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[…]

Accompanying the document

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions

Contingency plan for ensuring food supply and food security in times of crisis

{COM(2021) 689 final} - {SWD(2021) 318 final}

STAFF WORKING DOCUMENT – CONTINGENCY PLAN TO ENSURE FOOD SUPPLY AND FOOD SECURITY

CONTENTS

GLOSSARY

Term or acronym	Meaning or definition
AWU	Annual work unit
CAP	Common Agricultural Policy
CFP	Common Fisheries Policy
CMO	Common Market Organisation (Regulation)
DG	European Commission Directorate General
EGD	European Green Deal
EU	European Union
F2F	Farm to Fork Strategy
FAO	Food and Agriculture Organization
FSC	food supply chain
GREX	European Commission Expert Group
HORECA	hotels, restaurants and catering
MS	EU Member State
NATO	North Atlantic Treaty Organisation
OECD	Organisation for Economic Cooperation and Development
TFEU	Treaty on the Functioning of the European Union
UN	United Nations

WEF	World Economic Forum
WHO	World Health Organisation
WTO	World Trade Organization

1. INTRODUCTION

1.1. Purpose and scope

A sustainable food system must ensure a sufficient and varied supply of safe, healthy and nutritious, respectful of the environment, and affordable food to people at all times, not least in times of crisis. **The recent COVID-19 crisis showed that the EU's food supply chain (FSC) is resilient**, as it responded remarkably well to fast changing conditions: food supplies continued to be available throughout the crisis thanks to farmers, fishers, aquaculture producers, and other actors of the food chain. However, in the initial stages of the COVID-19 crisis, there were some **issues that affected the normal functioning of the EU's FSC and could have posed a threat to food security**. These included border controls and sanitary measures at various steps of that value chain that slowed down the free movement of people and goods and restricted the ability of the Single Market to operate fully, to the benefit of consumers; and resulted in market disruptions due to the severe reduction of the demand for some products. Food security in the EU is of primary concern for EU citizens. A recent Eurobarometer survey finds 92% of respondents believe that it is important that the CAP aims to secure a stable supply of food in the EU[1].

The Farm to Fork Strategy[2], part of the European Green Deal, envisages the **development of a contingency plan** by the Commission, to be activated when there is a crisis that affects the entire or part of the EU food system, and endangers EU food supply and food security[3]. According to the strategy, the contingency plan will include the creation of a coordinated crises preparedness and response mechanism, drawing on the lessons learned from past crises, and from the ongoing COVID-19 pandemic. **This contingency plan is the subject of a Communication** to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions.

The Farm to Fork Strategy includes many actions and has a larger scope than addressing needs in times of crisis. At the heart of the European Green Deal, the Farm to Fork Strategy aims to make food systems fairer, healthier and more environmentally-friendly. One of the key initiatives is **a Commission proposal for a legislative framework for sustainable food systems**, due in 2023. In preparing this framework, the Commission will consider, among others, more comprehensive options to strengthen the resilience of food systems and the system's ability to respond to crises threatening food security, including possible legislative changes. The legislative framework for sustainable food systems will be subject to a separate process to the present one on the contingency plan.

The Commission has organised a large **consultation process**[4], inviting a wide range of stakeholders to provide feedback on the form, nature and scope that the contingency plan for ensuring food supply and food security in the EU should take, in line with the Farm to Fork Strategy. The following stakeholders were consulted: operators in the FSC (producers, traders, processors, distributors, retailers, food service providers) and their associations; other

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1 Special Eurobarometer 504 (November 2020) – Europeans, Agriculture and the CAP: https://europa.eu/eurobarometer/surveys/detail/2229.

2 A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system, COM(2020)381 final

3 The overview page for this initiative: https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/market-measures/agri-food-supply-chain/contingency-plan_en.

4 Consultation strategy, Contingency plan for ensuring food supply and food security.

stakeholders with an interest in FSC operation (input providers, packaging material suppliers, transport operators, insurers, NGOs, etc.); consumers and consumer groups. Member States, and some third countries, were also invited to contribute to the design of the contingency plan, as were several international organisations, think-tanks and the scientific community[5] .

A questionnaire targeted at stakeholders was also open for two months, in March and April 2021 and received over 250 answers. The summary of the main answers is available in a separate synopsis report. In addition, the Commission prepared three separate questionnaires addressed to Member States authorities, the answers of which are summarised in Annex III. In addition, the initiative was presented in a number of meetings of existing consultative fora (Civil Dialogue Groups, Market, Observatories, Advisory Councils, etc.)

Finally, Annex I lists the conclusions drawn from a set of interviews of experts ran at the end of 2020. These interviews sought to draw lessons for the FSC from the COVID-19 pandemic.

The purpose of this Staff Working Document is to provide an analytical summary of the findings of the consultation described above. Three main areas are described: (1) strengths and weaknesses of the agricultural, fishery, and food sectors in addressing the challenges posed by a changing risk landscape; (2) policies in place to address such challenges in times of crisis; (3) possible improvements.

1.2. Food supply and food security: concepts and definitions[6]

There are many possible understandings of several of the concepts used in this document. Both Member States and stakeholders raised the issue of the need for a common understanding on concepts during consultation. This would be useful for more fruitful discussions on the process and content of policies in the area of food security.

We will use the definition of food security set out by the United Nations' Food and Agriculture Organisation's Committee on World Food Security:

"food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life"[7].

Concepts related to food security include:

Food availability: the availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid). The expression **food supply** used in this exercise would refer to this aspect of food security.

Food access: access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Entitlements are defined as the set of all commodity bundles over which a person can establish command given the legal, political, economic and

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[5] In-depth exchanges were held, in particular, through seven joint DG AGRI-DG MARE- DG SANTE GREX meetings (for agricultural markets, in particular concerning aspects falling under the single CMO Regulation, sub-group on the contingency plan for ensuring food supply and food security; and for markets and trade in fishery and aquaculture products (MTFAP). See Annex II.

[6] For further elements see SAPEA, Science Advice for Policy by European Academies, A sustainable food system for the European Union, 2020.

[7] In relation to this definition, the OECD (2020) notes: "food security is not only a matter of food availability – people will only be food secure when they have access to it, and when it leads to good nutritional outcomes. A [further] requirement is stability of these dimensions over time".

social arrangements of the community in which they live (including traditional rights such as access to common resources).

Utilisation: utilisation of food through adequate diet, clean water, sanitation and health care to reach a state of nutritional well-being where all physiological needs are met. This brings out the importance of non-food inputs in food security.

Stability: to be food secure, a population, household or individual must have access to adequate food at all times. They should not risk losing access to food as a consequence of sudden shocks (e.g. an economic or climatic crisis) or cyclical events (e.g. seasonal food insecurity). The concept of stability can therefore refer to both the availability and access dimensions of food security.8

Food safety: refers to "handling, storing and preparing food to prevent infection and help to make sure that our food keeps enough nutrients for us to have a healthy diet" (Food and Agriculture Organisation).

Food system resilience: supply chain resilience is defined as "the capacity of a supply chain to persist, adapt, or transform in the face of change"[9]. The Commission used in its 2020 annual Strategic Report[10] the following definition: "resilience is the ability not only to withstand and cope with challenges but also to undergo transitions in a sustainable, fair, and democratic manner". We use these definitions, appropriately expanded, to the broader food system concept employed in the Farm to Fork Strategy. Food security and food supply are therefore linked to food system resilience. According to Antón[11], there are several ways to improve food system resilience: i) investments in on-farm resilience capacities; ii) no-regret policies and investments in public goods; iii) greater focus on ex ante policies and strategies; iv) consider outcomes and interests of stakeholders; v) participatory and collaborative processes. The revised CAP mentions resilience as a key element within its specific objectives (which include the need to foster a smart, resilient and diversified agricultural sector ensuring food security). This is a core element of the recommendations addressed to Member States by the Commission for the drafting of their CAP national strategic plans[12]. In the same vein, the CFP has as one of its objectives to promote the development of fisheries and aquaculture activities that are environmentally, economically and socially sustainable, and to contribute to healthy and stable food supplies and security for EU citizens. This is a key aspect addressed by Member States in the drafting of their national programmes under the European Maritime, Fisheries and Aquaculture Fund (EMFAF), which supports the CFP, the EU maritime policy, and the EU agenda for international ocean governance.

Food system: the definition of 'food system' has been debated in the preparation of the United Nations' Food Systems Summit, building on a variety of previous contributions[13]. The definition proposed is as follows: "food systems encompass the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing,

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8 http://www.fao.org/fileadmin/templates/faoitaly/documents/pdf/pdf_Food_Security_Cocept_Note.pdf.

9 Wieland, A., & Durach, C. F. (2021). Two perspectives on supply chain resilience. Journal of Business Logistics.

10 2020 strategic foresight report.

11 Antón, J., presentation at JRC Workshop, 20 May 2021.

12 Recommendations to the Member States as regards their strategic plan for the Common Agricultural Policy, COM(2020)846 final https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0846.

13 Von Braun et al., Food Systems – Definition, Concept and Application for the UN Food Systems Summit, 2020.

distribution, consumption and disposal of food products that originate from agriculture, forestry or fisheries, and food industries". Further, "the broader economic, societal and natural environments in which they are embedded" is relevant. The definition clarifies that not only production in the FSC is concerned, but also activities upstream, services and interlinked value chains: "Production at the beginning of value chains, of course, includes the farming communities but also pre-production actors, i.e., from input industries such as fertilizer or seeds. The range of actors also includes science, technology and innovation actors that are partly integral to the food system, partly embedded, for instance, in the life science and health research systems. In food industries' processing, foods and non-foods result from interlinked value chains. Related to these value chains is another set of relevant food systems actors, i.e. public and private quality and safety control organisations".

Food self-sufficiency is defined as the ability to meet consumption needs from own production, rather than by importing food. Food self-sufficiency gained increased attention in a number of countries in the wake of the 2007–08 international food crisis, as countries sought to buffer themselves from volatility on world food markets. Food self-sufficiency is often presented in policy circles as the opposite of free international trade in food, and is widely critiqued by economists as a misguided and counterproductive approach to food security, that places political priorities ahead of economic efficiency[14];

Food sovereignty: defined originally by Via Campesina[15], the concept corresponds to a peoples' or a countries' right to independently define their agricultural and food policy, without dumping vis-à-vis third countries, prioritising local agricultural and food production in order to feed people, and giving access to producers, farmers and landless people to land, water, seeds, and credit.

2. THE EU FOOD SECTOR: STRENGTHS, RISKS AND VULNERABILITIES

2.1. The EU food powerhouse

2.1.1. *A leading agricultural producer with high food self-sufficiency*

The self-sufficiency rate is an indicator used to describe the import (or export) level of reliance on trade for specific products. For many food products, the self-sufficiency of a country or territory is explained in part by natural conditions. For example, the self-sufficiency rate for wheat is above 100% in the EU because the natural conditions in the EU are very favourable to the production of wheat. On the other hand, the natural conditions for soya bean production are less favourable in the EU than in other parts of the world, and so the EU is a net importer of these products. Similarly, the EU self-sufficiency rate for tropical fruits is low due to the quasi-absence of tropical climate zones in the EU[16]. Since the creation of the European Economic Community in 1958, the EU has progressively become self-sufficient in most

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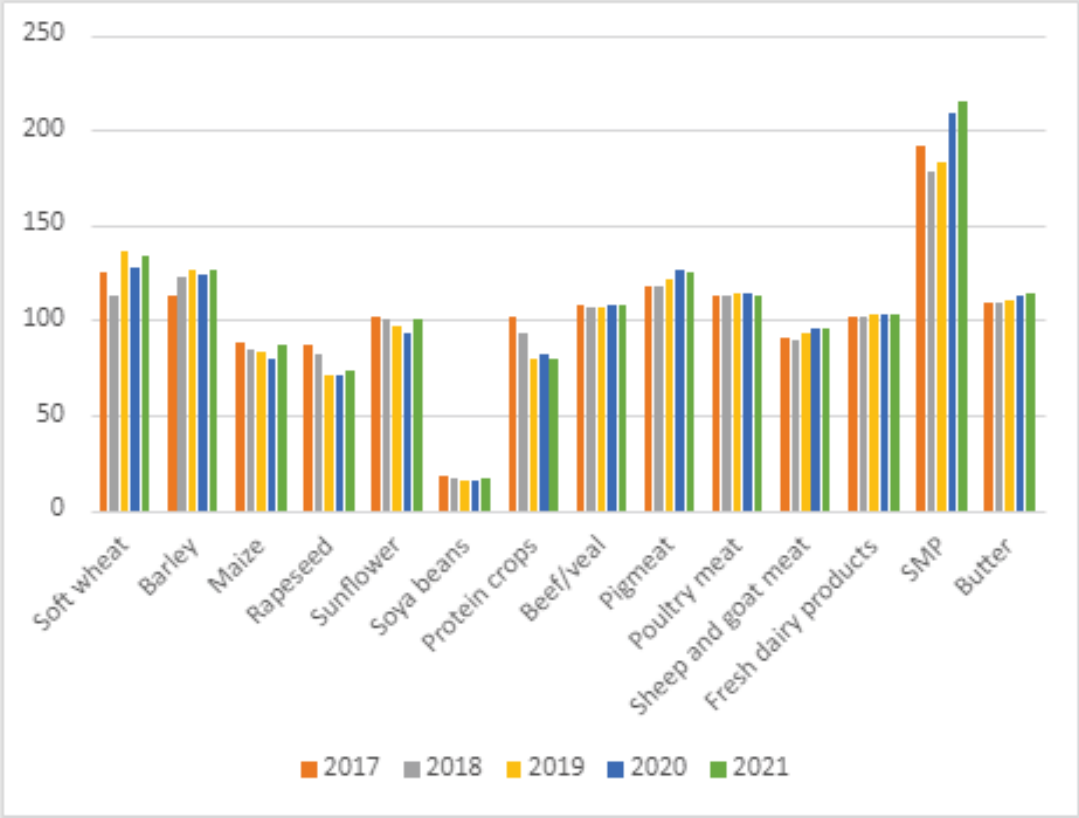
[14] Jennifer Clapp, Food self-sufficiency: Making sense of it, and when it makes sense, Food Policy, Volume 66, 2017, Pages 88-96.

[15] Claeys, P. (2013) Food sovereignty: a critical dialogue.

[16] Note that this use of the term 'self-sufficiency' does not account for substitutability between products – for example, consumers would substitute the consumption of tropical fruits by other types of fruits, to a degree, should the price of tropical fruits in the EU market increase. This substitution effect in product terms would also allow EU consumers to substitute, to an extent, for the nutritional benefits derived from tropical fruit. That is, *de facto* the EU's self-sufficiency on food – for example at a nutritional level – is higher than what is suggested by the self-sufficiency rate at a product level that we employ in this section.

primary agricultural products in volume terms (figure 1). Beyond the natural conditions for food production and consumers' preferences in the EU, there are other factors determining the competitiveness of the agricultural, fishery and food sectors, among others supportive policies, such as the Common Agricultural Policy, the Common Fisheries Policy, and the Single Market.

FIGURE 1. EU27 SELF-SUFFICIENCY RATE FOR SELECTED COMMODITIES[17]



Source: DG Agriculture and Rural Development, based on Eurostat data (2021 figures are estimates).

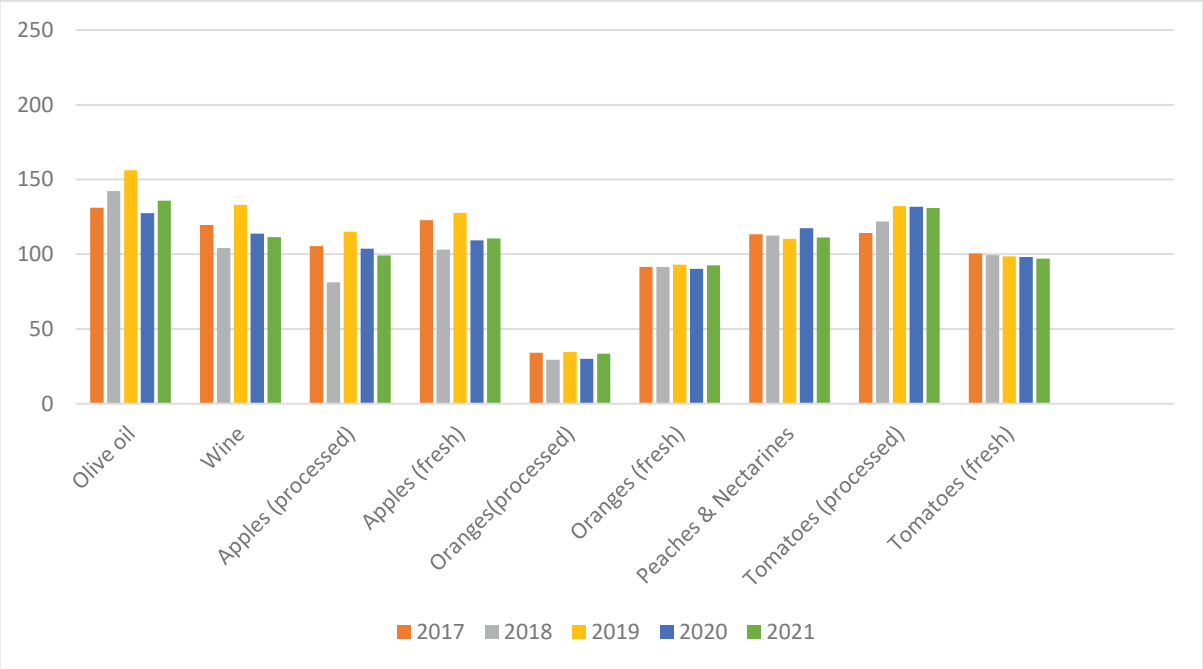
On average, the main primary products in which the EU was self-sufficient in 2017-2021 include: cereals (soft wheat, barley); sunflower; animal products (all meat and dairy products with the exception of sheep and goat meat); fruit & vegetables (peaches, nectarines, fresh apples and processed tomatoes, and close to 100% self-sufficiency in fresh oranges, fresh tomatoes, and processed apples). The EU's production surplus is most significant for milk powders (whole and skimmed milk powder, whey), olive oil, and soft wheat.

These figures are for aggregate sectors or sub-sectors. They should be treated with caution when these sectors or markets are segmented, for instance in the case of meat, where various different types of cuts, with different values can exist - e.g., poultry breasts, legs or wings. An above 100% self-sufficiency in poultry production does not mean that the EU only exports poultry meat: EU consumers buy more poultry breasts, which are net imported, and less for other cuts, which are net exported.

[17] SMP self-sufficiency rates during this period were influenced by the opening of public stock intervention, which drove the production and storage of SMP.

Not all food commodities can be produced in any given territory, due to its specific natural conditions or other factors influencing comparative advantage. In the EU, tropical products (avocadoes, bananas, palm oil, cocoa, coffee, warm-water shrimps) are not produced in any significant scale, and need to be imported. Other products are produced under more favourable conditions out of the EU, but not in sufficient scale to meet demand. The main primary food products in which the EU was not self-sufficient included cereals (durum wheat, maize, rice), sugar, protein crops (lentils and chickpeas), oilseeds products (rapeseed, soya beans, palm oil), sheep and goat meat, fishery and aquaculture products (EU self-sufficiency averaged 42.5% in 2018 for all fishery and aquaculture products and 14% for the top 5 species consumed in the EU (i.e., tuna, salmon, cod, Alaska pollock and shrimps[18]) and certain fruits and vegetables (such as processed oranges – mainly orange juice; see figure 2).

FIGURE 2. EU27 SELF-SUFFICIENCY RATE FOR SELECTED FRUITS AND VEGETABLES, OLIVE OIL AND WINE, FISHERY AND AQUACULTURE PRODUCTS



Source: DG Agriculture and Rural Development, based on Eurostat data (2021 figures are estimates); for fishery and aquaculture products EUMOFA, based on EUROSTAT, FAO, national administrations and FEAP data (2020 and 2021 data not available).

2.1.2. *A key actor on the global food market*

The EU is a net exporter of agri-food products, and the sector contributes significantly to the EU's economy. In 2020, net exports reached EUR 62 billion[19]. Higher value products, such as processed food and food preparations, are the main drivers of the EU's positive trade balance.

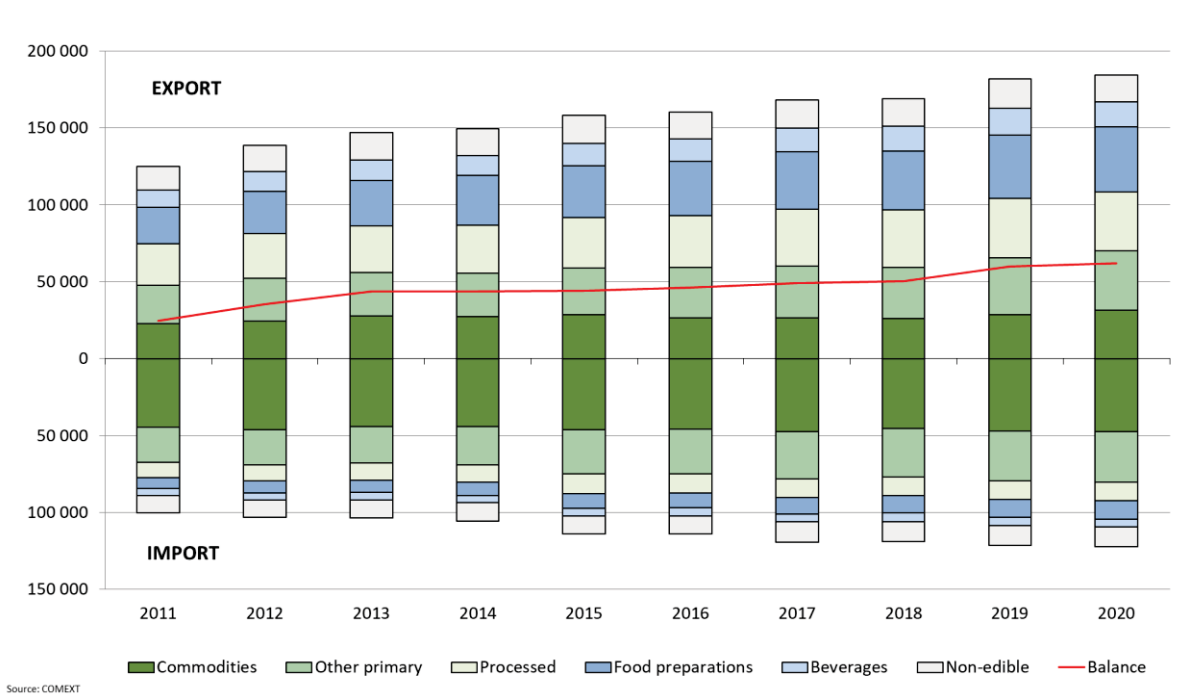
Although more than 85% of EU agriculture and food production is consumed in EU domestic markets (traded within the Single Market, used at national, regional or local level), the share

[18] The EU fish market 2020 edition, EUMOFA.
[19] The EU imported EUR 122.3 billon of agri-food products and exported EUR 184.3 billion in 2020.

of exports to countries outside the EU increased in recent years. In some sectors, extra-EU export opportunities played a large role in recent income growth (e.g. wine, cheese and pig meat). The EU has found important export markets in particular in countries where dietary patterns have changed with economic growth or the adoption of westernised consumption patterns, and where local climatic conditions limit production. This trend has accelerated in the past three decades, during which time the EU increased its production – and its surpluses – of certain primary agricultural products, most significantly dairy products (excluding butter) and pig meat.

The increase in the EU's agri-food net trade balance in the last decade, is due to significant competitiveness gains, in particular concerning high value added and quality products, and in spite of the higher production costs[20] implied, among others, by higher EU production standards (notably related to food safety), the environment, or animal welfare.

FIGURE 3. EU STRUCTURE OF AGRI-FOOD TRADE WITH EXTRA-EU, 2011-2020 (IN MILLION EURO)



Source: COMEXT

The EU is the world's leading agri-food exporter, and ranks within the top three world importers, behind the US and China (average 2017-2019). According to the OECD, participating in global value chains generates significant economic gains as it fosters specialisation and productivity gains (OECD, 2021[21]).

Seafood is among the most traded food commodities. The EU is the largest seafood market in the world. This also makes the seafood system, among others, more vulnerable to systemic shocks that disrupt the flow of products and the livelihoods that depend on this trade. The extra-

[20] Se section 4 costs of production in the EU of the factsheet on production, yield and productivity (2018).
[21] OECD, Global value chains: Efficiency and risks in the context of COVID-19 (11 February 2021).

