the costs of actions.

Scotland: The Climate Change (Scotland) Act 2009 requires Scottish Ministers to provide an annual report on progress towards achieving the objectives and implementing the proposals and policies set out in the SCCAP. The first annual report was published in May 2015¹⁹⁹³, the second in May 2016¹⁹⁹⁴, the third in May 2017¹⁹⁹⁵ and the fourth in May 2018¹⁹⁹⁶. The Act establishes the requirement for the ASC to independently assess the Scottish Government's progress towards meeting the objectives in the SCCAP. The first independent report was published in September 2016¹⁹⁹⁷. The ClimateXChange centre has developed an indicator framework for Scotland, with funding from the Scottish Government. This is currently being updated to inform the second ASC Independent Assessment.

¹⁹⁹⁰ CCC, 2015, Reducing emissions and preparing for climate change: 2015 Progress Report to Parliament. URL: <https://www.theccc.org.uk/publication/reducing-emissions-and-preparing-for-climate-change-2015-progress-report-to-parliament/>. Date accessed: 11/05/2018.

¹⁹⁹¹ HM Government, 2015, Committee on Climate Change's 2015 progress report: Government response. URL: <https://www.gov.uk/government/publications/committee-on-climate-changes-2015-progress-report-government-response>. Date accessed: 11/05/2018.

¹⁹⁹² CCC, 2017, 2017 Report to Parliament – Progress in preparing for climate change. URL: <https://www.theccc.org.uk/publication/2017-report-to-parliament-progress-in-preparing-for-climate-change/>. Date accessed: 11/05/2018.

¹⁹⁹³ Scottish Government, 2015, Climate Ready Scotland: Scottish Climate Change Adaptation Programme, Annual Progress Report 2015. URL: <http://www.gov.scot/Publications/2015/05/2336>. Date accessed: 11/05/2018.

¹⁹⁹⁴ Scottish Government, 2016, Climate Ready Scotland: Scottish Climate Change Adaptation Programme. Second Annual Progress Report 2016. URL: <http://www.gov.scot/Publications/2016/05/7046>. Date accessed: 11/05/2018.

¹⁹⁹⁵ Scottish Government, 2017, Climate Ready Scotland: Scottish Climate Change Adaptation Programme. Third annual progress report 2017. URL: <http://www.gov.scot/Publications/2017/05/3941>. Date accessed: 11/05/2018.

¹⁹⁹⁶ Scottish Government, 2018, Climate Ready Scotland: Scottish Climate Change Adaptation Programme - Fourth Annual Progress Report. URL: <http://www.gov.scot/Publications/2018/05/8259>. Date accessed: 11/05/2018.

¹⁹⁹⁷ Adaptation Sub-Committee, 2016, Scottish Climate Change Adaptation Programme: An independent assessment. URL: <https://www.theccc.org.uk/publication/scottish-climate-change-adaptation-programme-an-independent-assessment-for-the-scottish-parliament/>. Date accessed: 11/05/2018.

The progress reports do not contain comprehensive information concerning financial information on allocated budgets and the costs of actions.

Wales: Under the CCA there are provisions for the Welsh Government to report on progress in relation to climate change, which are set out in the Welsh Government's Annual Report, along with a summary of the actions taken. This reporting requirement has been strengthened through the Well-being of future Generations Act, where all public bodies will need to set out how they are working towards the well-being goals including the 'Resilient Wales Goal'. The Welsh Government intends to introduce adaptation indicators in a phased manner.

Northern Ireland: The CCA requires that the next Climate Change Adaptation Programme (and any subsequent ones) must contain an assessment of the progress made towards implementing the objectives, proposals and policies set out in earlier programmes. The identification of data and indicators to monitor adaptation is also considered as part of Northern Ireland's adaptation programme and will be part of the next adaptation programme due to be published in 2019.

The progress reports do not contain comprehensive information concerning financial information on allocated budgets and the costs of actions.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

Monitoring of adaptation action and sectoral integration is embedded in the monitoring scheme of the respective adaptation programmes, as it contains priority sectoral activities and actors responsible for their implementation.

In addition, in England, the Secretary of State for Environment, Food and Rural Affairs has the discretionary power to direct reporting authorities to prepare reports on how they are adapting to climate change. Reports include an assessment of climate change risks faced by the reporting authority, and a programme of measures to address the risks and opportunities presented. In the first reporting round (2010-2011), over 100 organisations from the water, energy, transport and public sectors submitted reports. In 2013, the Government published a strategy for the second round of reporting, with just over 100 organisations invited to report on a voluntary basis for the second round between 2014 and 2016. The ASC provides advice to the Government on the ARP. New advice was published in March 2017¹⁹⁹⁸. The Government will lay its third strategy for adaptation reporting in 2018 following discussions with reporting organisations and a public consultation.