EU trade balance deficit in fish products in 2019 was worth EUR 21 billion, which was slightly higher than the previous year. In a longer perspective, the deficit in real terms grew by 33% from 2010 to 2019.

In 2019, extra-EU exports of fishery and aquaculture products reached a 5-year peak of 2.21 million tonnes, and showed a growth of 7% with respect to 2015. The EU mainly exports herring, blue whiting, skipjack tuna, mackerel, non-food use products and salmon. Five countries receive 50% of EU exports: Nigeria, Norway, the USA, China and Egypt. Extra-EU imports of fishery and aquaculture products reached a 10-year high of 6.34 million tonnes in 2019. More than one-quarter of extra-EU imports originates from Norway, the main supplier. China is second, but far behind, accounting for less than 10% of the total, while Iceland, Ecuador, Morocco, Vietnam and the United States follow, each covering about 5%.

2.1.3. *A limited number of cases where the EU is strongly reliant on imports*

The preceding sections included a general discussion of EU self-sufficiency and the net trade position for agricultural, fish, and food products. The present section identifies the main products for which the EU relies on imports to ensure supplies.

2.1.3.1. Agricultural commodities

For some specific products the EU has a significant trade deficit, which, on a first approach, may be considered to increase in the vulnerability of the EU's food system. In some cases, imported products are difficult to substitute for, be it in terms of volume, import sources, quality or cost. For example, disruptions in oilseeds' global trade and a consequent price spike for protein imports would result in higher production costs for meat and dairy, with consequences in terms of production. A tight global cereal supply would affect both food and feed costs, with implications for the bio-economy. A disruption of vegetable oil trade could affect the EU biofuel and food processing sectors. Still, these effects would have to be significant (for example, a combination of being reliant on a few import sources and a high vulnerability to climate change in those regions leading to sudden shortages[22]) and combined with further supply disruptions elsewhere in the EU to pose a serious challenge from a food security of supply perspective.

The self-sufficiency ratio of the EU in 2019/2020 for oilseeds was 55%. The EU mainly imports soya beans (67% of total EU oilseed imports) to produce soya meals and soya oil (Figure 6). Imports of soya beans are necessary to produce animal feed items (with soya meals) and oil for human consumption or biodiesel (with soya oil). The EU imports mainly from the US (almost 50% of the total trimmed average imports in 2015-2019) and Brazil (around 25%). Rapeseed imports are also on the rise due to reduced domestic output (around 30% of EU domestic demand for rapeseed is met by imported products and close to 50% of EU rapeseed imports are sourced from the Ukraine).

[22] https://www.eea.europa.eu/publications/global-climate-change-impacts-and.

Still, when it comes to feed protein, roughage represents 43% of total EU feed use (in protein content equivalent) according to the feed protein balance sheet[23]. About 32 million tonnes of protein from roughage was fed to animals across the EU in 2020/21. Concerning cereals, 14.2 million tonnes of protein was sourced from domestically produced cereals. Still, the EU is a net importer of maize, which is a significant source of proteins for animal feed. The EU self-sufficiency ratio is 80% and around 17.1 million tonnes are imported annually (2016-2020 average). The EU maize imports are following an upward trend to meet the feed demand. The EU is mainly importing maize from Ukraine and Brazil, which represent around 80% of total maize imports. Nevertheless, EU domestic production is also increasing, and up to 50 million tonnes of domestically produced maize are fed to animals in the EU.

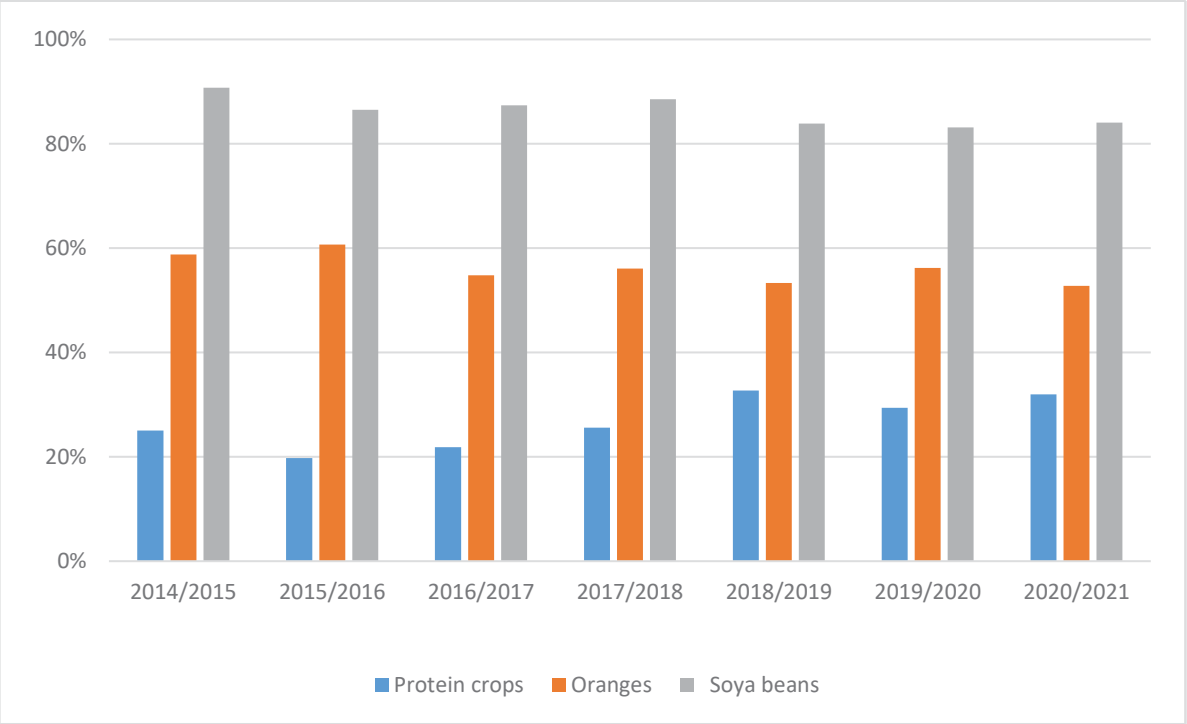
The EU self-sufficiency ratio for oil meals is slightly above the one for oilseeds (at 63% in 2020/2021). Forty percent of EU domestic demand for oilseed meals is met by imports, with soya meals at more than 80% in its total oil meal imports. The EU imports soya meal mainly from South America (Brazil 48%, and Argentina 39%).

The EU is also a net importer of protein crops (pulses with the exception of soya beans: peas, beans, etc.), which are mainly used in animal feed, but also in food. Regarding feed, around 90% of the protein from these crops is sourced domestically (mainly field peas and broad beans). Other protein crops aimed at food consumption, such as lentils and chickpeas, are net-imported to meet increased demand. In 2020, EU chickpeas imports increased by 32%, compared to the 5-year average of the previous years, and lentils imports increased by 16%.

Concerning vegetable oils, the EU imports 40% of its needs, out of which around 70% are palm oil imports. For palm oil, more than 80% come from two countries. The main sources are Indonesia (almost 50% of total EU palm oil imports in 2020/21) and Malaysia (about 33%). In 2020, 2.4 million tonnes of palm oil imports were directed to biodiesel production (34%) while 4.7 million tonnes was used for food production.

[23] https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/farming/documents/eu-feed-protein-balance-sheet_2020-2021_en.pdf.

FIGURE 4. SHARE OF IMPORTS IN TOTAL EU DOMESTIC CONSUMPTION



In the case of oranges, a distinction should be made between imports of fresh oranges and processed oranges. The EU imports a large majority of the processed oranges it consumes (predominantly in the form of juice) from Brazil (84% of total EU processed oranges imports on average in 2010-2020)[24].

In 2017, the global organic food and drink market reached EUR 92 billion[25]. The EU accounts for 37% of the global market for organic food and drink (EUR 34.3 billion). Over the last ten years, the EU market doubled its size and it continues to grow at a significant pace (+11% in 2017 compared to 2016), indicating that it has not yet reached its maturity. The EU relies on imports of organic products to meet its demand, but no quantitative analysis has been conducted to date for these products.

2.1.3.2. Fisheries and aquaculture

The EU is a leading trader of fish and aquaculture products. In 2019, imports and exports of fisheries and aquaculture products between the EU and the rest of the world totalled 8.55 million tonnes, with a value of EUR 33 billion, making the EU the second largest trader of these products after China. The EU is a net importer, with a trade deficit of EUR 21 billion in 2019. The majority of products produced, consumed and traded in the EU are wild products whereas farmed products are the majority at global level.

The EU has a low self-sufficiency rate in fisheries and aquaculture products and it is largely dependent on imports to meet internal demand. Imports dominate for tuna, salmon, cod,

[24] The EU imports a high share of its demand for tropical products, such as coffee and cocoa. The lack of data, notably on EU production levels, impedes a full analysis for these sectors. While this is not strictly an issue of concern from a food security perspective, the consumption of these products is important and could be monitored with additional data.

[25] https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/farming/documents/agri-market-brief-18-organic-imports_en.pdf.

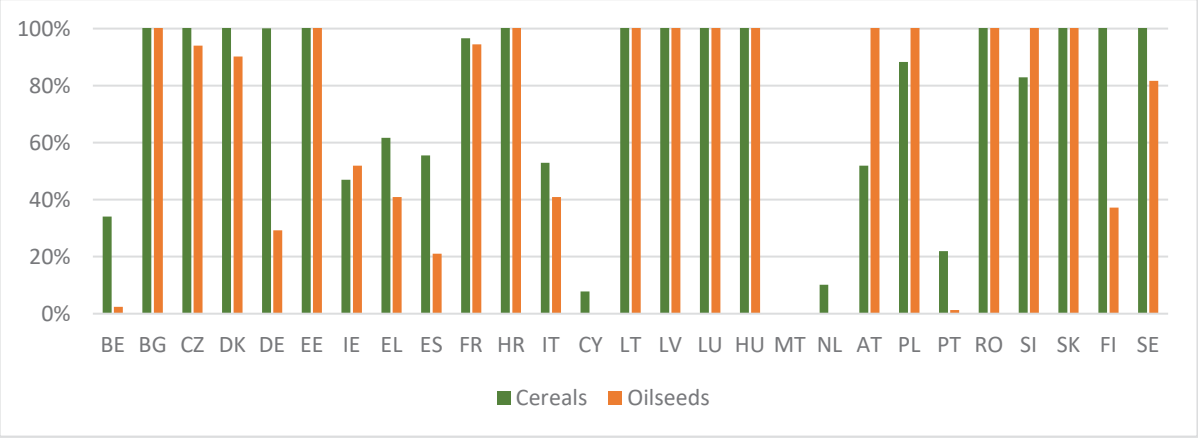
Alaska pollock and shrimps – the top 5 species consumed in the EU, for which EU self-sufficiency averaged 14% in 2018. The EU is also partially dependant on processing activities outside its borders. Part of the seafood products, domestic or imported, are processed in third countries (e.g. peeling of shrimps or filleting of white fish). That is, part of EU exports are then reimported after being processed outside the EU.

2.1.3.3. Member State level

Natural conditions and agricultural and seafood production capacities are very diverse across the EU, with implications for food security[26]. The Single Market is of crucial importance to satisfying the demand for food of EU consumers. The Single Market allows food items to move freely from one Member State to another and to reach all regions across the EU. The Single Market also allows necessary inputs to food and agricultural production to reach those in the FSC that need them.

One indicator that can be used to quantify this diverse situation in EU Member States is the self-sufficiency rate. This rate is calculated from production and trade figures to estimate consumption levels[27]. As shown in the graphs below, it is estimated that nine Member States are self-sufficient in arable crops (cereals and oilseeds), while eight are self-sufficient in animal products (meats and dairy products), and no Member State is self-sufficient in seafood. More specifically, data show that fourteen Member States are producing enough cereals for their domestic production (self-sufficiency rate exceeding 100%). Twelve Member States are producing oilseeds to sustain their demand. For some EU Member States, the self-sufficiency ratio exceeds 100%, and they have a surplus to export within the Single Market or to third countries (figure 5).

FIGURE 5. ARABLE CROPS SELF-SUFFICIENCY ACROSS THE EU

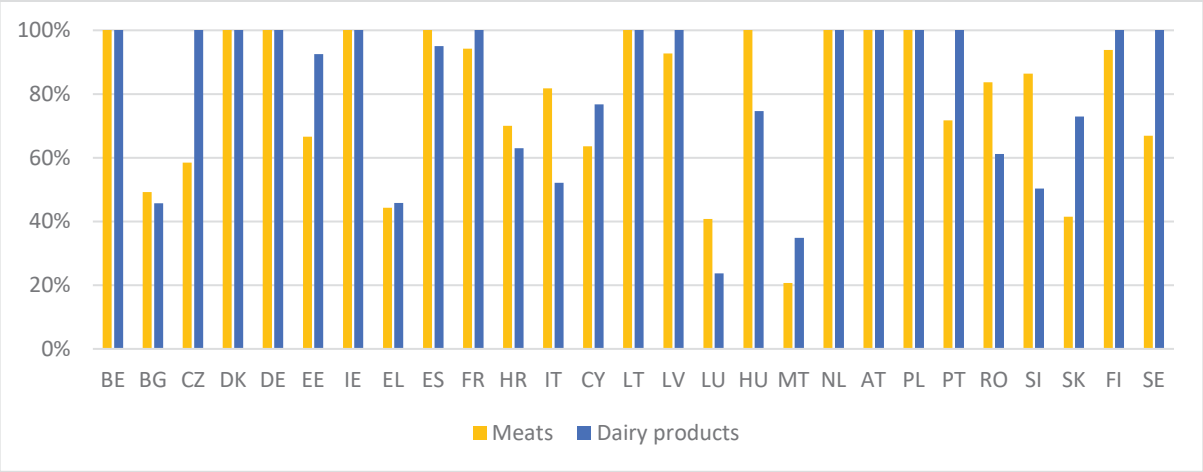


Source: DG AGRI-JRC Balance sheet

Fourteen Member States are self-sufficient on dairy products. For the case of all meats, ten Member States are self-sufficient (figure 6).

[26] See, for example: Economist Intelligence Unit, *Global Food Security Index*.
[27] DataM database: https://data.jrc.ec.europa.eu/dataset/33243e5e-44a1-4b43-9444-31d64dc7921f.

FIGURE 6. ANIMAL PRODUCTS SELF-SUFFICIENCY ACROSS THE EU



Source DG AGRI_JRC Balance sheet

While the above analysis gives an overview of the situation mainly in terms of aggregated arable and animal products, it is useful to have a more detailed monitoring of the situation at the level of specific commodities.

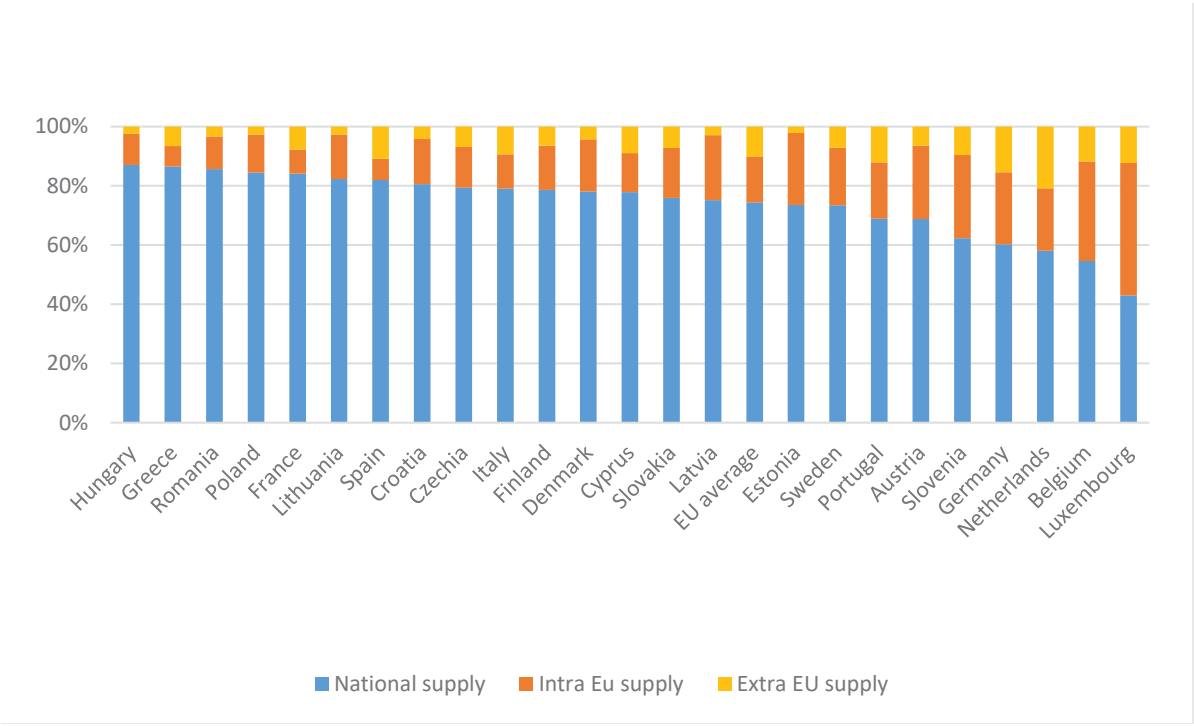
Member States that are not self-sufficient in a specific commodity typically use the Single Market to satisfy demand. For instance, in Spain, which is not self-sufficient in cereals or oilseeds, more than 80% of wheat and sunflower flows are imports from other EU Member States. Italy is self-sufficient at 53% for cereals, and 67% of their cereal imports come from within the Single Market. External trade (with non-EU countries) is used to satisfy the demand for certain products. In France, the self-sufficiency ratio for soya beans is 46%, and extra-EU trade partners meet around 80% of the remaining demand. Denmark and Portugal, which have a self-sufficiency ratio for soya beans of 0% (meaning no production), trade mostly with extra-EU partners to meet demand for this commodity (60% and 98%, respectively). As for fishery and aquaculture products, for which no Member State is self-sufficient, the EU is able to maintain a high level of fish and seafood apparent consumption (production plus imports minus exports) mainly by sourcing from other regions of the world through imports.

The supply tables give an indication in value of how diverse the situation in the EU is, with regard to the share in value of imports (intra-EU or extra-EU) in the total supply of agricultural products, fish products and food products. For agricultural products and food products[28], the average share of domestic sourcing is around 75% in the EU (with the remaining 15% sourced within the Single Market and 10% from third countries for agricultural products; and, for food products, 19% from the Single Market and 6% from third countries). A certain number of Member States with a strong agri-food sector source over 80% of both their agricultural and food products nationally (France, Italy, Spain, Poland, Romania). Germany has a high share of national sourcing for food products (76%) but less for agricultural products (60%) and relies on 24% of agricultural products imported from other Member States. Member States in the East and North of Europe rely more on imports to supply their agri-food markets. The supply of fish products is sourced much less from national sources than agri-food products: only 48% in average of fish products are used in the country where they have been produced (in value), while on average 28% is sourced from the Single Market and 24% from third countries. Imports

[28] In the sense of national accounts.

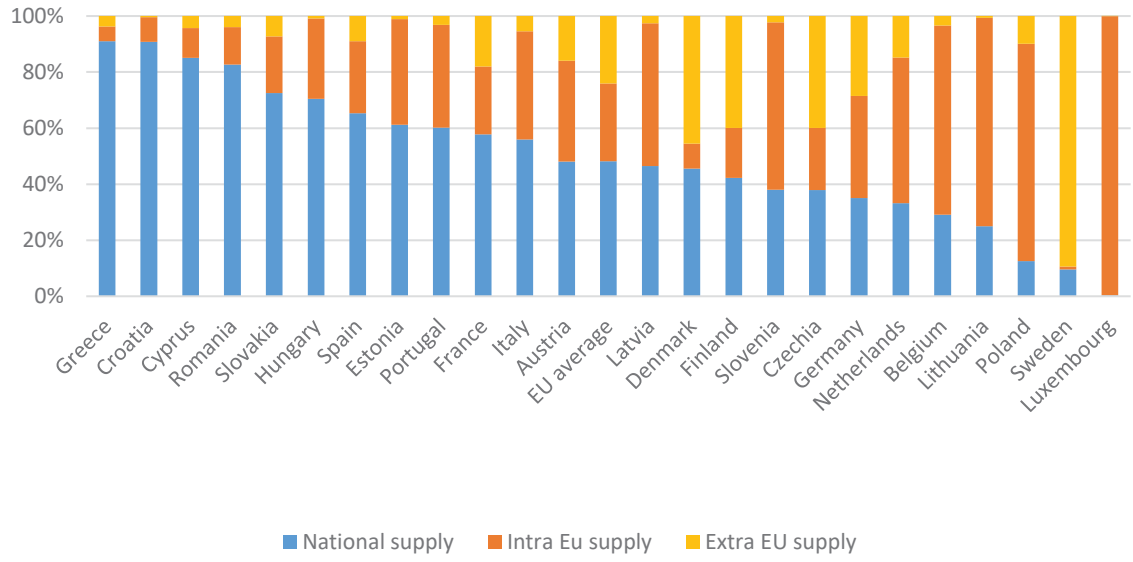
prevail for tuna, salmon, cod, Alaska pollock and shrimps – the top 5 species consumed in the EU and for which EU self-sufficiency averaged only 14% in 2018.

FIGURE 7. SHARE OF NATIONAL AND IMPORTED SOURCING IN THE SUPPLY OF AGRICULTURAL PRODUCTS (2019)



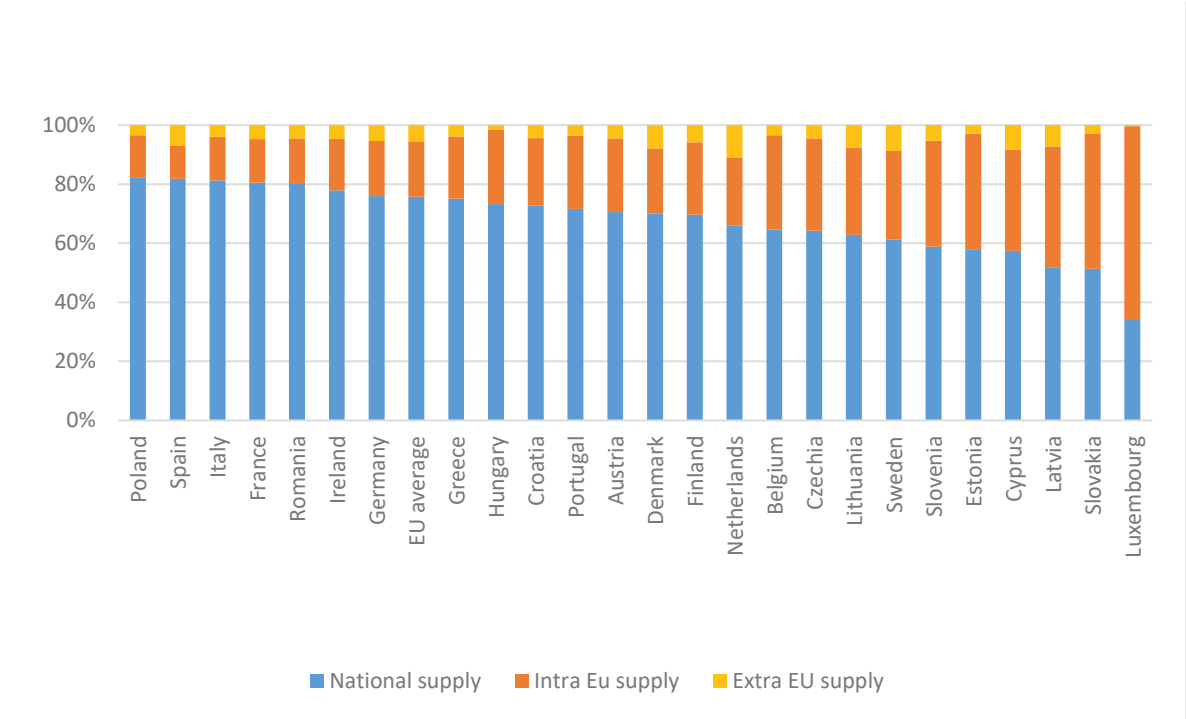
Source : Eurostat, National accounts (some MS unavailable)

FIGURE 8 SHARE OF NATIONAL AND IMPORTED SOURCING IN THE SUPPLY OF FISH PRODUCTS (2019)



Source : Eurostat, National accounts (some MS unavailable)

FIGURE 9 - SHARE OF NATIONAL AND IMPORTED SOURCING IN THE SUPPLY OF FOOD PRODUCTS (2019)



Source : Eurostat, National accounts (some MS unavailable)

2.1.3.4.Inputs

The EU is not self-sufficient in certain inputs used in food production. Globally, fertiliser production is rather concentrated in a few countries and, thus, the EU relies on a limited number of sources for its fertiliser needs. The EU imports several types of mineral fertilisers from Eastern neighbourhood countries (such as Belarus, Ukraine and Russia) and North Africa (Algeria and Morocco). On average, in 2010-2020 and depending on the product, the EU relied up to 43% on a single country for fertilisers[29]. In the case of potassic fertilisers, the EU relies on Belarus and Russia for 59% of its imports. For phosphatic fertilisers, one third of the EU imports come from Morocco, while for nitrogen fertilisers (ammonia plus mineral nitrogenous fertilisers), 31% of the EU imports come from Russia.

For plant-protection products and micronutrients for compound feed, although detailed quantitative data are not easily available, the EU imports mainly from a few countries (in particular from China). No accessibility issues were reported during the COVID-19 health crisis for these products.

For feed inputs, the reliance on the global supply chain posed challenges during COVID-19, especially in the beginning of the crisis[30]. Delays in sourcing of raw material for feed additives

[29] Share of Russian exports in EU total imports of fertilisers containing two or three of the fertilising elements nitrogen, phosphorus and potassium.
[30] FEFAC, presentation at GREX.

(chemical precursors or substances themselves)[31] and packaging (paper and cardboard, ink)[32] had a ripple effect on the rest of the food chain, although not to a major extent.

The seed industry was able to avoid major disruption during COVID-19, thanks in part to a policy of diversification, including of location of research and development, of production and processing, and of packaging. The stability and continuity of policies is an important element to allow companies being better prepared to crises[33]. Still, the limited number of companies operating in the seed industry could be seen as a vulnerability in itself.

While the EU is a net importer of fishmeal, mainly from Peru, major disruption was avoided during the COVID-19 crisis by sourcing from EU production, hence limiting exports thereof in the same period, combined with a global decrease of the demand.

2.1.3.5.Diversity of production and of supply chains

The EU's real food security "insurance" is the presence of a diversity of skilled and generally well-organised farmers and fishers throughout the European Union territory, in combination with well-functioning markets, implemented technological progress, and sustainable production. Concerning agriculture, Europe's temperate climate, with broadly sufficient precipitation throughout the year and moderate temperatures, is an important guarantor of stable yields at a high level, which ensures sufficient production, if policies are in place to ensure that farmers can produce.

There is a large diversity of farming types in the EU[34]. In terms of asset value, on average, Dutch and Danish farms held the highest amounts of assets (around EUR 3,118,000 and EUR 2,689,000, respectively). This reflects the very high land prices and the large share in these Member States of types of farming that typically need considerable investment, such as dairy production, granivores and horticulture. In contrast, farms in Romania had the lowest total asset values (EUR 55 000), as they are characterised by less capital-intensive types of farming and lower land prices. In terms of labour, the average number of workers employed per farm in the EU stood at 1.6 Annual work units (AWU) in 2018. However, the average labour input varies considerably across Member States, ranging from 10.6 AWU per farm in Slovakia to 1 AWU in Greece. The average size of farms studied in this publication (small farms are not well covered in the Farm Accountancy Data Network sample) was 37 ha in 2018. However, this average size varied considerably across Member States, ranging from 445 ha per farm in Slovakia to 3 ha per farm in Malta. The average farm in the EU-28 had 16.1 ha of agricultural land in 2013[35]. Most farms in the EU-28 can be characterised as small in physical terms, since 66% had less than 5 ha of agricultural land, and only 7% more than 50 ha in 2013. Close to half (47%) of the very small farms (<5 ha) are located in Romania, with another 11% in Poland. At the EU level the CR5 (concentration ratio: the market share of the five largest firms) at farm level was 0.19% in 2010 (ranging from 0.4% in Germany to around 9% in Estonia), meaning there is a low level of market concentration in agriculture in the EU[36].

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[31] FEFANA, presentation at GREX.
[32] EUROPEN, presentation at GREX.
[33] Euroseeds, presentation at GREX.
[34] EU farm economics overview, 2021.
[35] Economic brief on Farm structures, 2018.
[36] Commission SWD Impact Assessment - Initiative to improve the food supply chain (unfair trading practices), 2018.

When looking towards the future, farming is likely to remain highly diversified in the EU. A foresight study on the farmers of the future states that "there will be a more diverse ecosystem of farms responding to […] challenges and opportunities – benefitting from technological and social innovation of the next 20 years. Those famer profiles that reflect the current mainstream of farming are expected to adapt and to still be around in 2040. They will be joined by the profiles that are currently considered to be emerging, but by 2040 are well established (cell farmer, controlled environment farmer, urban farmer, regenerative farmer, social care farmer, lifestyle farmer)[37].

Fishery and aquaculture producers in the EU benefit from being able to join producer organisations (POs). There are around 220 such POs in the EU, representing roughly 80% of the catches in value and volume. Although the situation varies from one Member State to another for historical or cultural reasons, POs globally play a key role in the collective management of their members' activities and in the promotion of sustainable, efficient and viable activities, aligned with the objectives of the common fisheries policy and taking advantage of the market dynamics. POs played a decisive role in adapting and supporting their member's activities to face the market disruptions resulting from external chocks, such as the outbreak of the COVID-19 crisis or Brexit.

Downstream in the FSC, the EU food and drink industry is the largest manufacturing sector in terms of turnover in the EU (EUR 1.09 trillion), and the biggest industrial employer (4.4 million employees). 99% of companies are SMEs (representing 60% of employment and 47.5% of turnover), 78% are micro enterprises of 0 to 9 employees (14.5% of employment and 5.7% of turnover) and only 1% are large companies (40% of employment and 52.5% of turnover). The industry is among the top three manufacturing industries in most Member States. This diversity is still the main picture of the EU food industry, despite growing concentration: the top five food processing firms are estimated to represent an overall market share in retail of 15% in a majority of Member States. On a product category basis however, a few food industries are much more concentrated: for example in the biscuits or the confectionery sectors, the CR5 is above 60%.

Food retail is also characterised by the existence of a high number of SMEs involved in food trade (over 99% of the enterprises, representing 54% of turnover and 56% of the total employment), but with important differences across Member States. Large food retail chains account for a varying share of the market (from around 30% in IT to around 90% in FI).

With such a diversity of actors in the FSC, the channels to bring food from the farm to the fork are themselves diverse. The case of tomato supply chain in Spain[38], offers an illustration of this diversity: a 'local' supply chain represented by a network of small-scale agro-ecological farmers selling directly to consumers; a 'mixed' chain from medium-sized semi-diversified farms selling through a cooperative to a network of grocery shops in the same region; and a 'global' chain where tomatoes are produced on substrate in average- and large-sized farms of a specialised region (Almeria), and sold to a wholesale cooperative that supplies wholesale markets and, sometimes, directly to retailers throughout Europe. Just for short or for local FSCs the diversity of organisational arrangements is striking, from Community-supported agriculture

[37] Bock A.K. et al. (2020) Farmers of the Future.

[38] Gamboa, G., Kovacic, Z., DI Masso, M., et al. The Complexity of Food Systems: Defining Relevant Attributes and Indicators for the Evaluation of Food Supply Chains in Spain, Sustainability (2016).

schemes, to diverse types of on-farm sales, farmers markets or shops, public procurement schemes, e-commerce arrangements, etc.[39]

In terms of policy, favouring a diverse supply chain can contribute to food system resilience. A key characteristic of agriculture production is its dependence on the weather, and trade across regions of agricultural products is a way to hedge against unfavourable weather events in one or more specific regions[40]. The importance of trade for resilience is likely to increase in the face of the climate change[41]. Similarly to the approach of biodiversity offering a buffer for ecosystems against external shocks, it can be demonstrated that diversity of supply chains reinforces the capacity of a city to resist to food shocks, for instance generated by drought events[42]. The existing FSCs system was remarkably resilient during the COVID-19 pandemic, including successfully innovating to respond to a fast changing situation[43]. This illustrates the ability that FSCs have to respond to market-led changes, including to shifts in consumer food demand towards short or local FSCs. The role of short and local FSCs was also the subject of a GREX presentation by Via Campesina[44]: short FSCs can still work in events where vulnerabilities linked to supply flows are at stake. Short FSCs have their role to play in such events, as shown during the COVID-19 pandemic, as alternatives to longer supply chains. But shocks can be of multiple types, and flexibility and options are needed. The literature shows that local food systems are not able to feed the whole world population on their own, and that global FSCs are essential to ensure an adequate and stable food supply[45]. That is, local and global FSCs are complementary, from a resilience perspective. But further: local and global FSCs are also mutually benefitting and reinforcing each other, with positive spill-overs occurring from the operation of global, highly efficient and innovative FSCs contributing to the modernising and the spurring of innovation of local production systems[46].

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[39] Short Food Supply Chains and Local Food Systems in the EU. A State of Play of their Socio-Economic Characteristics.

[40] Dall'Erba, Sandy, Zhangliang Chen, and Noé J. Nava. "US Interstate Trade Will Mitigate the Negative Impact of Climate Change on Crop Profit." *American Journal of Agricultural Economics* (2021).

[41] Pérez Domínguez, I., Chatzopoulos, T., and Hristov J., Economic adaptation of EU agriculture to climate adversities: the role of trade as a buffer , 26 March 2021.

[42] Gomez, M., Mejia, A., Ruddell, B.L. et al. Supply chain diversity buffers cities against food shocks. Nature 595, 250–254 (2021).

[43] https://read.oecd-ilibrary.org/view/?ref=134_134305-ybqvdf0kg9&title=Food-Supply-Chains-and-COVID-19-Impacts-and-policy-lessons&_ga=2.130541263.1760422270.1627227487-1315192944.1603338099.

[44] How can short food supply chains make Europe more resilient to food crisis? Presentation at the GREX 21 April 2021.

[45] Kinnunen, P., Guillaume, J.H.A., Taka, M. et al. Local food crop production can fulfil demand for less than one-third of the population, Nature Food (2020).

[46] IFPRI Virtual Event – "Local vs Global? The role of trade in building food system resilience", https://www.ifpri.org/event/virtual-event-local-vs-global-role-trade-building-food-system-resilience?fbclid=IwAR3sFl1H5ps6zv9wsHoCxkrZwhi0RUMZTkO4Xjz5f0OnILyprR_xjDUeQ-c.

2.2. Risks and vulnerabilities

2.2.1. Risks to the food system

The Commission's *Megatrends Hub* identifies fourteen global **megatrends**[47]. These are long-term global driving forces that are observable in the present day and are likely to continue into the future. The JRC in the second GREX meeting (organised in February 2021) looked at how some of these megatrends are likely to affect food supply and food security in the EU, offering a categorisation in three groups (figure 10):

1) Mega-trends with a highly disruptive potential for FSCs, which include: security (attacks on energy or other critical infrastructure); expanding use of technology and IT infrastructure (for example, IT failure, cyber-attacks, disruption to communication channels); climate change (more frequent extreme weather events and natural disasters, newly introduced and expanding pests); health (pandemics, biosecurity and bioterrorism); and social inequalities (social unrest, decreasing social capital).
2) At a lower level of disruptive potential: mega-trends related to work and migration (availability of workforce, organisational structures); education (training, misinformation); resource scarcity (land availability, water, nutrient scarcity); and the growing importance of East and South (geopolitics, international trade). Some of these may both bring risks to food security, as well as opportunities to improve food security (for example, international trade and migration dynamics can have a positive impact on system resilience);
3) Megatrends that reflect structural developments that have to be taken into account, but that have a lower disruptive potential in relation to food security: demographics (aging society, depopulation); the role of cities (city food policies, broader contingency plans at city level); governance (new networks, new actors); consumerism (higher demand, food prices, food innovation).

The World Economic Forum (WEF), based on survey results in its Global Risks Report[48], identifies the **top global risks** according to their time horizon (short-, medium-, and long-term), likelihood, and impact (see figure 11). According to WEF, the top short-term risks relate to diseases, livelihood crises, extreme weather events or cybersecurity. Medium-term risks are more structural (asset bubbles, debt crises). Long-term risks relate to the weakening of states or natural resources crises. WEF assesses four of the five most likely risks to be linked to the environment: extreme weather, climate action failure, human environmental damage, and biodiversity loss. Another category of likely risks are related to technology (3 of the top ten risks according to WEF: digital power concentration, digital inequality and cybersecurity failure). Societal risks like diseases (pandemics) and livelihood crises are also seen to be both among the ten most likely and impactful.

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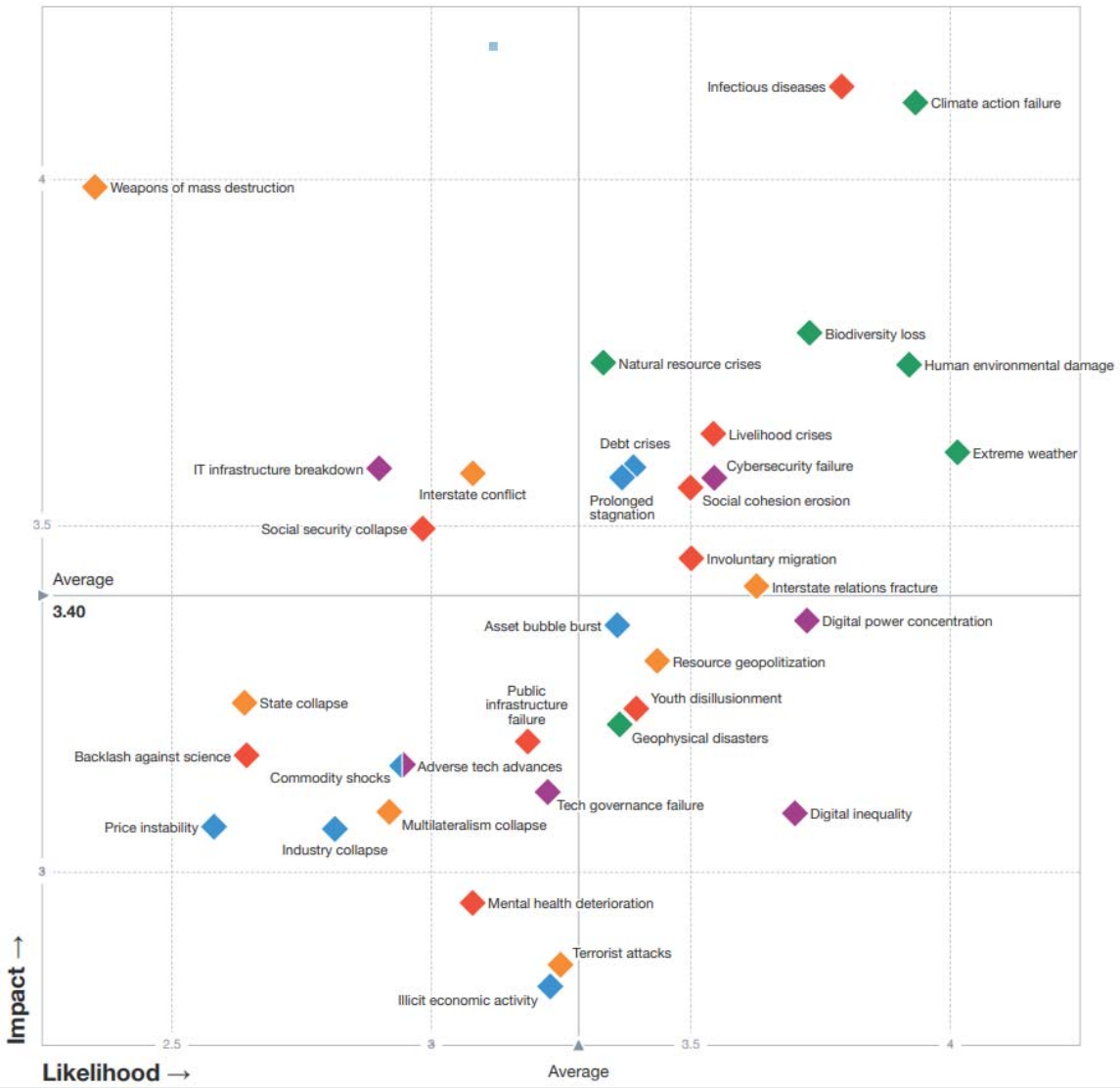
[47] These long-term driving forces are identified and monitored by the Commission's Joint Research Centre (JRC). They are continually reviewed by JRC experts to include updates and accommodate associated trends of relevance or interest for the EU Commission Services. The definitions of the 14 megatrends are available here.

[48] World Economic Forum: https://www.weforum.org/reports/the-global-risks-report-2021 and presentation at the GREX.

FIGURE 10 - RESULTS OF A MAPPING EXERCISE OF 14 MEGATRENDS IN RELATION TO FOOD SECURITY

Source: JRC, 2021

FIGURE 11 - WEF SURVEY: PERCEIVED IMPACT AND LIKELIHOOD OF GLOBAL RISKS



Source: WEF, 2021

Beyond this mapping of risks, the WEF also identifies frontier risks (see figure 12). These are seemingly less likely (low probability possibilities), but the impact of which could be large. An example of such frontier risk is that related to large volcanic eruptions, which are known to cause extreme climate and weather variations, depending on numerous factors including the location of the volcanic eruption, its timing, duration, etc.[49]. In 1815, Tambora erupted in Indonesia resulting in severe local and global impacts. 1816 was known as the 'year without a summer' in the Northern Hemisphere (America, Europe) and characterised by widespread crop failure[50].

[49] Puma, M.J., Chon, S. and Wada, Y. (2015), Exploring the potential impacts of historic volcanic eruptions on the contemporary global food system.

[50] Oppenheimer, C. (2003) Climatic, environmental and human consequences of the largest known historic eruption: Tambora volcano (Indonesia) 1815.

This illustrates the high degree of uncertainty around the nature of the next crises that could affect food security and food supply in the EU.

FIGURE 12 - WEF FORESIGHT ON FRONTIER RISKS

Source: WEF, 2021

Two examples can be further detailed. Most of the risks among those quoted for food supply and food security are associated to shortages in the supply of food in terms of quantity produced (due to large-scale crop failures or conflicts). Since its inception, the EU has largely been preserved from such risks, but these should be kept in mind as possibilities.

A clear outcome of the Commission's own consultation process is that climate change-related weather events and environmental degradation are the perceived main source of risk to food security in the EU in the future: 60% of respondents to the Commission's stakeholder questionnaire considered extreme weather events and global warming as the main threats to EU food security. This result was confirmed by participants in the GREX (Annex 2) and by the answers to the Commission's "Member States' questionnaire" (Annex 3). Global warming and climate change affect the phenology of plants and animals, the distribution of agro-climatic zones and fish populations, water availability, the development of pests and diseases, and yields - both in quality and quantity[51]. For any particular crop, the effect of increased temperature will depend: in some areas, warming may benefit the types of crops or allow farmers to shift to crops that are currently grown in warmer areas. Conversely, if the higher temperature exceeds a crop's optimum temperature, yields will decline. The increase of CO2 concentration can result in increased plant growth, but also reduced nutritional value. Animal production is also affected though heat stress, increased exposure to diseases and by the impact of drought and heat for example on pastures and feed grain production. Heat and cold waves, water scarcity and droughts, floods, and wildfires will all directly impact farming, as well as indirectly through increased levels of weeds, pests and fungi that benefit from warmer and wetter climate

[51] OECD – opportunities and threats for agriculture https://www.oecd.org/agriculture/understanding-the-global-food-system/opportunities-and-threats-for-agriculture/.

and of CO2 fertilisation. The impact of climate change on EU agriculture has been modelled and shows that, without adaptation, cereals yields might decrease, in particular in Southern Europe, with expected losses corresponding to 10% to 20% of the current yields, and up to 80% in Southern Europe in non-irrigated systems for maize, a crop that will become unavailable in regions where water is getting scarcer[52]. Illustrating the North-South divide in Europe in relation to climate change, wheat yields could on the contrary slightly increase in Northern Europe (by up to 5%), regions that would benefit from more precipitation, an anticipated growing cycle, and CO2 fertilisation effects. Given the severe climate change impacts on large agricultural producers outside Europe, EU production could slightly increase as Europe is projected to have a comparative advantage. Globally, agricultural production is currently not expected to decline due to climate change before 2050[53]. Other threats to EU food supply often identified by respondents to the questionnaire relate to the environment in general, with resource scarcity or degradation and biodiversity loss (e.g. pollinators), plant or animal health issues (uncontrolled plant or animal pests), and human health (pandemics).

A decrease in the catches of wild fish is also likely to occur under the effect of climate change. Models show global marine life biomass could decrease by 5% to 17% under the sole effect of climate change, primarily driven by increasing seawater temperature and decreasing primary production (with important variations across regions and species)[54].

Recent extreme weather events such as unusually late cold spells combined with vegetation being in advance (in 2017, 2021), the increased frequency, intensity and length of droughts (2018, 2019), unusual heatwaves (2003, 2019) and floods (2021), show that climate change already affects agricultural and seafood production in the EU today. The probability of occurrence of years that are both warm and dry has doubled compared to the period 1961-90[55]. The IPCC 6th assessment report confirms that "many regions are projected to experience an increase in the probability of compound events with higher global warming. In particular, concurrent heatwaves and droughts are likely to become more frequent. Concurrent extremes at multiple locations become more frequent, including in crop producing areas (...)"[56]. In addition, the joint probability that key crop and pasture regions simultaneously experience severely warm conditions in conjunction with dry years has also increased. This affects the risk for yield shocks for regional and global agricultural markets and has implications for food security, in particular as there is an increase in the probability of climatic extremes hitting several major agricultural regions simultaneously. For example, this increasing risk of simultaneous failure has been illustrated for wheat, soybean crops[57] and maize[58]. A few countries dominate global maize production and trade. Simultaneous production shocks in these countries can have tremendous impacts on global markets. Such synchronous shocks are rare, but will become more likely if the climate continues to warm. The possibility that extreme weather events in different areas of the world happen close to each other in time, as shown in

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52 JRC, Climate change impacts and adaptation in Europe, 2020.
53 European Environmental Agency, Global climate change impacts and the supply of agricultural commodities to Europe, February 2021.
54 Lotze, Heike K., et al., Ensemble projections of global ocean animal biomass with climate change, 2018.
55 Sarhadi, A., Ausin, M.C. et al., Multidimensional risk in a nonstationary climate: Joint probability of increasingly severe warm and dry conditions, 2018.
56 IPCC, Climate change 2021, The Physical Science Basis, Summary for Policymakers, 2021.
57 Gaupp, F., Hall, J. et al., Changing risks of simultaneous global breadbasket failure, 2018.
58 Tigchelaar, M., Battisti, D.S. et al., Future warming increases probability of globally synchronized maize production shocks, 2018.

the Northern Hemisphere in association with a meandering jet stream[59], could further increase the probability of negative effects on crops.

While climate change and related extreme weather events can affect the supply of food, other risks weigh on the capacity of the FSC to bring the food from producers to consumers. Cyber-attacks affecting the IT systems of large companies in the agri-food sector have already resulted in disturbance to the food chain. For instance, food systems are becoming increasingly dependent on information networks - as is the case for every aspect of modern life. This implies considering the potential impact of cyber-insecurity on food systems[60]. Food processing uses increasingly sensors, for example to monitor food product temperature during processing and transportation, ensuring products being processed or transported remain at optimal temperatures. A potential risk is that the sensors could be manipulated, allowing food products to be stored at less than optimal temperatures without being noticed, thereby leading to an enhanced risk of bacterial contamination or loss of shelf-life. Food systems are also reliant on just-in-time transportation: agricultural producers depend on timely transportation of seed, fuel, fertiliser and plant protection products, as well as on the timely transportation of harvested crops to processors to ensure crop quality is maintained. Grocery retailers require the timely delivery of processed agricultural products, along with fresh fruits and vegetables, for ultimate delivery to the consumer. In these systems, inventories are kept light, and much of the "inventory" is in transit at any one time. Cyber-infrastructure breach in just-in-time distribution settings could have seriously disruptive ripple effects across the supply chain. An example occurred in June 2017 when the 'NotPetya' malware attack infected the IT networks of the shipping company Maersk. The company, which is responsible for 15% of all global freight, reported $300 million in losses. Ships could not be located at sea, nor could they be unloaded at port. All Maersk operations came to a standstill. It took 10 days for the company to restore all systems. According to Maersk Chairman Jim Snabe, 'human resilience' and support from customers made it possible for Maersk eventually to cover 80% of shipping volume through manual systems while IT was down. If the attack had spread more widely across the transport sector and related industries, damage costs could have grown exponentially with spill-overs across multiple sectors and economies.