¹⁹⁹⁸ CCC, 2017, Adaptation Reporting Power: Second Round Review. URL: <https://www.theccc.org.uk/wp-content/uploads/2017/03/Adaptation-Reporting-Power-Second-round-review-Committee-on-Climate-Change-March-2017.pdf>. Date accessed: 11/05/2018.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / No

Monitoring is carried out at a local level and disseminated at a national level. The details are provided under Indicator 10a.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

A periodic review of adaptation action is planned at the UK level and by the devolved administrations.

The review involves an evaluation of the climate risks and the CCRA must be updated every five years, with the second CCRA published in 2017¹⁹⁹⁹. The CCRA is updated at a national level, including targeted assessments at the level of the devolved administrations. The evidence gathered is used to inform the development of subsequent strategies and action plans.

During the lifetime of the adaptation programmes, there are additional review mechanisms, including an independent review by the ASC (carried out at national level and at the level of the devolved administrations). In the case of England, reports submitted by the ARP are also considered in the evaluation.

The CCA requires the UK's adaptation cycle to be renewed every five years and a new UK NAP is due in 2018-2019; updates by the devolved administrations are also expected according to same timeframe.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / No

For the development of the second CCRA (which forms the evidence base of the respective adaptation programmes), stakeholders have been: invited to submit evidence (in 2014); invited to attend two workshops with 100 stakeholders present each time; involved in a series of targeted work groups (with between 10 and 20 stakeholders present each time); and involved in peer review of the CCRA²⁰⁰⁰.

¹⁹⁹⁹ CCC, 2017, UK Climate Change Risk Assessment 2017 Evidence Report. URL: <https://www.theccc.org.uk/uk-climate-change-risk-assessment-2017/>. Date accessed: 11/05/2018.

²⁰⁰⁰ CCC: Review and engagement. URL: <https://www.theccc.org.uk/tackling-climate-change/preparing-for-climate-change/uk-climate-change-risk-assessment-2017/review-and-engagement/>. Date accessed: 11/05/2018.

In addition, for England stakeholders were invited to participate in a public consultation concerning the proposals for the third round of adaptation reporting (relating to the ARP).²⁰⁰¹

²⁰⁰¹ Defra: Climate change adaptation: proposals for the third round of adaptation reporting. URL: <https://consult.defra.gov.uk/environmental-quality/adaptation-reporting/>. Date accessed: 11/05/2018.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
Step A: Preparing the ground for adaptation		
1 <i>Coordination structure</i>		
1a	A central administration body officially in charge of adaptation policy making	<u>Yes</u> / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	<u>Yes</u> / In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	<u>Yes</u> / In progress / No
2 <i>Stakeholders' involvement in policy development</i>		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	<u>Yes</u> / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	<u>Yes</u> / No
Step B: Assessing risks and vulnerabilities to climate change		
3 <i>Current and projected climate change</i>		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	<u>Yes</u> / In progress / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	<u>Yes</u> / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	<u>Yes</u> / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / <u>In progress</u> / No
4 <i>Knowledge gaps</i>		
4a	Work is being carried out to identify, prioritise and	<u>Yes</u> / In progress

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
	address the knowledge gaps	/ No
5 Knowledge transfer		
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	<u>Yes</u> / In progress / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	<u>Yes</u> / In progress / No
Step C: Identifying adaptation options		
6 Identification of adaptation options		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	<u>Yes</u> / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	<u>Yes</u> / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	<u>Yes</u> / In progress / No
7 Funding resources identified and allocated		
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / <u>In progress</u> / No
Step D: Implementing adaptation action		
8 Mainstreaming adaptation in planning processes		
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	<u>Yes</u> / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	<u>Yes</u> / No
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	<u>Yes</u> / No

Adaptation Preparedness Scoreboard		
No.	Indicator	Met?
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	<u>Yes</u> / In progress / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / <u>No</u>
9 <i>Implementing adaptation</i>		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / <u>In progress</u> / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	<u>Yes</u> / No
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	<u>Yes</u> / No
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	<u>Yes</u> / No
Step E: Monitoring and evaluation of adaptation activities		
10 <i>Monitoring and reporting</i>		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	<u>Yes</u> / No
11 <i>Evaluation</i>		
11a	A periodic review of the national adaptation strategy and action plans is planned	<u>Yes</u> / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	<u>Yes</u> / No