On the consumer side, the development of the Internet of Things could also imply risks for food—if hackers were able to control the temperature settings on smart refrigerators, consumers could unwittingly be exposed to food spoilage or food poisoning. The capacity for disinformation on social media, and the degradation of trust towards traditional media outlets creates an environment where carefully-crafted rumours could become viral for instance concerning food safety.

This also applies at farming level, with the development of precision farming, threatening potentially also supply, not only distribution: sensors the rate of application of water, pesticides and herbicides, for activating ventilation systems or monitoring health of animals in livestock farms, autonomous robots (i.e. robotic milking machines) deployed in large part to relieve a shortage of labour on farms and driverless tractors are being tested. Attacks on these systems result in short term disruption of availability of information or long term manipulation of one or more of the data inputs. The negative potential effects (such as the over-application of

[59] Kornhuber, K., Coumou, D. et al., Amplified Rossby waves enhance risk of concurrent heatwaves in major breadbasket regions, 2020.

[60] Jahn, M.A., Oemichena, W. et al., Cyber Risk and Security Implications in Smart Agriculture and Food Systems, 2019.

fertilizer, etc.) might not be detected until it is too late in the growing season, causing irreversible damage.

Based on the above, the EU FSC, and its capacity to provide food to EU citizens, is thus facing increasing levels of uncertainty and volatility. Further there may be risks that are unknown and, thus, unanticipated – which pose further challenges.

2.2.2. Potential vulnerabilities of the EU food supply chain

The EU's FSCs remained resilient during the COVID-19 crisis. The decline in food and drink industry production was much lower than compared to total manufacturing production (-9.1% in Q2 2019)[61]. Similarly, while the employment levels in the food and drink industry decreased, they did so to a lesser extent than for total manufacturing.

As shown in Annex I, some bottlenecks emerged due to closed borders within the Single Market, which distorted the supply for inputs, transport of goods as well as, through confinement and other issues, caused labour shortages. Another problem in supply arose from panic buying and stockpiling by consumers in the first weeks of the pandemic. Nevertheless, , supply chains stabilised quickly and remained resilient.

During the second wave, the food industry was impacted to a lower extent than the first wave, as some producers were able to adapt to new types of demand and outlets (e.g., adjusted packaging, labelling, and production, delivery or take-away services, on-line sales). Additionally, borders remained open, and consumers refrained from panic buying and stockpiling.

Regardless of its remarkable resilience, the food sector faces different sets of challenges compared with other sectors that are not as critical for daily life. These challenges are linked at least to the five following factors: need for workers/labour, changes in consumer demand and habits, business continuity of food production facilities, changing food trade policies, and financial pressures in FSCs (see box 1 for an example from Nestle). The following subsections give an overview of the vulnerabilities by stage in the food system. One noteworthy aspect is the interdependence between the different sectors – from this perspective, a vulnerability in one specific sector can quickly become a vulnerability for the other sectors.

[61] de Vet, J.M., et al., Impacts of the COVID-19 pandemic on EU industries, March 2021.

BOX 1 - EXAMPLE FROM NESTLE[62]

Challenges for the food supply chain

Response

Setting up COVID-19 steering committees (24/24h crisis management approach)

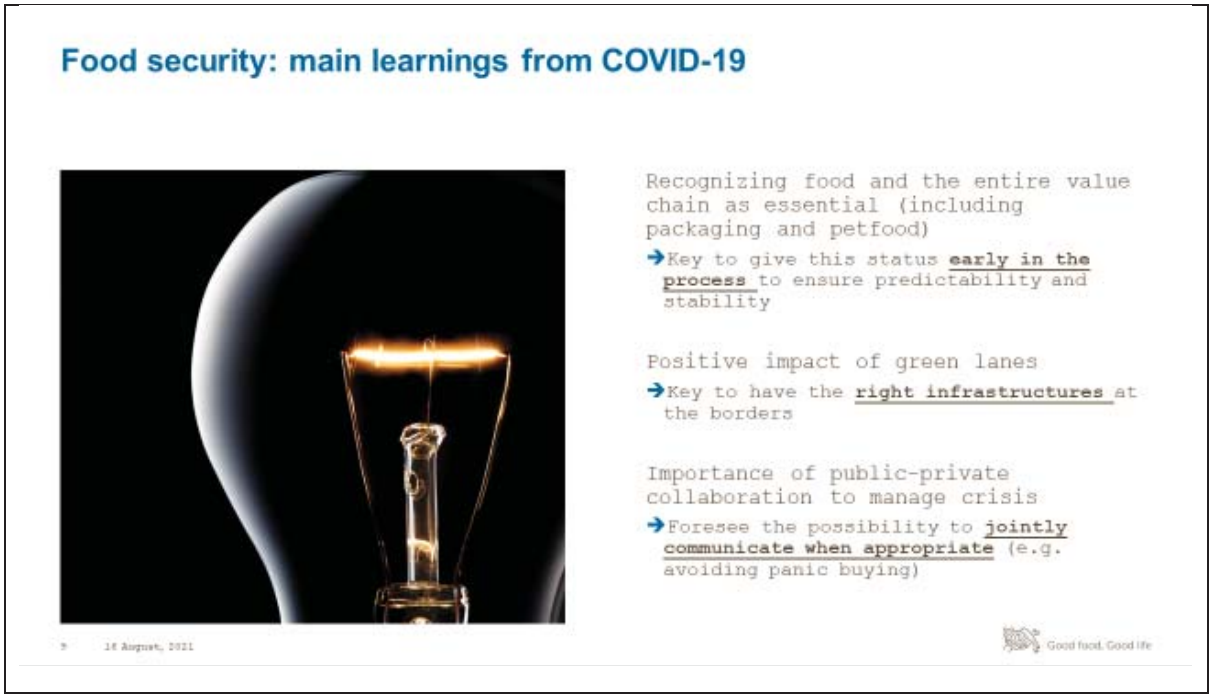
- to **protect employees**, with additional safety measures, programmes to support the mental health of employees, protocols with labour unions on health and safety at work (both at company level and sector level), rewarding frontline employees with benefits, remuneration of employees affected by temporary stoppage for a certain duration;

- **to ensure food supply and operative responsiveness,** thanks to crisis management processes (increased inventories, early risk identification, strong focus on supply base), business continuity plans, agility (consider all options and procedures) at supply level, transfer and share of contingency volumes and technicians between factories, development of visibility tools (for example, on transport, the online tool "Sixfold" developed with a supplier to ensure visibility of delays at borders), preventive measures to protect drivers, be prepared for 'plan b' in transport and distribution;

- to **help society** where possible through public-private partnerships

Lessons learned

[62] Praillet, R. Presentation at the expert group on the Contingency Plan for ensuring food supply and food security, 21 April 2021.



Agricultural producers

During the first wave of the COVID-19 pandemic, farmers in the EU suffered significant economic losses because of supply chain disruptions or the closure of specific trade channels (e.g. food services). These events led in some cases to production surpluses. Farm incomes in 2020 declined 7.9%, corresponding to EUR 7.1 billion, compared to 2019[63].

Overall, studies show that, despite the pandemic, EU agriculture performed relatively well in 2020-21, with production and trade levels remaining stable. Prices also remained stable across sectors; according to FAO's Food Price Index, global agri-food prices have even been on an upward trend over the last months. In the animal products sectors in particular (dairy and meats), price levels in 2021 are not only above last year but also clearly above the 5-year average. Still, there seems to be a low level of systematic planning by primary producers for the event of crises: 83% of the primary producers that responded to the Commission's targeted stakeholder survey stated they did not have a risk management or contingency plan in place before the COVID-19 pandemic.

Some sectors, however, were affected more severely than others. The whole or parts of the wine, beer, frozen/processed potato and meat (beef, poultry) sectors were impacted by the closure of restaurants. The flowers and plants sector experienced significant financial losses. The consumption of sugar also declined.

Importantly, the pandemic significantly affected consumer preferences. It is possible that some of these changes may become structural (or have accelerated structural changes already taking place before the pandemic). Consumers are increasingly interested in buying food online, in convenience shopping, as well as in the consumption of healthy products. However, and

[63] European Parliament.- Research for the AGRI Committee, Preliminary impacts of the COVID-19 pandemic on European agriculture: a sector-based analysis of food systems and market resilience, 2021.

especially for low-income groups, price has become a key determinant of food choice, often to the detriment of healthier options, in the face of increase economic uncertainty.

The COVID-19 crisis has not significantly affected the capacity of the farming sector to keep its business. Shortages that could be feared on inputs (fertilisers, seeds, plant protection products and veterinary medicines and feed) did not materialise, thus had virtually no effect on the on-going and subsequent production cycles.

BOX 2- EXAMPLE FROM ARLA FOODS[64]

The Arla crisis management mechanism includes the following steps:

Report: clear reporting lines; single points of contact in countries; regular training and guidance updates;

Assess: quick 360º assessment and instant approval of assessed crisis level;

Manage: crisis response structures set up ; roles and responsibilities assigned;

Evaluate: ongoing feedback loop; evaluation of situation and link to response.

Experience with COVID-19

COVID-19 combined different crises elements and impacts, and tested the preparedness of the company like never before. Arla is a co-operative, and has the advantage of a close relationship between farmer and company. This means a deep understanding about the functioning of the supply chain. While consumption patterns remained stable for dairy staples, several challenges arose, but dairy industry showed itself to be highly resilient.

Lessons learned

Resilience is not built overnight. There is a need for a strong policy, financial, and cultural environment to support the dairy sector. Supply can't be quickly turned on and off;

Global integrated supply chains give flexibility to move products to where they are needed, and to source inputs from the global market when needed;

Flexibility and agility is key for decision-making. Speedy responses should be replicated in the political and policy environment;

Data-led decision-making: spend 'peacetime' building the processes so they can be quickly executed in a crisis;

Partnerships can increase efficiency and effectiveness, but there concerns around what can be done under competition rules

Fishers and aquaculture producers

Drawing conclusions from the COVID-19 crises, the fisheries sector has been mainly affected by the changes in downstream demand, as well as by restrictions operations. The demand for certain species decreased substantially, in particular for demersal fresh fish fisheries, as sales decreased in the HORECA sector. For some time, exports were also restricted among other due to limited and costly air freight capacities. The working conditions in fishing vessels make it

[64] Morrisson, G., Arla Foods crisis preparedness and response, 21 April 2021.

difficult to maintain physical distancing (as also mentioned in Annex 1). Consequently, many fleets had to cease their activity temporarily during the peaks of the pandemic and to change procedures on board. In addition, there was a need to alter control routines, since inspectors and observers were unable to board the vessels.

In the aquaculture sector, farms had problems with decreased demand, which meant fish had to be kept longer in facilities. Consequently, hatcheries and nurseries had problems selling juvenile fish for the next stage of the production cycle. Farmers reported that reduced tourism led to low sales over the summer of 2020. Some MSs reported that the direct sales of some species increased in 2020 (but fewer fish may be available in 2021)[65]

In the seafood sector, professional organisations, in particular producer organisations recognised under the Regulation on the Common Organisation of the Market for Fishery and Aquaculture products [66], have played a crucial role during the health crisis, for the implementation of emergency measures, in particular in adapting their members' production and marketing strategies to a suddenly changing and substantially lower demand.

Processors

The COVID-19 pandemic led to disruptions in the food processing industry, which was affected by rules on social distancing, by labour shortages due to sickness, and by lockdown measures to contain the spread of the virus.

In some instances, high levels of concentration in the processing sector may have compounded the negative effects of the pandemic.

In confined spaces, such as packing plants for fruits and vegetables or meat and seafood processing facilities, social distancing measures necessary to ensure adequate employee protection reduced the efficiency of operations. Many firms reported high rates of worker absenteeism (for example, staff availability was reduced by up to 30% in French meat processing facilities in the regions of the country worst hit by COVID-19[67]). Processors were also impacted by similar sanitary and confinement measures adopted by operators from which they source their raw material.

In some cases, workers live together in overcrowded conditions, which further facilitates the spread of the virus and impacts worker availability. Meat processing appears to be more sensitive than other types of food processing due to the labour intensive nature of operations[68]: multiple outbreaks have been reported in many major meat-producing countries in the EU and in third countries, affecting the meat market, with prices pushed upwards due to the incapacity of processing facilities to supply. By contrast, grain handling and processing is highly automated and less labour intensive, and did not experience the same disruptions as the meat-processing sector.

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[65] Study on the main effects of the COVID-19 pandemic on the EU fishing and aquaculture sectors. European Commission, European Climate, Infrastructure and Environment Executive Agency. https://op.europa.eu/en/publication-detail/-/publication/14f00b66-b139-11eb-8307-01aa75ed71a1.

[66] Regulation (EC) 1379/2013 on the Common Organisation of the Market for Fishery and Aquaculture Products.

[67] Food Supply Chains and COVID-19: Impacts and Policy Lessons. OECD Policy Responses to Coronavirus (COVID-19), 2 June 2020. https://www.oecd.org/coronavirus/policy-responses/food-supply-chains-and-covid-19-impacts-and-policy-lessons-71b57aea/.

[68] ILO, COVID-19 and its impact on working conditions in the meat processing sector, 2021.

Retailers

During the COVID-19 pandemic, food retailers experienced increased sales due to a sharp shift in consumer behaviour from out-of-home consumption (at school, at work or in restaurants) towards food consumed at home. Retailers of frozen and packaged foods experienced the steepest increase in sales. In the first weeks of the crisis, sales of frozen foods in France were 63% higher than in 2019. Similarly, packaged food sales in Germany increased by 56%. Later on in the crisis during the summer of 2020, demand stabilised at 15% to 20% higher levels than during the same period in 2019[69]. For the whole year 2020, grocery retail increased by 8% in volume and 10% in value[70].

Food retailers were able to adjust to the changing demand. This was particularly the case for large retailers. During the pandemic there were significant changes to how consumers buy their food. Online food sales registered a high growth during the first months of the pandemic (a 55% increase in 2020). This corresponds to a shift of market share of 1.5 percentage points. By comparison, brick-and-mortar supermarkets lost ground, accelerating some previous trends. Customers from all demographics, but notably those over 50, shifted to digital and delivery. This has created an environment ripe for innovation, with a need to realign supply chains, redefine what parts of the food workforce are essential, and gain a deeper understanding of how to connect with customers through social media. The potential long-term impact of the pandemic on the grocery and food retail sector includes increased competition in the online sales space[71] and further digitisation, with consumer surveys showing this evolution is likely to continue.

Other challenges for the retail sector relate to a deeper polarisation between consumers going to more expensive products (trade up) and those who focus more on cheaper versions or substitutes due to lower available income (trade down). Such evolution has affected loyalty to retail brands, with a significant share of consumers changing stores or banner. The health and environmental consciousness of consumers is also on the rise, with the number of eco-active consumers rising from 6 to 10 percent in France, Spain or Germany.

Food services

The HORECA sector estimates losses of 60% to 90% in 2020 compared to 2019. The main reasons for the deep impact on the food service sector are related to the repeated targeted national restrictions limiting the functioning of restaurants, canteens, and bars. Food services are to an extent substitutable by physical or online retail food sales. As such, while the issues faced by the sector are linked to regulatory, social or economic factors, they seem limited from a food security of supply contingency planning perspective, unless large-scale disruption of the retail sector would take place.

Labour

COVID-19, and the resulting measures to contain the spread of infections have significantly affected the food-related workforce. Food is an essential sector that needs to keep producing during the crises, and workforce availability is a fundamental part of the sector's ability to produce.

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[69] de Vet, J.M., et al., Impacts of the COVID-19 pandemic on EU industries, March 2021.
[70] McKinsey, Eurocommerce, Disruption and uncertainty, The State of Grocery Retail, 2021.
[71] Deloitte, Understanding the impact of COVID-19 Grocery & Food Retail. 2020.

To alleviate these issues, the Commission published practical guidelines to ensure that, within the EU, mobile workers who qualify as critical in the fight against the coronavirus pandemic can reach their workplace[72]. Farming is by definition a seasonal activity with certain peaks of work along the year. Seasonal workers are critical to the agricultural sector in terms of harvesting, planting and tending functions, especially in some labour-intensive sectors like fruit and vegetables. The Commission adopted guidelines[73] to ensure the protection of seasonal workers in the EU in the context of the coronavirus pandemic. These provide guidance to national authorities, labour inspectorates, and social partners to guarantee the rights, health and safety of seasonal workers, and to ensure that seasonal workers are aware of their rights.

Migrant workers in particular, both from inside the EU and from neighbouring countries, provide critical labour and skills to labour-intensive agriculture in EU Member States, including by filling seasonal jobs for which is often difficult to find suitable local labour. Germany, Italy, France, Spain each receive between 150,000 and 400,000 migrant workers each year[74]. Migrant seasonal workers originate either from the EU (Romania, Bulgaria, and Poland in particular) or from outside the EU (Ukraine, Morocco, Albania, etc.). Between 2011 and 2017, the number of intra-EU migrant farm workers increased by 36%, and the number of extra-EU ones by 31%. Such figures are considered to be underestimates.

It is unlikely that the food sector in several EU Member States would be able to work at normal capacity without the workforce originating from outside the country. This makes labour one of the critical inputs in the food system, in a food security context. During Spring 2020, some estimated that 40 to 50% of the migrant workforce needed was not available. EU governments took a range of actions to compensate for this lack of workers, from organising charter planes to fly in the workers, to extending the work permits of those on-site, facilitating change of status (from student to seasonal worker), allowing asylum-seekers to work, or encouraging local population to step in. Further, seasonal workers' can face risky working conditions in pandemics, in some cases working in confined spaces with a lack of social distancing, sharing accommodation with poor hygiene conditions, or sharing transport.

Inputs

Fertilisers

Farmers – and therefore the whole food chain - rely on the supply of fertilisers to grow crops. For this reason, the sector can be regarded as essential in a food contingency planning context. To increase the sustainability of agriculture, the Farm-to-Fork Strategy aims to reduce fertiliser use by at least 20%. Excessive nutrients in the soil can contribute to problems such as pollution of drinking water, soil acidification and climate change. Still, an adequate supply of nutrients and micronutrients in the soil is essential to crop growth, as it increases the production of biomass in the plant and, thus, yields.

In consultation, the European fertiliser industry highlighted the following actions as crucial to improve the resilience of the sector[75]: ensure the continuation of transportation and distribution of fertilisers in the Single Market during crises; ensure a safe and healthy environment for the

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[72] European Commission, Coronavirus: Commission presents practical guidance to ensure the free movement of critical workers, March 2020.
[73] European Commission, Guidelines on Seasonal Workers in the EU in the Context of the COVID-19 Outbreak, July 2020.
[74] European Parliament briefing, Migrant seasonal workers in the European agricultural sector, 2021.
[75] Fertilizers Europe, COVID-19: Implications for the European fertilizer industry, 2020.

employees of the sector; ensure that agricultural inputs are listed as priority products, so that the transport and delivery of fertilisers would not face delays and disruptions at borders.

Seeds

Seeds can be high-tech, high value-added products, which form an important link in the FSC. 3,500 new varieties are authorized for marketing within the EU each year, and more than 42,000 different varieties of agricultural and vegetable species are available to farmers in Europe[76]. In planning seed security, it should be taken into account that the seed sector is global (more than 25% of commercial seed used worldwide is not locally grown). Moving seeds across borders enables breeders and seed producers to test seeds or breeding lines under specific regional environmental conditions, timing of harvests, and localised expertise. Unimpeded international movement of seeds is key to ensure that all farmers worldwide can access the high quality seeds, ultimately contributing to global agricultural productivity and food security. During consultation the European seeds industry highlighted the need to avoid restrictions to the free movement of seeds and related services in the EU, and to continually align the EU with international developments in the area of seed quality, seed health and market access requirements.

Feed and feed additives

The feed industry provides necessary inputs to the animal farming sector. It includes 3,500 compound feed manufacturing sites located mainly in rural areas. Its main challenges during the COVID-19 pandemic were essentially related to other stages on the FSC: logistical disruptions and uncertainties with regard to possible trade restrictions, worrisome for a sector where import dependency is high, impact on meat markets through reduced demand and meat industry capacities affected, and decreased availability of co-products (among others due to collapse in use of biofuels).

In addition, feed additives are important from a food safety point of view (feed preservation and hygiene is essential in protecting human and animal health), for ensuring nutritional value and optimal digestibility of feed (resource efficiency, animal welfare, reduction of antibiotics), and for reducing emissions and waste. From a contingency planning point of view, the feed and feed additives industry is also important because the sector is globalised, innovative, addressing societal concerns like antimicrobial resistance, and diverse (the sector includes a large number of SMEs). Feed additives are largely imported[77]. A striking example are vitamins for which the share of imports, mostly from China, is extremely high (for instance, in the USA, above 80% of the total use for vitamins C, B1, B6, B12[78]). The situation is similar for other additives, such as amino acids, trace elements, enzymes and others - markets where strong growth is expected (while overall feed demand is decreasing in the EU). This means that during the COVID-19 pandemic, disruptions in sea transport (shortage of containers) resulted in difficulties to ensure supply. Dependency on a few or single suppliers justified developing alternative sourcing, and delays in flows convinced companies of the need to develop regional stocks to be able to source more quickly.

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[76] Euroseeds, presentation at GREX 21 April 2021.
[77] FEFAC, presentation at GREX, 25 February 2021; FEFANA, presentation at GREX, 21 April 2021.
[78] Shurson, J. and Urriola, P., Understanding the vitamin supply chain and relative risk of transmission of foreign animal disease, 2019.

BOX 3 – EXAMPLE: THE EU ASSOCIATION OF SPECIALTY FEED INGREDIENTS AND THEIR MIXTURES (FEFANA)[79]

Specialty Feed producers occupy an important place in the food chain – they hold only 3.5% of the volume, but 10% of the value of compound feed.

The COVID-19 continuity plan for FEFANA's production units includes:

1. *Local pandemic management teams and the identification of essential functions;*

2. *Crisis monitoring, with follow-up of the spread on sites following international (WHO), national and regional authorities' recommendations;*

3. *Hygiene and protection measures, and quarantine rules recommended by the national authorities.*

4. *If needed, calls made to retired employees to work as back-up staff;*

5. *Increased frequency of office and facilities cleaning;*

6. *Strong limitation of inter-sites or plants visits, use of public transport;*

7. *Mandatory remote work for European employees in administrative and support functions;*

8. *Hygiene and protection measures for external visitors (for example, for raw materials supply and transport of finished goods);*

In addition, the early designation of the feed additives industry as essential for the food chain, and the good coordination at national level (authorities and business operators), were key during the pandemic.

Transport and logistics, advisory and consultancy

Some sectors of transport and logistics, such as seaports and storage facilities, have been dealing with pandemics and sanitary issues from the earlies history - the concept of quarantine originated at seaports. Transport and logistics operators already carried out some safety measures that had to be implemented during the COVID-19 pandemic. For example, in bulk cargo shipping masks are customary due to dust, high levels of automation make social distancing the norm with some operations, and there is a naturally high degree of ventilation is storage facilities. Also, the loading and discharging vessels implies a high volatility in daily labour demand and 24/7 availability, so port working systems are by design arranged based

[79] The EU Association of Specialty Feed Ingredients and their Mixtures, https://fefana.org/.

on cellular working teams which enables to keep "cells" of workers without contact among them. This provides resilience, if one cell is affected, the rest are not[80].

In terms of different means of transport, a key bottleneck – at least during the COVID-19 crisis - seemed to be sea transportation, mainly due to insufficient shipping capacity[81]. A global shipping container shortage occurred through a combination of a slowdown in investment in new capacities, changes in consumption modes, with on-line purchases needing quick delivery, and port congestion[82]. With the introduction of the Commission's 'Green Lanes' initiative, intra-EU road and train transportation faced fewer problems. The transport of perishable products by air also saw significant falls in traded volumes for certain goods, such as seafood exported to remote markets, for which air freight was either unavailable or too expensive[83].

There are also indications that other services related to food production (for example, technical advice to farmers and other food supply chain operators, consultancy services, etc.) have been affected by the COVID-19 pandemic[84]. Often these issues were related to the freedom of movement of workers and the classification (or not) of some business activities as 'critical'.

BOX 4 - EXAMPLE FROM UNISTOCK EUROPE[85]

Most storage companies have in place certain procedures, for the safety of workers[86]:

- Strict procedures of disinfection of machinery cabins, before and after each shift/worker;
- Mandatory masking at all times;
- Dressing rooms and showers' capacity reduced to 30%;
- Eating room capacity reduced to 15%;
- Contactless documentation of trucks and trains;
- Constant and transversal communication about the pandemic, helping to tighten ties among teams;
- Hydrogel easily available;
- Intense signalling with instructions about proper procedure.

BOX 5 - CASE STUDY: IATA[87]

IATA lists the following elements to improve the distribution and flow of perishable goods, such as food, throughout the supply chain:

- Ensure compliance with international standards, procedures and practices;

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[80] UNISTOCK, presentation at GREX, 21 April 2021.
[81] UNIDO, Global maritime supply chains in times of COVID-19, July 2021.
[82] Rabobank, Global Freight Market Outlook, 2021.
[83] IATA, presentation at GREX, 21 April 2021.
[84] OECD, Services Trade Restrictiveness Index, 2021.
[85] Association of Professional Portside Storekeepers in the Food and Feed Chain, http://www.unistock.be/.
[86] UNISTOCK, presentation at GREX, 21 April 2021.
[87] The International Air Transport Association, https://www.iata.org/. See IATA, presentation at GREX, April 2021.
In maritime transport there are also actions for improved resilience. For example, several leading companies have joined the Neptune Declaration on Seafarer Wellbeing and Crew Change, 2021.

- Improve handling and transportation performance (e.g. to address food wastage and loss);
- Embed social responsibility and sustainability practices, and communicate actions taken to customers;
- Apply appropriate quality and risk management processes and increase collaboration;
- Ensure product safety along the supply chain (e.g. food safety);
- Improve industry readiness and preparedness through applying guidelines, regulations, training, certification and registry;
- Apply a broader supply chain approach: a concerted effort to meet industry concerns and improve the level of competency, infrastructure, quality and training needed to ensure compliant handling and transportation of perishables throughout the supply chain.

Packaging

The packaging industry plays a key role in preventing food contamination, spoilage and food waste. Packaging shortages at times of crisis could worsen food availability issues. In the initial stages of the COVID-19 pandemic, the packaging supply chain faced several instances of disruption[88]. The switch from food services to home cooking made it necessary to solve the mismatch of packaging: large quantities packages, usual at wholesale to foodservices, had to be repacked in end-consumer packages. The closure of raw material suppliers during the COVID-19 pandemic in 2020 led to a shortage of some materials in 2021, while demand resumed with on-line sales, notably concerning paper-based packaging. For example, some egg suppliers in the UK had to switch from cardboard packages to plastic ones[89].

[88] EUROPEN, presentation at GREX.
[89] https://www.bristolpost.co.uk/whats-on/whats-on-news/britain-shortage-egg-boxes-supermarkets-4484632.

BOX 6 – EXAMPLE FROM THE EUROPEAN ORGANISATION FOR PACKAGING AND THE ENVIRONMENT (EUROPEN)[90]

Lessons learned from COVID pandemic

How to improve crisis preparedness in the packaging supply chain

- *Centralisation of risk management governance;*
- *Improving data visibility;*
- *Expanding and harmonizing risk categories;*
- *Reassessing the supplier base;*
- *Holding inventory;*
- *Strengthening supplier-customer dialogue.*

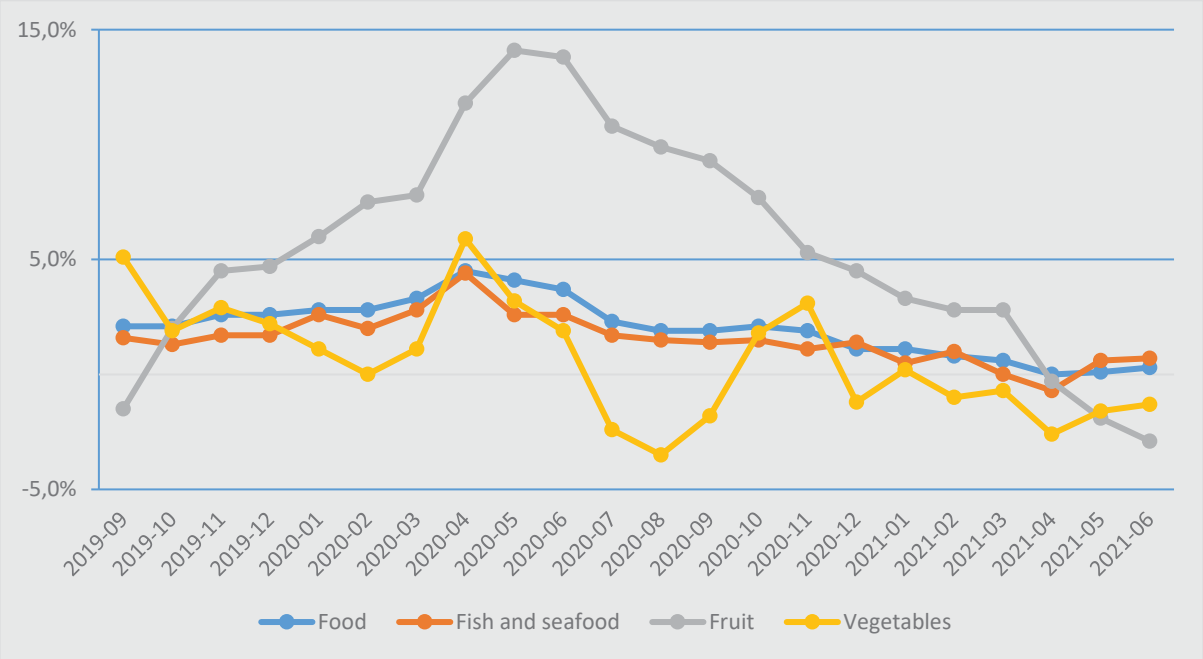
Consumers

One of the key consequences for consumers when food supply and food security are threatened is to see consumer prices increasing beyond what can be afforded. Consumer food price inflation reached a multi-year high of 4.5% in April 2020, but returned below 2% year-on-year as from the month of August 2020. The high levels of food price inflation registered between April and June 2020 may have been, in part, due to higher than usual demand for food products during the period (for example, due to displaced demand), as well as logistical issues in supply chains and in shops, including due to social distancing and hygiene requirements. Since April 2020, the deceleration of food prices (mostly from July 2020, inclusive) indicates an easing of these factors. Two sectors have seen significant increases of consumer prices: fruits (up to +15% year-on-year in May-June 2020) and vegetables (up +6% in April 2020, but with high prices already in 2019). For both categories, there is now deflation and the overall food inflation is low at 0.5% year-on-year during the first half of 2021. Seafood prices were affected in the same way, as EU households purchased more fishery and aquaculture products in 2020 than in 2019.

[90] The European Organization for Packaging and the Environment, https://www.europen-packaging.eu/.

Europanel data on household consumption of fresh fish in the largest EU consuming countries show increases by 7% in value and by 4% in volume from 2019 to 2020 for fishery and aquaculture products, most likely due to the closing of the HORECA sector.

FIGURE 13 - FOOD AND SELECTED FOOD ITEMS PRICE INDICES TO CONSUMERS (YEAR-ON-YEAR, % CHANGE)



Source: Eurostat, price statistics

Increasing prices are among the drivers that can trigger panic hoarding, the phenomenon of a sudden increase in buying of one or more essential goods in excess of regular need provoked by adversity, usually a disaster or an outbreak resulting in an imbalance between supply and demand, as defined in literature[91]. Hoarding can be due to a sense of perceived scarcity, that increased prices can reinforce, psychological (need to control) and social dimension as well as lack of confidence in the authorities. It can mix rational and irrational or emotional reactions[92]. From the rational side, consumers may consider shopping will be more difficult in times of crisis and decide to minimise the activity. Some governments suggested families to stockpile food, water and household essentials in March 2020. From the irrational side, some consumers may be affected by peer influence when they see others buying, creating a herd effect. Household stockpiling of commodities can trigger shortages and further price rise, thus resulting in negative externalities. It has been found particularly marked for non-perishable goods (although also signalled for fresh products), like for example canned fruit and vegetables or flour in Germany (over +100% in March 2020)[93]. It will disproportionately affect vulnerable

[91] Arafat, S.M.Y., Kuamr Kar, S. et al. (2020) Panic buying: an insight from the content analysis of media reports during COVID-19 pandemic.

[92] Wang, H.H. and Hao N. (2020) Panic buying? Food hoarding during the pandemic period with city lockdown.

[93] Lehberger, M., Kleih, S. and Sparke, K. (2021) Panic buying in times of coronavirus (COVID-19): extending the theory of planned behaviour to understand the stockpiling of non-perishable food in Germany.

people such as those in rural areas and those with low incomes. This may create a sense of fear, anxiety, insecurity, and panic among those affected. Media play an important role in spreading the news; disseminating photos of empty supermarket shelves, which in turn increase fear and anxiety among people, but they can play a positive role by disseminating reassuring messages, reducing fear and changing the perception of possible scarcity. One policy pursued in Belgium consisted in banning discounts to limit hoarding in March 2020. Such policy was quickly abandoned being considered to have fuelled food price inflation[94].

As noted during the consultations, the largest food security concern during the COVID-19 pandemic was due to the loss of income from economic shock[95]. Such loss of income, expected in times of crises, adds to persistent problems of food insecurity in developed countries, due to level of income, education, place of residence or others drivers of food insecurity. During the COVID-19 pandemic, public authorities coordinated efforts to provide food assistance to vulnerable groups[96]. Measures mostly involve increasing funding for pre-existing programmes, but also new measures, including meal and food parcels delivery services, free meals to children from low-income families, provision of protective equipment for volunteers in food banks and other charity organisations, increased budget for food assistance programmes with fund raising mechanisms also implemented by civil society organisations[97]. Some MSs[98] published guidance to ensure safe food redistribution activities.

Food banks played a role, but their activity has been hampered by a lack of volunteers, a lack of protective equipment at the start of the crisis, and an increased demand for food. 76% of food banks also declared they experienced a drop in financial resources[99]. The shortage of volunteers was due to the age of volunteers and to restrictions imposed by authorities, which implied an extra recruitment effort in particular for younger volunteers to ensure business continuity. Social distancing restrictions have also hindered food banks' efforts to redistribute food to those in need (for example, having to arrange to have food delivered directly at beneficiaries' homes). Donations from food services decreased significantly while retail faced increased demand. Food banks stated there was in 2020 a steep increase in the demand for food aid, as they redistributed in the first months of the year more than double the amounts of food as compared to the previous year, 2019[100] and they helped more than 34.7% in need as compared to 2019[101].

Through the recovery of surplus food from the supply chain and its redistribution to people in need, the work of food banks addresses both food insecurity and reduction of food waste. Facilitating food donation is an essential measure of many national food waste prevention programmes in order to ensure that any surplus food generated in the food supply chain is made available, as a priority, for human consumption. Close cooperation between actors in the food supply chain is crucial to ensure safe and effective food donation practices. Government

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94 https://www.euractiv.com/section/economy-jobs/news/belgium-ends-supermarket-discounts-ban/.
95 Baldwin, K., Examples of crisis management from developed countries from a food security perspective, May 2021.
96 Placzek, O., Socio-economic and demographic aspects of food security and nutrition, 2021.
97 . Social Emergency Fund – FEBA Campaign Portal.
98 Some examples can be found in the March 2020 edition of the EU Platform on Food Losses and Food Waste newsletter and in the resources library, Food loss and waste prevention during the COVID-19 crisis section of the European Commission's Food waste website.
99 European Food Banks Federation, European Food Banks in a post COVID-19 Europe, 2020.
100 Idem.
101 European Food Banks Federation, Annual Report 2020, 2021.

authorities support such cooperation by laying down relevant rules and/or guidance as well as providing incentives for food donation through fiscal measures or direct funding[102]. Some Member States have in addition introduced specific regulatory measures to stimulate food donation. For instance, in France, since 2016, food surplus at the retail level that is still edible must be donated to food banks[103]; this obligation was extended, in 2019, to the food and drink industry (> 50M€ turnover) and collective catering (<3000 meals/day)[104] and, in 2020, to the wholesale sector (if <50M€ turnover)[105]. Farmers in France can also donate produce from their farms that would otherwise be lost and in return receive a tax reduction. During COVID-19, initiatives[106] were also launched to find alternative destinations for surplus food, through implementation of "business-to-business" market places, reinforcing the existing initiatives that exist in normal times to limit or avoid food waste.

At EU level, the Commission adopted in 2020, and in addition to EU food donation guidelines[107] of 2017, - guidance on food safety management systems for food retail activities, including food donations[108]. The Commission is also currently amending EU food hygiene rules[109], in order to lay down certain requirements to promote and facilitate food donations, whilst guaranteeing safety for consumers. The Fund for European Aid to the Most Deprived (FEAD) supports EU Member States' actions to provide food and/or basic material assistance to the most deprived.. In response to the COVID-19 outbreak and growing needs, the Common Provisions Regulation and the FEAD Regulation were amended – first in April 2020 as part of the CRII+ initiative, to (i) allow for the use of indirect delivery modes, e.g. vouchers or cards (to lower the risk of contamination), (ii) allow for the purchase of personal protective equipment for organisations delivering FEAD support, and (iii) improve liquidity in the Member States, allowing them to use a 100% co-financing for one accounting year[110]. On 10 February 2021, the FEAD regulation was amended a second time, to allow for additional

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[102] FOODCLOUD is the largest social enterprise in Ireland matching businesses with surplus food to local charities and community groups; almost half of their operations are funded by the Irish government. Source: Benefacts.ie.

[103] French Government, LOI n° 2016-138 du 11 février 2016 relative à la lutte contre le gaspillage alimentaire, JORF n°0036 du 12 février 2016, texte n°2, 2016.

[104] French Government, Ordonnance n° 2019-1069 du 21 octobre 2019 relative à la lutte contre le gaspillage alimentaire, JORF n°0246 du 22 octobre 2019, Texte n° 23, 2019.

[105] French Government, LOI n° 2020-105 du 10 février 2020 relative à la lutte contre le gaspillage et à l'économie circulaire, JORF n°0035 du 11 février 2020, Texte n° 1, 2020.

[106] For example, in the Netherlands: Together Against Food Waste – Initiatives during the Covid 19 crisis; The B2B market place for good food.

[107] European Commission, EU guidelines on food donation, 2017.

[108] European Commission, Notice providing guidance on food safety management systems for food retail activities, including food donations, 2020.

[109] European Commission, Regulation (EU) 2021/382 of 3 March 2021 amending the Annexes to Regulation (EC) No 852/2004 of the European Parliament and of the Council on the hygiene of foodstuffs as regards food allergen management, redistribution of food and food safety culture, 2021. For further information: Food Donation (europa.eu).

[110] Regulation (EU) 2020/559 of the European Parliament and of the Council of 23 April 2020 amending Regulation (EU) No 223/2014 as regards the introduction of specific measures for addressing the outbreak of COVID-19 *OJ L 130, 24.4.2020, p. 7–10* .

resources, allocated in the context of the REACT-EU initiative, to be allocated to FEAD programmes (in addition to ESF and ERDF ones)[111].

Sudden changes of demand patterns for food (as was the case during the COVID-19 pandemic, but also in other events like the Russian embargo where food supply was not a stake, but where amounts of supply could suddenly not find their intended outlet), or disruptions in the food chain, as illustrated recently in January 2021 when goods traded between the EU and UK were reported to be spoiled due to delays in transport and logistics, represent a threat for increased levels of food waste. In the case of the COVID-19 pandemic, disruptions in the food supply chain contribute to food losses and unnecessary food waste[112]. This includes unsold products, poorer quality due to difficulties in accessing inputs or because of longer transport times, or food losses due to shortage of seasonal workers. Potential losses due to difficulties to manage stocks, including strategic reserves, can also be feared.

At household level however, there are indications that although the amount of food purchases increased during the lockdown, food waste actually decreased as people mainly bought more non-perishable food[113]. 26% of respondents to a consumer survey in the Netherlands indicated to waste less food at home thanks to better shopping planning (increased use of shopping lists, more longer shelf-life products, less impulsive buying), increased amounts of time spent on meal preparation and fewer leftovers, a better overview of what's in stock, attention to expiry dates and fewer unexpected events[114]. Consumer surveys carried out in other Members States (e.g. Ireland[115]) have indicated similar findings. Limited food supplies, higher prices, limited employment opportunities, increased time in the home allowing improvement of cooking practices are all factors leading to decreased food waste at home[116].

3. FOOD SECURITY POLICY IN PRACTICE

3.1 EU policies

The COVID-19 health crisis showed that the EU's FSC is resilient to large-scale disruption, and that the baseline conditions to deal with crises are solid. The following longstanding policies, as well as recently adopted measures and temporary initiatives, have been instrumental in achieving this outcome.

The Common Agricultural and Common Fisheries Policies (CAP and CFP), as set out in the Treaty on the functioning of the European Union[117], allow farmers, aquaculture producers and fishers, processors, traders and retailers to make good quality, affordable food available to consumers at reasonable prices. These policies have within their objectives, among others, the need "to assure the availability of supplies" and "to ensure that supplies reach consumers at reasonable prices" (Article 39.1 of the Treaty).

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[111] Regulation (EU) 2021/177 of the European Parliament and of the Council of 10 February 2021 amending Regulation (EU) No 223/2014 as regards the introduction of specific measures for addressing the crisis associated with the outbreak of COVID-19 OJ L 53, 16.2.2021, p. 1–5.
[112] FAO (2020), Mitigating risks to food systems during COVID-19 : Reducing food loss and waste.
[113] Pappalardo, G., Cerroni, S. et al. (2020) Impact of Covid-19 on Household Food Waste: The case of Italy.
[114] WUR factsheet, Evenveel of minder voedselverspilling bij consumenten thuis door COVID-19, 2020.
[115] Irish food waste attitudes survey, 2020, available on www.stopfoodwaste.ie.
[116] Saulo, A. (2021) How the COVID-19 Pandemic Has Impacted Food Waste.
[117] Treaty on the functioning of the European Union.

The main policy instruments to reach the objectives of the **CAP** are direct income support to farmers, risk management tools, other instruments for rural development, and market stabilisation policies under the Common Market Organisation (CMO) Regulation for agricultural products[118]. Direct payments provide an income safety net that supports the resilience of millions of EU farms, contributing to around 30% of the average income of the EU farming community depending on the years. They allow farmers to better cope with price instability[119]. Rural development policy makes a substantial contribution too by supporting investments, risk management, knowledge-building (including via the farm advisory system) and promoting the organisation of farmers in the supply chain. All these elements[120] contribute to reinforce resilience and adaptability of farmers in times of crises. The CMO for agricultural products includes safety nets for markets, with public intervention, private storage and exceptional measures to tackle market disturbance and /or specific problems. These tools have been used during the COVID-19 pandemics, as mentioned in Annex I, but also on the occasion of other crises that were not necessarily threatening food supply or food security in the EU, but that resulted in severe market disturbances negatively affecting the situation of EU farmers (for example the Russian embargo on EU food exports declared as from August 2014).

The **CAP is undergoing a process of reform**, due to be implemented from 2023. The reform aims at further improving sustainable development and contributes to Green Deal objectives. The concept of resilience will figure even more prominently in this reform - including with a compound indicator measuring the economic, social and environmental resilience of agriculture.

The **CMO for agricultural products** will also be revised, and its large array of instruments and practices reinforced. Exceptional measures will now also cover crises related to plant health issues in certain sectors; the existing market observatories will be complement by new ones and benefit from a clear legal base; and the Commission will regularly report on the implementation of exceptional measures. The future Strategic Plans Regulation includes rules to resolve specific problems in an emergency. Finally, the new financial reserve represents an improvement on the previous arrangements with the crisis reserve (higher amounts, of at least €450 million every year, and more easily directed towards measures such as emergency buying and private storage aid).

In **the seafood sector**, the **CFP's** guiding principles are both the need to ensure economic, social and environmental sustainability, and the need to contribute to the availability of food supplies. This contributes to a resilient food system.

The **Regulation on the Common Organisation of the Markets in fishery and aquaculture products** (CMO)[121] is an integral part of the CFP. The CMO was set up to stabilise the markets and guarantee a fair income for producers. Over the years, it has steadily evolved from a system involving market intervention to one that focuses largely on sustainability. Rules and

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[118] http://data.europa.eu/eli/reg/2013/1308/oj.

[119] EEIG, Agrosynergie, Evaluation study of the impact of the CAP measures towards the general objective "viable food production", 2020.

[120] Bergevoet R.H., et al., Improving crisis prevention and management criteria and strategies in the agricultural sector, 2019.

[121] Article 2 of the Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy states that the CFP "shall ensure that fishing and aquaculture activities are environmentally sustainable in the long-term and are managed in a way that is consistent with the objectives of achieving economic, social and employment benefits, and of contributing to the availability of food supplies".

procedures have also become simpler, and governance has improved since Producer Organisations (POs) in the fishery and aquaculture sector have taken on more responsibility for managing their own activities through their production and marketing plans. The strong structuring of the sector around POs and their empowerment to collectively manage and control their members' activities, as well as opportunities arising from the mutualisation of resources, are determinant in the ability to 'fish for the market', maximise revenues and adapt to external shocks.

In response to the COVID-19 outbreak, the Commission also provided rapid support to the sector through amendments to the **European Maritime and Fisheries Fund (EMFF)** and to the **regulation on the CMO in fishery and aquaculture products** to allow for crisis compensation payments to the fishery, aquaculture and processing sectors. As mentioned in Annex I, in view of the usefulness of these measures, the new Fund for 2021-2027 – **European Maritime Fisheries and Aquaculture Fund (EMFAF)** – can support actions to build up and strengthen the resilience of the sector, and includes a new scheme to provide financial compensation in case of exceptional events causing a significant disruption of markets, upon recognition of the occurrence of such events by the Commission. This would allow rapid activation by the Commission of exceptional temporary emergency measures.

Market **monitoring tools** can play an important role for public authorities and stakeholder during crises. Quick access to market information allows observing market developments during a crisis, and is critical to inform effective and speedy policy responses. At EU level, sectoral market monitoring and the short-term or medium-term outlook activities of the European Commission support the work of the Market Observatories and the Civil Dialogue Groups. The CAP indicators (Common Monitoring and Evaluation Framework - CMEF) for the CAP 2014-2020, identifies a set of performance indicators in four categories: context, output, result, and impact, which help to provide objective market intelligence that is made publicly available (in particular through the Commission's Agri-Food Data Portal[122]). In the seafood sector, the European Market Observatory for Fisheries and Aquaculture Products (EUMOFA[123]) provided prompt and targeted monitoring of the market developments, with a focus on those species most affected by the COVID-19 crisis. Open channels of communication between the Commission, public authorities and stakeholders proved to be critical for the exchange of robust qualitative information on market developments, in particular during the early stages of the COVID-19 pandemic, where the food policy context was developing quickly. The European Commission also contributes with concrete information to the G20 Agricultural Market Information System (AMIS)[124] monitoring activities.

The General Food Law Regulation[125], adopted in 2002 as a consequence of a series of food incidents in the late 1990s, lays down the general principles and requirements of food and feed law. While primarily addressing food safety, it is intrinsically linked to food security. It sets out an overarching and coherent framework for the development of food and feed legislation both at Union and national levels. To this end, it lays down general **principles, requirements** and **procedures** that underpin decision-making in matters of food and feed safety, covering all stages of food and feed production and distribution. It also sets up an independent agency

[122] https://agridata.ec.europa.eu/extensions/DataPortal/home.html.
[123] www.eumofa.eu.
[124] http://www.amis-outlook.org/.
[125] Regulation (EC) No 178/2002.

responsible for scientific advice and support, the European Food Safety Authority (EFSA)[126]. Moreover, it creates the main procedures and tools for the management of emergencies and crises, detailed below, as well as the Rapid Alert System for Food and Feed (RASFF)[127].

The EU Single Market, with its free movement of goods, capital, services and people, ensures access to a market of 450 million consumers and 22.5 million small and medium-sized enterprises. Keeping trade flowing within the internal market is paramount for ensuring food supply and food security in times of crises.

As a consequence of the outbreak of the COVID-19 pandemic in early spring 2020, with the aim to protect public health, Member States often closed their borders in a fragmented and uncoordinated manner, including to the circulation of goods. This initially led to a disruption of the Single Market, with long waiting times for freight vehicles at borders and cargo flights disrupted, triggering some shortages of food in some locations, and general uncertainty in the reliability of the supply of goods.

To ensure the continued functioning of supply chains in the Single Market, and so to avoid possible shortages in the context of the COVID-19 emergency, the Commission adopted specific **guidelines for border measures to protect health and keep goods and essential services available**[128].

A **Communication on the implementation of the 'Green Lanes'**[129] followed the guidelines for border measures in March 2020. The Green Lanes Communication stipulates that freight vehicles should not face more than 15 minutes total delay in crossing internal borders in the Trans-European Transport Network (TEN-T) area, irrespective of the goods they carry, and sets out accompanying provisions for transport workers.

The Commission adopted a **further upgrade of the Green Lanes Communication**[130] on 28 October 2020 with, among others, a focus on transport workers, stronger coordination and information, as well as on a crisis contingency plan.

On 30 March 2020, seasonal workers in agriculture were qualified as 'critical workers' in the fight against the coronavirus pandemic. To ensure that **mobile workers** within the EU (cross border and seasonal workers) as well as third-country nationals (seasonal workers) that qualify as critical workers can reach their workplace, two Commission communications were adopted in the form of practical guidelines[131].

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[126] European Food Safety Authority.
[127] Rapid Alert System for Food and Feed.
[128] European Commission, COVID-19 Guidelines for border management measures to protect health and ensure the availability of goods and essential services, 2020.
[129] European Commission, Communication from the Commission on the implementation of the Green Lanes under the Guidelines for border management measures to protect health and ensure the availability of goods and essential services, 2020.
[130] Communication from the Commission to the European Parliament, the European Council and the Council upgrading the transport Green Lanes to keep the economy going during the COVID-19 pandemic resurgence, COM(2020)685.
[131] Communication from the Commission Guidelines concerning the exercise of the free movement of workers during COVID-19 outbreak, 2020/C 102 I/03 (mobile workers within the EU).
Communication from the Commission COVID-19 Guidance on the implementation of the temporary restriction on non-essential travel to the EU, on the facilitation of transit arrangements for the repatriation of EU citizens, and on the effects on visa policy, 2020/C 102 I/02 (third-country nationals).

From the Single Market perspective, the COVID-19 pandemic has shown that some Member States may be tempted to implement **uncoordinated unilateral measures** in times of crisis. Several cases have been reported, both during the first lockdown and afterwards, when markets had recovered to a large extent. For example, the decision by the Romanian authorities through the Military Ordinance No. 8 of 9 April 2020 to restrict the export of certain grains, including within the Single Market, added to an already tense situation. The Ordinance added to logistical difficulties in road freight and harbours, and could have led to price increases or localised shortages of the supply of grains (in particular in MSs depending on Romania's exports), if not finally withdrawn by the Romanian authorities. Similar measures, or general legal bases for export restrictions, were considered by several Member States during the COVID-19 pandemic (for example in Bulgaria, Slovenia, Latvia, and Lithuania). Other potential obstacles to the free movement of food products identified during the COVID-19 pandemic concerned rules or draft rules on setting maximum prices or margins (Romania, Poland, Lithuania, Slovenia, Latvia, Belgium, Spain); measures resulting in granting a favoured status to domestic/national products by means of minimum shares in retail outlets (Czech Republic, Slovakia, Bulgaria), or by the promotion of national products or calls to buy national (France, Bulgaria, Italy, Austria, Poland, Portugal, Lithuania, Croatia, Romania, Hungary, Czech Republic, Slovakia etc.). All these measures have **the potential to fragment the Single Market**, if not justified by legitimate objectives and proportionate, which in times of crisis can result in significant consequences for the supply of food in the EU. The Commission has therefore inquired these cases and in several instances sent letters of formal notice.

Finally, a **Temporary Framework for State Aid measures**[132] allowed Member States to channel up to EUR 100,000 to individual farmers and up to EUR 120,000 per company active in the fishery and aquaculture sector facing liquidity shortages. More than EUR 60 billion seem to have been directly allocated in support to the food sector by MSs in form of state aid[133] , to which the contribution of "umbrella state-aid schemes", implemented by certain MSs such as Spain should be added. Most schemes targeted the primary production stage and did not target a specific sector. Most schemes consisted in direct subsidies, but other form of financial support such as credit support, flat-rate payments, or tax exemptions were also implemented. Non-financial measures were also implemented by MSs, in particular concerning greater flexibility in working conditions.

EU **Research and Innovation (R&I) policy** provides a means to align, leverage and fund research and innovation relevant to Europe and the international context. For example, it rapidly mobilised funding to respond to the COVID-19 crisis and address EU Green Deal objectives through dedicated calls for proposals via Horizon 2020[134]. The former chanelled an EU contrubution of 1.4 billion EUR for the COVID-19 response[135], while the latter provided over 70 million EUR worth of financing for 7 food systems-related demonstrators. Food system R&I is also a priority under the new Horizon Europe programme (2021-2027), which builds on existing strategic partnerships like the EU-African Union High Level Policy Dialogue of Food and Nutrition Security and Sustainable Agriculture (HLPD-FNSSA), and also foresees

[132] https://ec.europa.eu/competition/state_aid/what_is_new/sa_covid19_2nd_amendment_temporary_framework_en.pdf.

[133] Arcadia (2021), Preliminary impacts of the COVID-19 pandemic on European agriculture: a sector-based analysis of food systems and market resilience.

[134] https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1669.

[135] https://ec.europa.eu/info/live-work-travel-eu/coronavirus-response/overview-commissions-response_en.

new instruments such as targeted flagship missions (Caring for Soil is Caring for Life[136], 100 climate-neutral cities by 2030 - by and for the citizens[137], Mission Starfish 2030, restore our ocean and waters[138], Climate Resilient Europe[139], Conquering cancer, mission possible[140]) and a number of international partnerships related to agriculture and food.

BOX 7 - LESSONS FROM THE EU ENERGY SECTOR[141]

There are various emergency procedures within the EU regulatory framework in case of major disruptions to energy supplies. The type of response depends on the type and level of emergency. The frameworks concerned are Council Directive 2009/119/EC, imposing an obligation on MSs to maintain minimum stocks of crude oil and/or petroleum products, and Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017, concerning measures to safeguard the security of gas supply[142].

Oil supplies are secured through emergency stocks of 90 days of average net imports or 61 days of average net consumption (whichever is higher). MSs have the obligation to develop contingency plans for the event of a major supply disruption and to contract with private companies to hold the stocks, some adopt a mixed approach). MSs have to have arrangements in place for transporting stocks, to ensure their release or effective delivery to end users and markets within time frames and conditions conducive to alleviating the supply problems which may have arisen. Member States are also responsible for the identification, the accounting and the control of stocks. Despite the high costs of holding oil stocks, these provide a degree of resilience to the EU's energy supply system.

Moreover, Member States have reporting obligations about those stocks. These include keeping a national register of emergency stocks, annual reporting to the European Commission and providing monthly data to Eurostat.

A consultative Oil Coordination Group, chaired by the Commission and including representatives of the Member States, as well as, if needed, representatives from the sector concerned, contributes to analysing the situation within the EU with regard to security of supply for oil and petroleum products and facilitates the coordination and implementation of measures. The group meets three times a year.

Despite financial costs of holding oil and gas stocks, these provide a degree of resilience to the EU's energy supply system.

In general, the improvement of EU-level crisis management is high on the agenda in many areas. Crisis management is seen as an essential issue for protecting and enhancing the present

[136] https://op.europa.eu/en/publication-detail/-/publication/4ebd2586-fc85-11ea-b44f-01aa75ed71a1/.
[137] https://op.europa.eu/en/publication-detail/-/publication/bc7e46c2-fed6-11ea-b44f-01aa75ed71a1/language-en/format-PDF/source-160480388.
[138] https://ec.europa.eu/info/publications/mission-starfish-2030-restore-our-ocean-and-waters_en.
[139] https://ec.europa.eu/info/publications/climate-resilient-europe_en.
[140] https://ec.europa.eu/info/publications/conquering-cancer-mission-possible_en.
[141] See slides from the relevant expert group meeting of 26 March 2021.
[142] https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex:32009L0119; https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32018L1581.

and future wellbeing of EU citizens. Drawing on recent experience, many policy initiatives for better preparedness are being presented. The approach to crisis management aims to improve consistency and better integration across sectors[143]. The Group of Chief Scientific advisors has been mandated to develop, in 2022, a scientific opinion with recommendations on EU strategic crisis management for prevention, preparedness, response and resilience, including in their operational aspects. The Commission has also incorporated strategic foresight in its work, to better anticipate future crises. In 2020, the first annual foresight report[144] focused on how policies to improve resilience can open opportunities, after having mitigated vulnerabilities. It also calls for closer monitoring, with the development of resilience dashboards. The 2021 annual foresight report will address the issue of the EU's open strategic autonomy, with a timeline to 2040, discussing trends, emerging issues and uncertainties for ensuring that mutually beneficial international relations are developed, while protecting from unfair and abusive trade practices.

At operational level, ARGUS, a crises management coordination process of the European Commission set up in 2005[145], is responsible for managing transboundary crises that require action at EU level, including crises affecting multiple sectors.

A major revision of ARGUS is currently underway, aiming at making ARGUS an integrated, cross-policy 'EU crisis dashboard', with a particular emphasis on supporting (i) foresight, risk assessment, monitoring and early detection; (ii) prevention and preparedness, including resilience, and; (iii) response.

With regard to existing crisis management procedures with a link to the food security contingency plan, a mapping exercise was carried out across the Commission to take stock of existing sectorial procedures, including early warning systems[146].

The mapping is clustered in three categories: (i) sectoral contingency plans in specific policy areas with relevance for food security (table 1); (ii) early warning systems focusing on risks that are indirectly linked to food supply and food security (table 2; and (iii) early warning systems focusing on risks that, *prima facie*, have limited relevance in the context of food supply and food security.

TABLE 1 - SECTORAL CONTINGENCY PLANS IN SPECIFIC POLICY AREAS WITH RELEVANCE TO FOOD SECURITY

Nr.	Directorate General	Contingency plan
1.	ECHO	Emergency Response Coordination Centre (ERCC) contingency plans and maps related to natural and man-made risks (see box 8)
2.	HOME	Turkey/Western Balkan Route contingency plan

[143] Scientific Advice Mechanism (2021), Scoping paper, strategic management in the EU, Improving EU crisis prevention, preparedness, response and resilience.
[144] EC (2020), 2020 Strategic Foresight Report, Charting the course towards a more resilient Europe.
[145] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2005%3A0662%3AFIN.
[146] Early warning systems and rapid alert systems are used as a synonym in this context.

3.	SANTE	Commission Implementing Decision (EU) 2019/300 establishing a general plan for crisis management in the field of the safety of food and feed (see box 9)
4.	MOVE	Pandemic and other major crisis contingency plan for the European freight transport sector, being prepared in 2021
5.	GROW	Single Market Emergency Regulation
6.	SANTE	European Health Emergency Preparedness and Response Authority (HERA)
7.	DEFIS	2016 Joint Framework on countering hybrid threats

BOX 8- THE EUROPEAN UNION CIVIL PROTECTION MECHANISM AND THE EMERGENCY RESPONSE COORDINATION CENTRE (ERCC) [147]

The EU Civil Protection Mechanism (ECPM) aims to strengthen cooperation between the EU Member States and six participating states (Iceland, Norway, Serbia, North Macedonia, Montenegro, and Turkey) on civil protection to improve prevention, preparedness and response to disasters. At the heart of this Mechanism is the Emergency Response Coordination Centre (ERCC). It coordinates the delivery of assistance to disaster stricken countries, such as relief items, expertise, civil protection teams, and specialised equipment. The ERCC ensures the rapid deployment of emergency support and acts as a coordination hub between all EU Member States, the six additional participating states, the affected country, and civil protection and humanitarian experts. The centre operates 24/7 and can help any country inside or outside the EU affected by a major disaster upon request from the national authorities or a UN body. While Member States are responsible for the security and safety of their citizens, they have the responsibility to support other disaster-affected member States when requested. This principle is stated in the solidarity clause in Article 196 of the TFEU[148].

A Common Emergency and Information System (CECIS) is used as a secure web-based platform for immediate exchanges of information with Participating States. A training and exercise programme is maintained to support its functions. Civil protection modules consist of trained teams, experts and equipment that are deployable to respond to disasters. The response deployed by the ERCC consists of offers of assistance, experts, mobilisation of assets, co-financing, or can be of operational nature. Standard operating procedures or memoranda of understanding exist with other Commission services (DGs ENER, HOME, SANTE), with international organisations such as the World Health Organization (WHO), the European Centre for Disease Prevention and Control (ECDC), the International Federation of Red Cross and Red Crescent Societies (IFRC), the International Organization for Migration (IOM) and the International Atomic Energy Agency (IAEA), as well as neighbourhood countries and at regional level.

[147] https://ec.europa.eu/echo/what/civil-protection/mechanism_en.
[148] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A12016E196.

BOX 9 - DG SANTE'S FOOD SAFETY CONTINGENCY PLAN

The European Commission has in place, since 2004, a plan to manage incidents related to the safety of food or feed, in accordance with Article 55 of the General Food Law (Regulation (EC) No 178/2002). Drawing from experiences gained from multi-country foodborne incidents that occurred since 2004 in the EU such as E. coli in sprouts in 2011, Fipronil in eggs in 2017 or Listeria monocytogenes in frozen vegetables in 2018, this plan was revised in 2019 through Commission Implementing Decision (EU) 2019/300 establishing a general plan for crisis management in the field of the safety of food and feed.

The updated plan allows to address more effectively multi-country food/feed-borne incidents linked to biological, chemical or physical hazards, representing direct or indirect risks to human health, through enhanced Union coordination and, when required, the setting up of a crisis unit that brings together the Commission as well as relevant Member States and Union agencies. It sets out the practical procedures necessary for enhanced preparedness and for the management of incidents at Union level, including a communication strategy in accordance with the principle of transparency.

A network of crisis coordinators is instrumental for the successful implementation of the plan and meets regularly and as necessary to take appropriate risk management measures when the origin of the outbreak is identified. The Commission organises regular (yearly) inter-sectoral simulation exercises, to test the use and usability of the existing systems and communication tools (such as the Rapid Alert System for Food and Feed and the Early Warning and Response System) during a multi-country food or feed-borne outbreak and the ability of the Member States to work collaboratively and conduct the proper investigations if needed.

The resulting enhanced preparedness at EU and national level is of increasing importance since modern analytical tools (whole genome sequencing) are expected to result in the detection of more outbreaks. This combination of structures, tools and procedures is key to ensuring a high level of food safety for EU consumers.

TABLE 2 - EARLY WARNING SYSTEMS FOCUSING ON RISKS INDIRECTLY LINKED TO FOOD SUPPLY AND FOOD SECURITY

Nr.	Institution/ Directorate General	Early warning/rapid alert system of indirect relevance
	EUROPEAN COMMISSION (SG.G.3)	Community Capacity in Crisis Management
	COUNCIL	IPCR (Integrated political crisis response)
	ECHO	European and Global Flood Awareness System by the Emergency Response Coordination Centre (ERCC) in the EU Member States and beyond
	ECHO	Early Warning Systems and Information: Risk forecast mapping and emergency or/and operational plans produced by ERCC
	ECHO	European Global Drought observation system. It provides drought risk maps and indicators and emergency drought maps as well. They could be integrated into Food security contingency plan
	ECHO	European Forest Fires Information System (EFFIS). Forest fire forecast mapping and operational plans based on a DSS produced by ERCC
	ECHO	Copernicus Information for Emergency Response and Disaster Risk Assessment. ERCC provides Rapid risk mapping supporting operational interventions. in addition, ERCC provides Risk and recovery mapping and plans to support disaster risk management and recovery activities
	JRC	Crop monitoring system
	MOVE	EACCC (European aviation crisis co-ordination cell
	HOME	CIWIN (Critical Infrastructure Warning Information Network)
	JRC	EFAS (European Flood Awareness System)
	JRC	EMS (Emergency Management System)
	JRC	Weather warnings – meteoalarm
	ECHO	ERCC portal (Emergency Response Coordination Centre)
	EEAS	EU conflicts early warning system

	SANTE	EWRS (Early Warning Response System for communicable diseases)
	JRC	GDACS (Global Disaster Alert and Coordination System)
	SANTE	GWIS (Global Wildfire Information System)
	GROW	ICSMS (Information and Communication System for Market Surveillance)
	GROW	IMI (Internal Market Information System)
	SANTE	RAS-BICHAT (Rapid Alert System for Biological and Chemical Attacks and. Threats)
	SANTE	RASFF (Rapid Alert System for Food and Feed.) / iRASFF / RASFF window
	EMSA	Safe-Sea-Net (vessel traffic monitoring and information system)
	SANTE	ADNS (Animal Disease Notification System)/ ADNS II / ADIS (evolution of ADNS)
	SANTE	Harmful pests and diseases data collection
	EMSA	Urgent Pollution Alert Section

The European Union is involved in the protection of **critical infrastructures** that are essential for the functioning of our societies and economy, with a view to reduce vulnerabilities and offer safeguards from natural or man-made disruptions, intentional or not. The Commission has been active in this area since 2006, with its European Programme for Critical Infrastructures Protection. The Commission adopted at the end of 2020 a proposal for a new Directive on the resilience of critical entities[149], to improve the pre-existing framework, in order to take into account a more diversified risk landscape, the challenges of technological advances, and the increasing interdependence between economic sectors and actors, as well as the cross-border dimensions of risks. The proposed Directive would cover various sectors (transport, energy, drinking water, wastewater, finance, banking, public administration, space, health and digital infrastructures), but not specifically food production, processing and distribution. The Commission proposes to assess later whether the food sector should also be covered. The new Directive will set out minimum requirements for MSs and for the critical entities identified, provide a procedure for the identification of critical entities, and maintain a dedicated knowledge hub within the Commission.

In 2016, the European Commission and the High Representative of the Union for Foreign Affairs and Security Policy adopted a Joint Framework to counter **hybrid threats**, and foster the resilience of the EU, its MSs and partner countries, while increasing cooperation with NATO[150]. This framework provides for measures to prevent, respond, and recover from crisis

[149] COM(2020)829 of 16.12.2020.
[150] https://ec.europa.eu/commission/presscorner/detail/en/IP_16_1227.

by defining effective procedures to follow in the case a wide-ranging and serious hybrid attacks occurs. Hybrid threats are defined as mixture of activities often combining conventional and unconventional methods that can be used in a coordinated manner by state and non-state actors while remaining below the threshold of formally declared warfare. The objective is not only to cause direct damage and exploit vulnerabilities, but also to destabilise societies and create ambiguity to hinder decision-making. One of the actions in this context aims at, in cooperation with MSs, improve awareness of and resilience to hybrid threats within existing preparedness and coordination mechanisms, including on food aspects: the Commission collaborates with the European Food Safety Authority to adapt to advanced scientific investigation techniques, for a more precise identification and sourcing of health threats, and a resulting rapid management of food safety outbreaks. Developing a preparedness and coordination mechanism for food supply and food security will contribute to take into account these aspects in the identification of hybrid threats[151].

A certain number of these infrastructures or of other assets can be subject to **foreign direct investment (FDI)**, which should in the context of the EU's openness to FDI be subject to appropriate screening by the MSs. The screening Regulation adopted in March 2019[152] established an EU-wide framework in which the European Commission and the MSs can coordinate their actions on FDI. In this context, the Commission can issue opinions when an investment threatens security or public order in more than one MS. These provisions are now fully in force, and several of the cases discussed involve risks to food security when dealing with investment in agricultural land, inputs or infrastructures used for the movement of agricultural commodities and food. In times of crisis, for health care in particular but not only, strategic assets in the EU are essential for Europe's security. This motivates the call by the Commission to Member States to make full use of their existing screening mechanisms, and for strengthening their screening mechanisms where needed[153].

The updated **EU Industrial Strategy**[154] includes actions to ensure that the Single Market remains functional and that the availability and free movement of persons, goods and services continues in times of crises, through the design of a **Single Market Emergency Instrument**. This will include further information sharing, coordination and solidarity when MSs adopt crisis-related measures, and will help to mitigate these policies negative impacts on the Single Market. The strategy also tackles the risks of interruptions to global supply chains affecting the availability of essential products, some of which are relevant to the food industrial ecosystem, such as some active pharmaceutical ingredients (APIs) that are often also used in the food and feed industry, or raw materials used as inputs in agriculture (i.e., fertilisers). The strategy also put forward the need to **monitor strategic dependencies**, in line with the principles of open strategic autonomy. Phosphate rock, used essentially for fertilisers, is mentioned in the list of critical raw materials for the EU. Other critical raw materials such as bismuth, borate or phosphorus play a role in the food sector via their use in pesticides and fertilisers. The EU

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[151] European Commission, Joint report to the European Parliament and the Council on the implementation of the Joint Framework on countering hybrid threats - a European Union response, JOIN(2017)30 of 19.7.2017.

[152] Regulation (EU) 2019/452 of the European Parliament and of the Council of 19 March 2019 establishing a framework for the screening of foreign direct investments into the Union.

[153] European Commission, Guidance to the Member States concerning foreign direct investment and free movement of capital from third countries, and the protection of Europe's strategic assets, ahead of the application of Regulation (EU) 2019/452 (FDI Screening Regulation), C(2020)1981, of 26.3.2021.

[154] Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions – Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery. COM(2021)350 of 5.5.2021.

action plan for critical raw materials[155] envisages actions relating to the development of resilient value chains for EU industrial ecosystems, the reduction of dependency on primary critical raw materials through the circular use of resources, sustainable products and innovation, the strengthening of sustainable and responsible domestic sourcing and processing of raw materials in the European Union, and the diversification of supply, with sustainable and responsible sourcing from third countries, and the strengthening rules-based open trade in raw materials and removing distortions to international trade. Concerning APIs, the EU has a strong production capacity, but relies to a certain extent on third countries in terms of processes and inputs required for manufacturing. The Commission has engaged in a structured dialogue on the security of medicines supply with relevant public and private actors of the pharmaceutical supply chain to better understand vulnerabilities and potential dependencies, and take measures to strengthen the resilience of pharmaceutical supply chains, and ensure the security of supply of medicines to patients in the EU.

There are other sectoral initiatives of interest for the food system. To highlight a few, in the health domain, the Commission announced a number of lessons learnt from the experience with the COVID-19 pandemic, which will contribute to better anticipate public health risks and to enhance contingency planning [156], ranging from robust global surveillance, enhanced preparedness, including through an annual state of preparedness report, a new framework for an EU pandemic state of emergency, and the development of a toolbox for crisis situations. The new European Health Emergency Preparedness and Response Authority (HERA) should be operational by early 2022.

Within the Sustainable and Smart Mobility strategy[157], the Commission announced it will prepare crisis contingency plans with MSs and sector representatives, to ensure business continuity, and coordinate response measures in the transport sector during disruptive events.

3.2 Member States' policies

The European Commission consulted Member States in the GREX (on a contingency plan for ensuring food supply and food security[158]). As part of these consultations, Member States provided information on their practices and views on food security in a questionnaire. 18 Member States responded to the survey (DK, DE, IE, ES, FR, HR, IT, LV, LT, HU, NL, AT, PT, PL, RO, SK, SI, FI). The information in this section is based on their responses (summarised in more detail in Annex 3).

In a majority of the Member States one single administration, i.e. the Ministry of Agriculture, or other ministries (Home Affairs, Defence, Economy, etc.), or a specific agency or group,

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[155] Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions – Critical Raw Materials Resilience: Charting a Path towards greater Security and Sustainability. COM(2020)474 of 3.9.2020.

[156] Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions – Drawing the early lessons from the COVID-19 pandemic. COM(2021)380 of 15.6.2021.

[157] Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions – Sustainable and Smart Mobility Strategy – putting European transport on track for the future. COM(2020)789 of 9.12.2020.

[158] https://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupDetail&groupID=2730&NewSearch=1&NewSearch=1.

deals with crisis management issues related to food security. Still, in several Member States different parts of the administration share this responsibility. In these cases, more than half of the respondents indicate that they have no known coordinating team, while for the other Member States there is coordination through a shared team.

The focus of administrations in Member States in terms of food security work is, mainly, on monitoring (mostly through regular market reports; 7 MSs), crisis management (9 MSs), and the management of inventories (7 MS have strategic reserves in place). In some Member States different administrations are responsible for the one or other aspect of this work (4 MS).

Among the procedures in place to ensure food supply, seven Member States list the possibility to release food strategic stocks, and one Member State indicates the possibility of government buying and handing out food parcels to citizens, setting-up the logistics for an emergency value chain, introducing derogations to the food law, and the possibility of bans on hoarding, as well as distribution regulations. Another Member State recommends citizens keep household stocks for a minimum period of 10 days at all times.

As concerns the legislative approach, ten Member States have a legislation available, one Member State has a memorandum with stakeholders, another one uses EU regulation as a basis for public intervention, and four Member States indicate having no known legislation in place.

The national legislation focuses on monitoring, food reserves distribution, food supply (production, logistics), derogations to food laws, sharing and access to private data, and precautionary measures for long-term crisis preparedness.

With regard to monitoring, six Member States have annual or regular reports on the state of markets and prices. One Member State, together with the main economic operators, monitors critical processes with regard to food security and food. Others mention no formal monitoring but close contact with market participants, a balance sheet approach, or stakeholders involvement (covering voluntary reporting from food businesses in normal times, mandatory reporting in times of crises, and no obligation for market participants to report on stocks).

As concerns indicators, Member States mention self-sufficiency for food and critical inputs, level of stocks or stock-to-use ratios, or a combination of several indicators such as self-sufficiency and the ability to trade, measures of economic hardship and consumer confidence, monitoring of shortages. Some Member States mention risk scenarios or risk assessment linked to the establishment of food reserves, evaluating the effectiveness programmes, and considerations on international obligations and national security.

Eleven Member States do not use thresholds that would trigger a crisis response. One Member State would generate a crisis response in the case of a serious threat to meeting vital needs, and when market interventions are not sufficient.

Three of the 18 respondents do not currently foresee reviewing the plans they have in place. Three Member States indicate that the review of plans is a continuous process in their administrations. Two Member States are currently working on a reform to establish food reserves. One Member State has decided to review its preparedness and response planning to reinforce its efficiency and the flexibility against major risks and threats. Other Member States are considering either reinforcing national strategic reserves, reviewing COVID-19 measures if necessary, or reviewing their food security plans as a consequence of the Farm to Fork contingency plan for ensuring food supply and food security in the EU. Another Member State

mentioned that the food chain should be taken into account within the rules on critical infrastructure.

Plans for restructuring among Member States also include introducing a civil emergency planning system, conducting a review of national risks every three years, and reviewing preparedness versus emergency measures, and the role of agencies, monitoring and data security, as well as the scaling-up of training activities on crisis management.

The following sections consider food security contingency planning at country level, based on presentations by some individual Member States during the GREX consultation process.

Germany[159]

In Germany, there is a historical division between the Ministry of Agriculture, dealing with food security, and the Ministry of Interior, dealing with critical infrastructure and cybersecurity. The legal basis for this arrangement is found in the "Act on food security and precaution[160]". A crisis is defined by the Federal Government if supply is seriously in danger for a large part of the population. Possible measures can affect production, prices, stocks or security of supplies. In Germany, public strategic reserves, held by the federal government, are a component of food security. Moreover, the government recommends households to keep private food stocks corresponding to 10 days of consumption.

The COVID-19 crisis showed that in case of a crisis, food cannot be seen in isolation in policy terms, and needs to be addressed in conjunction with other relevant policies, including policies on critical infrastructure in the energy, transport and IT domains. The German authorities are examining ways to improve food security and emergency frameworks, including following recent German Court of Auditors reports (2011 and 2019).

Denmark[161]

The Danish food security contingency plan is part of a more general national crisis management system that applies to any type of incident. The crisis management system is activated in the event of extraordinary incidents requiring a coordinated response from the central authorities. The structure is a comprehensive network involving a high number of staff and agencies at national, regional and local level. General principles for preparedness and crisis management include sector responsibility, cooperation, precaution, subsidiarity and similarity (i.e. applying the same working methods in times of crises as in times without crises). The Danish crisis management organisational framework establishes and maintains the overview of the situation to ensure quick and effective decisions, ensure active cooperation and efficient coordination at all levels (national, regional, local), and provides information and instructions to the general public. The structure proved to be effective during COVID-19. The framework is regularly used for animal health and welfare or food safety risks. An important element, which proved its worth for animal health and welfare or food safety, is the dialogue and relationship with stakeholders (business organisations, NGOs, industries, other authorities).

Any level of the structure can trigger the plan and will get a reply within 1 hour. The network approach bases the national contingency plan on peer-to-peer exchanges, includes a holistic

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[159] Rudloff, B., Contingency planning: the German case in light of conceptual criteria, 26 March 2021.
[160] Bundesministerium der Justiz und für Verbraucherschutz, Gesetz über die Sicherstellung der Grundversorgung mit Lebensmitteln in einer Versorgungskrise und Maßnahmen zur Vorsorge für eine Versorgungskrise, 2017.
[161] Kühn Hove, N., The Danish preparedness model – a network approach, 26 March 2021.

view, associating stakeholder and industry organisations, and builds on a mindful outlook ('learn don't blame'). Responses are targeted, there is no one-size-fits-all approach.

Denmark carries out simulation exercises every other year. Simulation scenarios are chosen from a catalogue of scientifically plausible scenarios. Agencies are particularly committed to the exercise. A report on the learning points is sent to the Prime Minister and subsequently integrated into the national crisis management system.

Finland[162]

Finland's geographical (above 60° latitude, which implies a short growing season and the possibility of late frost in spring, as well as early frost before harvest, possible logistical difficulties if sea is freezing in harbours) and geopolitical situation (with a direct border with USSR during the cold war) are the main reasons for holding strategic food reserves.

In Finland, the holding of strategic food reserves is organised in public-private cooperation. These reserves mainly focus on milling quality grains for human consumption, feed grains, feed protein, seeds for all cereals and for the main forage crops. No reserves are held for prepared food products. Two to six months of reserves are held for grain commodities.

The National Emergency Supply Agency (NESA) owns the stored grain. Registered companies (grain companies or mills) are responsible for the storage and renewal of the grain, under contract with NESA. Minimum volumes and quality as well as renewal frequency are part of the contract.

Challenges in this context include not obtaining milling quality every year, which is also an obstacle for recycling, as well a possible market disruption from a high stock-to-use ratio, and of recycling the stores. Logistic disruptions (sea freight and inland) can be an issue, changing circumstances can make it difficult to decide which products, and how much of these, to keep in storage. Locally grown protein crops and seeds are currently not included in the scheme, farmers do not take part in the storage today.

BOX 10 – FOOD STOCKPILES AND STRATEGIC RESERVES

Some countries keep public stocks of certain food (or feed) products. These stocks can be used for market management purposes ('food stockpiles', released or bought from the market over time to smooth over price movements, i.e. to affect prices), or to protect against sudden sharp market movements due to catastrophic events, such as natural disasters or war ('strategic food reserves', used to provide emergency supplies). One can distinguish buffer stocks (used to stabilise commodity prices), social safety net stocks (to ensure food distribution programmes to the most deprived), and emergency stocks kept to provide assistance during transitory food shortages and crises, although the border between each type is often blurred and stockholding policies can pursue several objectives[163]. Some EU MSs and third countries maintain such stocks, with the choice of whether to do so, how, and for which products, guided by national circumstances.

[162] Schulman, M., Grain security Stocks in Finland, 25 February 2021.
[163] Deuss, A., Review of the performance and impacts of recent stockholding policies, 2015.

Lower levels of self-sufficiency in food seem to be lead to a higher likelihood that public stocks are maintained by a country: reserves protect against poor harvests either domestically or internationally, with a view to ensure sufficient food availability[164].

For example in Germany, Federal cereals stocks (wheat, rye and oats) were of around 800 thousand tonnes in 2017, i.e. around 1.7 weeks of the consumption of the cereals stored. Additional civil food stocks of rice (100 thousand tonnes), dairy products (4.5 thousand tonnes of condensed milk) and pulses (40 thousand tonnes of peas and lentils) were kept.

In Finland, cereals stocks (wheat and rye usually) amount to six months of consumption[165], while stocks for seeds are kept to ensure the following year's sowing, and some reserves are also contacted for feedstuffs.

Switzerland has a comprehensive approach to strategic food reserves, with reviewed levels in 2019, reaching 3 to 4 months of consumption for several cereals (common and durum wheat, rice, feedstuffs), as well as of sugar, coffee and cooking oils. Reserves of rapeseeds were introduced in 2019.

Other European countries declare maintaining strategic food reserves but do not disclose quantities and costs[166]. For instance, the Czech Republic stockpiles grains, sugar, meat and dairy products. In Poland the information regarding types of products, quantities and costs of maintenance are considered classified information.

Sweden, on the contrary, will shut down its last emergency stocks, intended for wartime, in 2022. Many countries do not maintain strategic food reserves as such (Austria, Denmark, France), but focus on other tools such as food distribution in case of emergency, or legal bases to seize products from manufacturers and suppliers in the case of emergency.

There can be significant direct costs associated with keeping stocks of products, for example to maintain the underlying infrastructure, to keep perishable food products in a good state of use over prolonged periods of time, or to waste. . For example, in Germany, the costs budgeted for 2021 amounted to EUR 21 million. Costs in Switzerland are estimated to be EUR 5.5 per capita per year for food and feed reserves. There are also indirect costs, related to distortive effects on market operation. These can even occur globally, for example in the case of the large-scale stockholding policies carried out in India or China. Market effects can occur at the time of constituting or releasing stocks, crowding-out stocking by the private sector, deviating public spending from other more profitable areas (such as investment), or to the vulnerability of such systems to speculative attacks, in particular when relying on price triggers rather than on objectives expressed in terms of quantities to be stored.

Some countries adopt recommendations for households to keep food stocks at home, as a contingency measure. This is the case in Sweden, the United States of America[167], and New Zealand (3 days of stocks), Germany (10 days), and Japan or Australia (14 days)[168]. In

[164] Gilbert, C., What are the threats to EU food security?, 25 February 2021.
[165] Bovin, A., Free market or food stockpiles, a comparative case study of food supply in a crisis perspective in Sweden and Finland, 2018.
[166] Ben-Yehuda, T., Emergency Food Reserves: a Comparative Study, 2015.
[167] https://www.ready.gov/.
[168] Keating, A., Food security in Australia: The logistics of Vulnerability, 2013.

Finland and the United Kingdom, there is a general recommendation for citizens to store products with a long shelf life. In most cases, the level of awareness and compliance with such recommendations by citizens is perceived to be low.

In terms of market transparency - a requirement for the efficient functioning of product markets - there is tension between calls by market participants for the need to increase data collection and publication on all food stocks (both public and private), and national security experts, who point out that part of the strategic value of keeping stocks in the form of food strategic reserves is that adversaries are kept in the dark about the full ability of a country to respond to attacks endangering food security.

3.3 Third countries and international organisations

Japan[169]

In Japan, there is a strong focus on preparedness due to regular occurrences of natural disasters such as earthquakes, typhoons or heavy rains. Starting from the earthquake and the subsequent tsunami in 2011, a shift from disaster prevention to risk mitigation took place, aiming at increasing the overall resilience of the food system, including a list of actions for on-farm risk mitigation with full checks on irrigation facilities, reservoirs and greenhouses. The Ministry of agriculture issues 'to-do' lists to prepare farms to mitigate disasters, with recommendations concerning insurance coverage, business continuity, emergency electricity supply, etc.

To address concerns about supply chain disruptions during the COVID-19 pandemic, Japan maintained continuous and accurate communication with the public and stakeholders (through dedicated business-continuity manuals for six sectors including food producers, processors and distributors), and provided emergency staff dispatched by the national government from least-affected local governments to local governments affected the most. Moreover, Japan provided emergency support to farmers. Providing correct information to consumers was also prioritised, with simple messaging on the absence of risk of food shortages through video clips aired in news media regularly.

With regard to public stockholding, Japan keeps public stocks of rice, and recommends private households to keep stocks corresponding to the quantity of 2 weeks of consumption. Trading companies also keep their own private stocks.

United States[170]

In the United States, the impact of COVID-19 on agriculture was mostly felt with regard to health issues in farm labour, in the processing sector and at ports, as well as with regard to lockdown measures in schools, businesses and restaurants. The US response to COVID-19 was to reinforce and complement standing measures supporting farmers and vulnerable groups, through several agricultural support programs and dedicated food assistance programs.

A dedicated American Rescue Plan made available USD 4 billion for FSC assistance through purchase and distribution of agricultural commodities, as well as grants and loans. USD 300 million of the total were reserved for the monitoring and surveillance of susceptible animals

[169] Yoneda, R., From Disaster Prevention to Disaster Mitigation, 26 March 2021.
[170] Glauber, J. W., COVID-19: Impacts on US Agriculture and the Government Response, 26 March 2021; Meyer, S., presentation at JRC Workshop, 20 May 2021.

with regard to COVID-19, another USD 100 million for the covering of overtime for inspection costs for small and very small meat and poultry processing facilities. Furthermore, funds were made available for workers' protection against COVID-19 and for providing support to individuals in need.

The 'Farmers to Families Food Box' program, introduced in spring 2020, was designed and implemented as a temporary, emergency relief effort to respond to severe market disruption caused by the global pandemic. It contributed to distribute ready-to-eat boxes of fresh produce, milk, dairy and cooked meats to citizens across the country. While the initiative was well received and appreciated by farmers and vulnerable groups, it represented a certain cost and is planned to be phased out and to be replaced by fresh produce boxes as part of the Emergency Food Assistance Program.

To address perceived vulnerabilities in supply chains revealed during the COVID-19 crisis, President Biden signed an Executive Order[171] requiring a review of global supply chains that support key U.S. industries, and ordering U.S. government agencies to identify ways to secure the American economy against shortages of critical and essential goods. The Executive Order defined resilient supply chains as secure and diverse, facilitating greater domestic production, a range of supply, built-in redundancies, adequate stockpiles, safe and secure digital networks, and a maintaining a world-class American manufacturing base and workforce.

The Order outlines two types of assessments by government agencies: (1) an initial 100-day Supply Chain Review focusing on key supply chain risks in four specific sectors relating to semiconductors, batteries, strategic minerals, and pharmaceuticals; and (2) more in-depth, one-year reviews (Sectoral Supply Chain Assessments) in certain critical business sectors *e.g.*, national defence, public health, information and communication technology, energy, transportation, but also including supply chains for the production of agricultural commodities and food products. The Executive Order focused on information gathering, with more comprehensive reforms and supply chain strategies to follow once relevant information is collected. On June 8, 2021, the White House released the findings of the 100-day assessment of critical supply chains.[172] The 100-day assessment report identified actions needed in both the immediate and long term to bolster domestic manufacturing of critical goods, reduce dependence on China and other foreign nations for supply chain needs, create jobs and address unfair trade practices. The administration announced a range of measures intended to reduce the country's dependence on foreign suppliers for critical goods.

Each Sectoral Supply Chain Assessment expected in 2022, including that for agriculture and food, should review among others (i) the critical goods and materials underlying the supply chain in question,; (ii) the manufacturing or other capabilities needed to produce these goods and materials; (iii) sources of contingencies that may disrupt the supply chain (examples given include cyber, homeland security, health, climate, environmental, , economic, geopolitical, human-rights or forced-labour risks, or other contingencies).

Switzerland[173]

Switzerland is landlocked and imports around 50% of its food, mostly from Europe. Switzerland is also an important axis for combined goods transport in Europe. Switzerland runs

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[171] White House, Executive Order 14017 of February 24, 2021 on America's Supply Chains.
[172] White House Fact Sheet, Biden-Harris Administration Announces Supply Chain Disruptions Task Force to Address Short-Term Supply Chain Discontinuities, 8 June 2021.
[173] Mitteholzer, M. and Menzi, S., Food Security in Switzerland, 25 February 2021.

a compulsory stockholding scheme for certain products. This is part of a wider toolbox to ensure food security, including also direct payments to farmers, free trade agreements, import promotion, the regulation of production, and rationing.

The Swiss government implements compulsory stockholding through private-public partnerships. The public National Economic Supply Agency ensures the supply of essential goods in the event of severe shortages. Around 35 staff, including communications and legal service staff, work in close collaboration with around 250 private key companies.

Every four years experts analyse the need to change the scheme (products, length of stock-keeping, volumes), a strategic decision is made by the Government, details of the implementation of eventual changes are set out by the Ministry, and companies implement the decisions, which are controlled by the Ministry.

The overall tendency since 1990 is that fewer types goods are kept in stock, and that existing compulsory stock volumes have been reduced (e.g. covering needs to 3 months, instead of 12 months). However, analysis pre-dating the COVID-19 pandemic, indicated the need to expand stock new goods (e.g. seeds) and higher volumes.

Food and feedstuff stocking costs amount to EUR 5.50 per capita and per year. Costs are financed by levies on traders. Companies are entitled to add the levy of EUR 5.50 on prices, like a tax, and get coverage for eventual price losses on compulsory stocks.

The release of stocks only occurs in the event of a severe nationwide shortage. Two different scenarios are defined for the release: (i) the Ministry decides to release stocks to bridge a short-term supply bottleneck, whose end can be predicted with a high degree of probability and that requires less than 20% of the compulsory stockpiled quantity; (ii) the Government decides the release in case of a severe shortage that lasts long and/or concerns more than 20% of the compulsory stock. The supply situation is analysed on the basis of data provided by companies. Considerable obstacles exist to prevent abuse and avoid creating incentives to reduce free operating stocks.

NATO

While civil preparedness is a national responsibility, it is also an issue of collective concern for NATO as such. In 2021, Heads of State strengthened a commitment originally issued in 2016, to enhancing resilience[174].

NATO's core functions of civil preparedness are continuity of government, continuity of essential services to the population and civil support to military operations. These draw on seven baseline requirements, among which figure resilient food and water resources[175]. The risks, threats and vulnerabilities that have been identified by NATO with regard to food and water security are:

- cyber-risks;

[174] NATO, Strengthened Resilience Commitment. Article 8 of this strengthened commitment states: "We will step up efforts to secure and diversify our supply chains, as well as to ensure the resilience of our critical infrastructure (on land, at sea, in space and in cyberspace) and key industries, including by protecting them from harmful economic activities".

[175] Baseline requirements: 1. assured continuity of government and critical government services; 2. resilient energy supplies; 3. ability to deal effectively with uncontrolled movement of people; 4. resilient food and water resources; 5. ability to deal with mass casualties; 6. resilient civil communications systems and; 7. resilient civil transportation system.

- inter-dependencies on other sectors (transport, energy, communication);
- supply chain vulnerabilities;
- shortage of qualified personnel (e.g. due to pandemics);
- impact of international trade disruptions and/or border closures; and
- impact of hybrid tools or conflict on food and water as well as contamination of food and water.

To address the risks, threats and vulnerabilities to food and water security, NATO issues guidance to national authorities, as well as checklists with mitigation measures and best practices. With regard to its guidance in the food and water sectors, NATO has recently complemented its 'just in time' planning with a 'just in case' planning. To that end it agreed on two new guidance documents in 2019: (i) Guidance on Security of Supply Arrangements for Food and Water Resources, with a focus on ensuring functioning markets, existing solutions, the complexity of food and water supply chains and key characteristics for a robust security of supply arrangements; (ii) Guidance to National Authorities on Managed Supply and Allocation Arrangements, focusing on cases where markets would fail, and emphasising the strengthening of national security of supply arrangements by transitioning to manage and allocate food and water resources.

Building resilience is a high priority on NATO's agenda.[176] The importance of NATO-EU cooperation is underlined by NATO, including staff-to-staff exchanges and cross-briefings.

The Agricultural Market Information System[177]

The Agricultural Market Information System (AMIS)[178] is a G-20 initiative launched in 2011, grouping 28 members (all G20 members plus 8 other major exporters and producers). The OECD and the WTO collaborate in the collection and dissemination of policy information for the Agricultural Market Information System[179].

A key reason for the creation of AMIS is the continuing need for reliable data to assess whether and how a crisis is unfolding. AMIS's work is based on the need for cooperation, transparency and a unified approach among countries to avoid panic on the markets.

AMIS's work on the COVID-19 pandemic and food security points to three lessons learnt for policy-makers: (i) anticipating is key to react effectively, including to unexpected crises (increased importance of monitoring and information sharing in the context of a global food system). (ii) understanding causal links contributes to appropriate responses;; (iii) each crisis is unique and requires a unique set of solutions.

AMIS's structure has three main elements: (i) a Global Food Market Information Group, in which technical representatives from AMIS members provide market and policy information (2 meetings per year and monthly webinars); (ii) a Rapid Response Forum, in which senior officials from AMIS members conduct early discussion about critical market conditions and ways to address them (1 regular meeting per year and additional meetings in case of emergency)

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[176] See also: https://www.nato.int/cps/en/natohq/topics_132722.htm.
[177] Drechsler, D., AMIS – Enhancing market transparency and policy coordination, 26 March 2021.
[178] http://www.amis-outlook.org/.
[179] In their collaboration through AMIS, the OECD and the WTO focus on enhancing food market transparency and policy responses for food security, including by assessing global supplies of maize, rice, wheat and soybeans and by providing a platform to coordinate policy action.

and; (iii) the Secretariat, including 10 International Organisations (FAO, GEOGLAM, IFPRI, IFAD, IGC, OECD, UNCTAD, the World Bank Group, WFP, and WTO).

The aim of the Market Monitor[180] and in particular its policy development section is to provide updates of recent policy developments in real time. Policies covered are all policies related to the AMIS monitored commodities and biofuels, that could influence prices, trade, production and consumption. New or modified laws, decrees, regulations as well as announcements of impending policy or market reforms fall under the conditions for inclusion.

The information used for the Market Monitor is gathered from the OECD, WTO, FAO, International Grains Council and other international organisations, or from news articles.

During the preparatory European Commission workshops, AMIS representatives added that policy-makers should avoid that measures taken during crises become permanent (for example, this may risk prolonging the critical situation). With regard to knowledge on stocks, AMIS has released a database on international best practices and published guidelines for stocks measurement[181]. AMIS highlights there are often data quality issues on information on stocks.

3.4 Private sector

The private sector showed itself to be a critical partner to EU and Member State administrations, as well as to the non-governmental sector in finding solutions to food system issues during the COVID-19 pandemic. It can be expected that the private sector would again play a significant role when similar challenges arise in the future. Businesses and their professional organisations played a vital role in response and recovery efforts in countries affected by COVID-19, by protecting their staff, community and clients and by prioritizing containment, following the recommendations of the national health authorities and WHO.

The United Nations called in April 2020 on all businesses and corporations to take three primary actions in response to the COVID-19 pandemic[182]:

- Adhere to health and safety guidelines and provide economic cushions to workers, including through ensuring worker safety and social distancing, and secure wages for those working from home;
- Provide financial and technical support to governments by contributing to the COVID-19 Solidarity Response Fund;
- Repurpose their facilities and business plans to focus on meeting the needs of the crisis.

It is important to mention that there are substantial differences between traditional business disruption caused by natural events (e.g., hurricanes, earthquakes, tsunamis), human-made (e.g. cyber-risks, terrorism), technology or operational failures on one hand, and those caused by pandemic events on the other. Whereas traditional business disruption is usually limited to a particular geographical area, a pandemic can start in a particular area and quickly spread globally. These differences persist due to the potential increased scale, severity and duration of

[180] http://www.amis-outlook.org/amis-monitoring#.YPa_WugzbIU.
[181] http://www.amis-outlook.org/resources-list/detail/en/c/1154853/.
[182] UN Business Guide on COVID-19, https://www.connectingbusiness.org/system/files/2020-04/COVID19-BusinessGuide.pdf.

pandemic events, necessitating the need for organizations to expand beyond traditional resilience planning strategies.

Companies do well to incorporate specific pandemic planning considerations into existing resilience management activities, to provide a comprehensive response and to provide continuity for their most critical products and services. Additionally, companies should consider establishing pandemic-specific policies and procedures, capabilities for employee communications, telecommuting and personal or family leave to minimize disruptions. Due to the potential duration of pandemics, impacts on personnel in the regions that absorb additional work cannot be overstated, from the start of the pandemic to several weeks in, when contractor resources can start to meaningfully contribute[183].

In addition to general crises planning, which all organisations could consider, more specific private sector considerations could apply[184]. During the pandemic the US Federal Emergency Management Agency[185] provided the following guidance:

- Applying for a disaster loan[186];
- Contact customers, vendors and suppliers to determine demand or potential supply issues;
- Review insurance policies to determine eligibility for coverage of business interruption or loss;
- Establish online commerce platforms, train staff to operate in an e-commerce environment, and adjust business models for a new economy.

Many companies have business continuity plans in place, including preceding the COVID-19 pandemic. Responses to the targeted questionnaire show that, apart from the primary production stage, about half of the companies in the food supply chain were implementing risk management or business continuity plans, and that 80% of these found them very useful. For most companies these plans had however not been fully tested in practice before the global pandemic broke out. Since then, several companies have taken additional measures to safeguard employees and mitigate financial and operational exposure. For example, many multinational businesses have reduced the output of facilities or suspended operations in affected regions, as travel restrictions and mandatory social distancing and homeworking public safety measures were implemented.

The OECD encourages business to take steps to ensure business continuity, in particular by managing risks to operations of core services, and by protecting critical infrastructures in case of shocks and ensuring such critical infrastructures may continue to exercise their functions[187]. Assessing progress on these recommendations, the OECD noted that countries made efforts to

[183] COVID-19 and pandemic planning: How companies should respond, Ernst & Young Global Limited, https://www.ey.com/en_be/covid-19/covid-19-and-pandemic-planning--how-companies-should-respond.
[184] Morgan, A., presentation at JRC Workshop, 20 May 2021.
[185] Planning Considerations for Organizations in Reconstituting Operations During the COVID-19 Pandemic, US Federal Emergency Management Agency, https://www.fema.gov/press-release/20210318/planning-considerations-organizations-reconstituting-operations-during-covid.
[186] In the EU context this could mean different types of support granted by the Member States, for example under the state aid Temporary Framework.
[187] OECD, Recommendation of the Council on the Governance of Critical Risks, 2014.

implement them and even provided advisory services or guidelines in some cases, but that there was little evidence that this had an effect in practice[188].

Box 11 - Ernst & Young Global 11-step guidelines for firms to plan and respond to pandemics[189]

1. **Apply a people-first mind-set**. The very first priority of an organisation during a pandemic should be the safety and well-being of its workforce. Employees are unable to focus on work responsibilities when their well-being and that of their family are in peril. Hence, the critical question firms must address at the onset of a pandemic event is whether their employees are safe, followed by whether they are available to perform critical functions.
2. **Plan for geographical segmentation of functions and activities**. As prudent risk management, and to the extent possible, companies should look to diversify their supplier base, customers and third-party service providers across geographies, to avoid single points of failure and increased exposure to regional outages and geopolitical events.
3. **Invest in technology and infrastructure to support remote work and virtual collaboration capabilities.** Companies should invest in tools to enable personnel to work remotely and collaborate virtually, assess their current bandwidth to support remote work, perform periodic network stress testing, and identify workarounds for critical tasks that are not executable from home. It is worth noting that while remote working is a viable option for the service sector, it does not work as well for manufacturing, thus resulting in critical impacts on product supply chains.
4. **Consider the systemic nature of pandemics when designing response strategies.** Companies must carefully design distinct strategies and plan around areas of high manual intervention and concentration risks, including single points of failure. Companies should validate that contracts between country-to-country affiliates are in place to reduce uncertainty of terms, rates, payments and regulatory requirements; that data-sharing agreements are addressed within the contracts (e.g., General Data Protection Regulation requirements); and, as required in regulated industries, that appropriate licenses are in place to conduct additional work. Further, companies should consider downstream dependencies.
5. **Assess reliance on third parties**. Companies must develop a thorough understanding of their critical third, fourth and fifth parties, and their resilience programs, and develop alternate plans, for instance insourcing strategies or substitutability, if the critical third party's ability to perform services is impaired.
6. **Engage with customers**. Companies must continue to communicate with customers through multiple channels, reinforce that customer interests are a priority, and provide information to alleviate their concerns. A clearly drafted frequently-asked-questions document published and disseminated through multiple channels, including the company's website and social media, can prove to be a useful tool to proactively address customer concerns.
7. **Develop a robust communication strategy (including social media).** For companies that have both retail and corporate customers, consistent messaging is key. All channels must reconcile (e.g., social media, customer call centres, public relations releases) to establish a robust communications strategy that clearly lays out process

[188] OECD, Assessing Global Progress in the Governance of Critical Risks, 2018.
[189] EY Global, COVID-19 and pandemic planning: How companies should respond, 19 March 2020.

and protocols to engage with a wide set of stakeholders, inclusive of any legal and jurisdictional considerations.

8. **Team with the public sector; national, state and local agencies; and health officials**. Companies must leverage advisories, resources and health and safety measures prescribed by international, national and local agencies and by health officials, and refrain from distributing conflicting materials, as this can lead to confusion and fear among employees. Companies must closely coordinate on any direct efforts (e.g., providing supplies) to support communities with local agencies to avoid chaos, and to not impede any public assistance efforts underway. Companies should establish communication strategies and channels to engage effectively with public authorities.
9. **Increase rigor and complexity of testing**. Companies must elevate the complexity of existing scenarios used for testing and simulations to assess their preparedness for pandemic events. This includes testing against scenarios that evaluate their response to extended periods of outages; total shutdown of a major operational facility, city or region; increased absenteeism (more than half workforce); multiple outages; and so on.
10. **Leverage pandemic command centres to prioritize and govern effectively**. As resources become constrained, firms must constantly re-prioritize delivery of products and services that are critical to meet customer needs and provide market stability. Companies must have a clearly documented prioritization framework, inclusive of associated risk tolerances, supported by a robust governance process to make risk acceptance decisions (e.g., discontinuation of certain services) during an event.
11. **Establish crisis management exceptional approval processes**. Companies must expand on existing human resources, finance, legal, operations and business processes to accommodate certain critical exceptions, and clearly communicate the revised policies, criteria and processes to allow such waivers in an accelerated manner

IATA lists the following elements to improve the distribution and flow of perishable goods, such as food, throughout the supply chain:

- Ensure compliance with international standards, procedures and practices;
- Improve handling and transportation performance (e.g. to address food wastage and loss);
- Embed social responsibility and sustainability practices, and communicate actions taken to customers;
- Apply appropriate quality and risk management processes and increase collaboration;
- Ensure product safety along the supply chain (e.g. food safety);
- Improve industry readiness and preparedness through applying guidelines, regulations, training, certification and registry;
- Apply a broader supply chain approach: a concerted effort to meet industry concerns and improve the level of competency, infrastructure, quality and training needed to

ensure compliant handling and transportation of perishables throughout the supply chain.

More broadly, in order to be adequately prepared for food supply crises, business should ensure they have updated business continuity plans in place, at the company and industry level, also covering suppliers and logistics.

4. EU FOOD CRISES PREPAREDNESS AND RESPONSE[190]

The ability of food systems to deliver safe, healthy and nutritious, affordable and sustainable food to consumers over time is of critical importance to the EU. In particular, **food supply has to be guaranteed during large-scale crises**. The Farm to Fork Strategy, part of the European Green Deal, as well as the CFP with regards to fisheries and aquaculture products and the reformed CAP with regards to agri-food products, underscores that food system resilience and sustainability, including the guaranteed availability of food supplies, are at the core of the EU's food policy. In terms of supply, the combined effects of the Farm to Fork Strategy and the Biodiversity Strategy targets are expected to result in a decrease of domestic supply by 10 to 15% depending on the sectors concerned and of the net trade surplus in agri-food products[191].

The text of the Farm to Fork Strategy reflects early experience with the COVID-19 crisis. The Commission has mapped several key **risks, threats and vulnerabilities**, both in the strategy and in the ensuing evidence-gathering process informing this SWD, that could conceivably have affected the ability of the food system to deliver food to EU citizens. During the COVID-19 crisis the EU food system responded well to challenges and food supplies were never at risk, so it is **important to understand what is working well** in the EU's food system.

While the issues that occurred were ultimately resolved effectively through *ad hoc* processes during this crisis, it became clear to the Commission and most other actors that **more could be done beforehand to be prepared** for crises challenging food security in the EU when these crises arrive.

Future crises that threaten food security in the EU could be of a different nature to COVID-19. It is not a question of whether such high-impact events will happen in the future, but rather when: the likelihood of major crises is increasing over time, for example due to climate change and biodiversity loss, to accelerating technological development, or to cyber-attacks.

Further, crises are increasingly transboundary and cross-sectoral in nature, due to the increased interconnectedness of the global economic system, technology and transport – a fact that is particularly relevant to the EU policy space. In addition, the preparation and response context within which current and future contingency planning takes place is also more complex, be it

[190] This section draws extensively on evidence from a technical workshop organised by the Joint Research Centre to support the Commission's contingency plan work, which will be subject to a technical report by the JRC.

[191] Barreiro-Hurlé, J., Bogonos, M. et al., Modelling Environmental and Climate Ambition in the Agricultural Sector with the CAPRI model, 2021.

due to society's decline in trust in institutions and expertise (deteriorating social capital), or the emergence and impact of social media (including concerted disinformation campaigns in the face of a need for a quick and effective public and private response to crises)[192]. This is a world of complex systems, including food systems that often interlock with other complex systems, in a way that is difficult to understand and address through policy. In such complex systems, accidents are, from time to time, inevitable, 'normal accidents' as Perrow would call them[193]. Constraints and pressures (technological, social, political, economic, ...) on systems are such that when a shock arises there is an innumerate number of simultaneous decisions taken in times of crisis, that nobody can predict with certainty[194]. Still, there is a need to create effective transboundary crisis management capacities, based on clear definitions of the boundaries of responsibilities between the actors, which in the EU exists in areas such as counter-terrorism, cybersecurity, energy, transport, health and migration, but not food[195].

Defining contingency planning

More broadly, it is possible also to think about improving **food system resilience** as a means to be better prepared as a whole to face crises. Contingency planning can be defined as one part of many in food system resilience, as well as be defined as separate in nature (for example, contingency planning has a short-term focus, and 'resilience' in this narrower sense would be understood from a more long-term perspective)[196].

Contingency planning can also be seen as one element of **risk management**, but risk management is a broader term that carries a more holistic view of risk reduction and prevention than being prepared to respond effectively to crises[197].

In general, the contingency planning process can be seen in the context of the crisis management cycle (figure 14), where the focus is primarily in preparedness and response (while awareness of the importance of other parts of the cycle remain important)[198]. The United Nations Office for Disaster Risk reduction[199] defines contingency planning as a management process that analyses disaster risks and establishes arrangements to enable timely, effective and appropriate responses, covering according to IFRC[200], three basic questions: (1) what is going to happen?; (2) what are we going to do about it?; (3) what can we do ahead of time to get prepared? Based on scenarios of possible emergency conditions or hazardous events, it allows key actors to envision, anticipate and solve problems that can arise during disasters. Contingency planning is an important part of overall preparedness.

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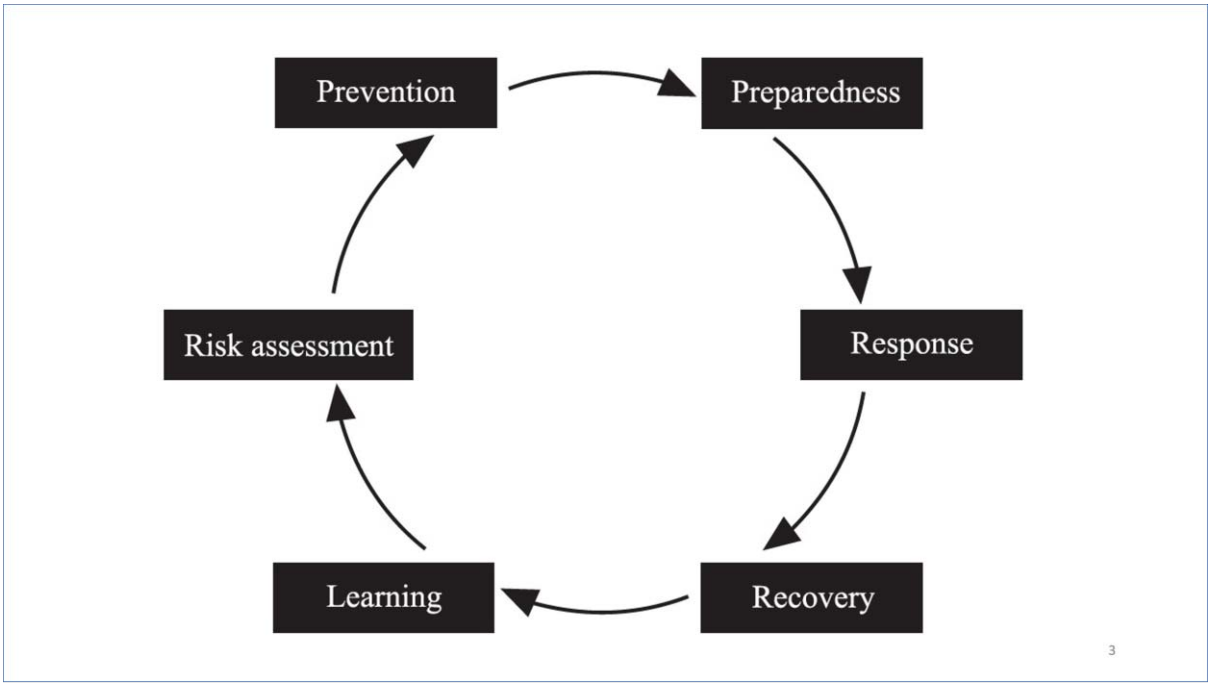
[192] Boin, A., presentation at JRC Workshop, 20 May 2021.
[193] Perrow, C., Normal Accidents. Living with High Risk Technologies, 1984.
[194] Le Coze, J.-C., 1984-2014; Normal Accidents. Was Charles Perrow right for the wrong reasons ?, 2015.
[195] Andrée, K., et al., Crisis Management Capacity in the European Commission, European Council and the Council of the European Union, 2017; Boin, A., presentation at JRC Workshop, 20 May 2021.
[196] Matthews, A., wrap-up at JRC Workshop, 20 May 2021. In the context of the F2F Strategy, in practical terms, the latter approach applies: system resilience aspects are covered under the sustainable food systems initiative (Action 1 of the F2F).
[197] Baldwin, K., presentation at JRC Workshop, 20 May 2021; Baruth, B., presentation at JRC Workshop, 20 May 2021; Pursiainen, C., presentation at JRC Workshop, 20 May 2021; Villasante, S., presentation at JRC Workshop, 20 May 2021.
[198] Matthews, wrap-up at JRC Workshop, 20 May 2021.
[199] https://www.undrr.org/terminology/contingency-planning.
[200] The International Federation of Red Cross and Red Crescent Societies, https://www.ifrc.org/en/what-we-do/disaster-management/preparing-for-disaster/disaster-preparedness-tools/contingency-planning-and-disaster-response-planning/.

Note then that this current SWD and the linked Communication focus on improving the ability of the EU to respond to crises once they occur, and do not cover structural aspect of food system resilience policy.

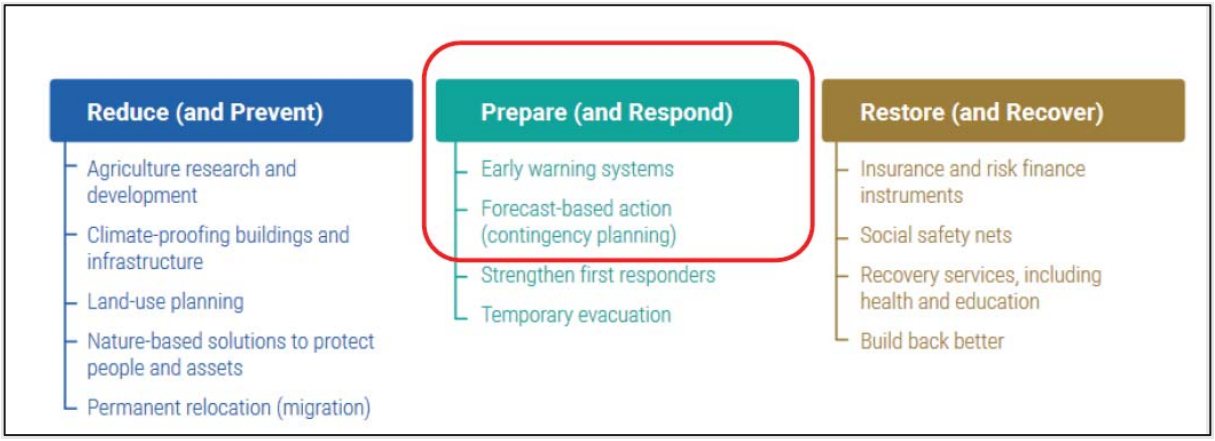
FIGURE 14 - THE CRISIS MANAGEMENT CYCLE



Source: Pursiainen, 2021.

In practical terms, preparation (and responding) in the case of food security can focus primarily on early warning systems and on how to respond effectively once the crises occurs - i.e., on contingency planning (see figure 15).

FIGURE 15 - CONTINGENCY PLANNING IN A RISK MANAGEMENT FRAMEWORK



Source: Baruth 2021, drawing on the Global Commission on Adaptation report, 2019.

If the crisis management or the disaster cycle provide a structured description of the steps to follow to manage a crisis, one recurrent question is whether and how the crisis itself can be defined, when it comes to food supply and food security. Many scholars propose definition of a crisis, for instance Rosenthal defines it as "a serious threat to the basic structures and/or fundamental values of a social system that requires urgent decisions under conditions of deep uncertainty"[201]. When it comes to agricultural markets crises, the debate is lively on how to define a crisis, in particular because, of defined, this could have consequences on the triggering of policy measures including market and/or support measures. The Court of Auditors for instance recently recommended to the Commission to clarify the criteria for triggering and ending exceptional measures[202] or to establish thresholds for analysing potentially significant market disturbances[203], suggestions the Commission did not fully accept for the reasons mentioned in both special reports. A recent study[204] has looked at the issue and concluded that beyond a general definition ("an unforeseen, rare and severe market disturbance caused by a sudden disequilibrium in supply and demand, resulting in price or income drops"), there was no consensus on what could be actual trigger levels and that context-specific conditions needed to be assessed on a case-by-case basis, notably in view of the inter-relation between the different aspects of crisis (frequency, severity, suddenness). Such 'market crises' are usually characterised by excess of supply or shortages of demand. They have important impacts on farmers, fishers and other stakeholders in the chain, should be subject to preparedness and response, which is the case within the CAP and the CFP. In the case of the present SWD, crises affecting food supply and food security should be looked at. These, contrary to 'market crises' are likely to be characterised by the opposite situations of shortage of supply (extreme weather vent, supply chain disruption) or increased demand (large scale stockpiling for instance). These crises are even less subject to a consensus in terms of quantitative triggering criteria than 'traditional' market crises.

The EU lacks a formal coordination mechanism for food crises

In the early stages of COVID-19, there were several instances of **issues of policy coordination** within the EU territory. The lack of an EU mechanism can affect the effectiveness, coherence and timeliness of the response to crises. During the COVID-19 pandemic suboptimal EU and Member State coordination gave rise to problems within the food system:

1. access to food system workers that needed to cross borders;
2. access to inputs, other materials (e.g. packaging), and food system services needed for production;
3. access to processing facilities and reduced processing capacity; and
4. the movement of food products within the Single Market.

While in the case of COVID-19 these problems were solved within days and weeks through EU-level *ad hoc* coordination, when unresolved they threatened at some stage to amplify the negative effects of the crisis on EU citizens, as well as put at risk the livelihoods of people

[201] Rosenthal, U., et al. (Eds.). Coping with crises: The management of disasters, riots and terrorism, 1989, quoted by Boin, A., presentation at JRC Workshop, 20 May 2021.
[202] ECA, Special report 23/2019, Farmers' income stabilisation: Comprehensive set of tools, but low uptake of instruments and overcompensation need to be tackled, 2019.
[203] ECA, Special report 11/2021, Exceptional support for EU milk producers in 2014–2016, potential to improve future efficiency, 2021.
[204] DG AGRI, Improving crisis prevention and management criteria and strategies in the agricultural sector, 2020.

employed in the EU's food system. As importantly, these problems put into question, for the first time in several decades, whether food security can be taken for granted throughout the EU territory. 'Go-it-alone' responses by EU Member States that run counter to the Single Market and other standing EU policies can worsen FSC disruptions at the EU level and destabilise markets[205].

Enhanced coordination is clearly the main type of further action praised by the respondents to the targeted questionnaire for a contingency plan. Over 60% of respondents would find improved coordination to be very useful and over 70% of them think this should take a compulsory form.

These types of issues can only be effectively addressed by Member States and the European Union coordinating their action. Further, the developments on the ground during the pandemic showed that **coordination that cuts across traditional policy areas** will likely be necessary to address the impacts of eventual food crises. Quickly and effectively responding to a crises means drawing not only on expertise, capacity or networks in the food sector but, as importantly, from other areas, such as transport, health or labour policy.

In addition, the early stages of the pandemic presented policy-makers at EU and MS level, as well as stakeholders and consumers, with a high-uncertainty environment, where **information was not easily accessible, easily verifiable, or easy to contextualise**. The high degree of uncertainty when a crisis is unfolding is a particularly important aspect: it is often even more crucial in a disaster to obtain valid information as to what is happening than it is to take immediate action. Contingency planning should help by providing the necessary channels for exchange of information to delay impulsive uncoordinated reactions in preference to appropriate and coordinated actions necessary in the situation[206].

Food security policy: building on lessons learned

Crises can be of different nature, and can have anticipated and unanticipated elements. Indeed, one of the challenges of contingency planning is to be prepared to deal with unknowable future shocks and their consequences. This raises the question of how to coordinate effective 'macro-level' contingency planning, say at EU level, with the existence of specific risks that require specialised knowledge for an effective response, and that risks can be addressed at multiple levels, from EU to MS or regional authority, from consumer to FSC operator and to the broader food system, including packaging, transport, insurance, etc.[207]

While some classification and conceptualisation for crises is possible, it is important to recognise that all crises are different and that often decision-makers have to operate in conditions of deep uncertainty[208]. As such, there is **a need for crisis response systems to be flexible** - contingency planning should recognise this and not impose unnecessary constraints that may limit the ability to act effectively when a crisis occurs[209]. Contingency planning should

[205] International trade can equally be seen as contributing to the long-term resilience of the food system, similarly to EU policies such as the Single Market and the CAP and CFP (Jackson, L. A., presentation at JRC Workshop, 20 May 2021; Antón, J., presentation at JRC Workshop, 20 May 2021).
[206] Perry, R.W. and Lindell, M.K., Preparedness for Emergency response: Guidelines for the Emergency Planning Process, 2003.
[207] Baruth, B., presentation at JRC Workshop, 20 May 2021.
[208] Pursiainen, U., presentation at JRC Workshop, 20 May 2021.
[209] Eriksson, E., presentation at JRC Workshop, 20 May 2021.

be seen as a continuous process with the aim to build crisis management capabilities and readiness, more than the drafting of a written physical plan which would not guarantee preparedness. It is impossible to cover every contingency that might arise in connection with a future disaster event. Hence, the planning process should emphasise response flexibility so that those involved in operations can adjust to changing disaster demands. The planning process should focus on principles of response[210], rather than on heavily elaborated plans which run the risk of becoming sacred documents, not questioned, changed and adapted if needed, thus hindering the response capability.

We should also be aware of what already exists in terms of policy that shores up the food system and improves our resilience, including our ability to respond to crisis. In addition, **existing policies**, such as the CAP, with its contribution to ensuring production and diversity of supply across the EU territory, and the Single Market, allowing the distribution of these supplies in a rational and quick way, showed themselves crucial to avoiding disruption of supply to consumers during the COVID-19 pandemic[211].

As important, **the public response to crises should avoid adding to the problem**. Notably, international trade contributes to resilience, and repeated evidence shows that avoiding panic reactions and maintaining food trade flows during times of crises is one of the most important elements in avoiding crisis escalation[212]. That during the COVID-19 pandemic, and contrary to past crises, international food trade did not face significant government-introduced barriers was key to maintaining relative market stability. This is evidence both that lessons have been learned from past crises by the international community and that global responses are the right approach to dealing with global problems[213].

In planning for the future, including defining what good practices in terms of crisis response are, there is clearly value in **learning from previous crises**. The OECD includes within its recommendation for the governance of critical risks the need to continuously share knowledge, including lessons learned from previous events, research and science through post-event reviews, to evaluate the effectiveness of prevention and preparedness activities.

Finally, crises typically present economic, social and environmental challenges – that is to say that **all of the elements of sustainability are present when a crisis occurs** (economic, environmental and social), and all need to be present in the solution. The F2F Strategy makes this link clear, adding that the EU's response to crises should be based on the sustainability approach.

Better prepared for crises through contingency planning

The role of contingency planning is to ensure food supply to citizens when a shock to the system is so significant that the existing economic and regulatory structures of the food system find it difficult to ensure food security. Contingency planning is a part of a broader approach to food system resilience that further includes 'structural' food system policy aspects. These

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[210] Perry, R.W. and Lindell, M.K., idem, 2003.
[211] Haniotis, T., presentation at JRC Workshop, 20 May 2021.
[212] Poppe, K., presentation at JRC Workshop, 20 May 2021.
[213] Haniotis, T., presentation at JRC Workshop, 20 May 2021; Rudloff, B., presentation at JRC Workshop, 20 May 2021.

related structural policies can be on the supply side (e.g., food production diversification strategies, the diversification of import sources, or establishing food reserves), the demand-side (food affordability, nutritional aspects, consumers in geographically isolated regions, income and health inequalities), or have a cross-cutting nature (sustainability of the food system, transport and logistics)[214].

A first step in contingency planning is to **identify the threats, risks and vulnerabilities** of the food system[215]. The first guideline for preparedness planning is that it should be based upon the best available and accurate knowledge of the threat and of likely human responses[216].

In terms of threats, this would imply the use of risk identification ('which risks?') and evaluation ('how significant?') systems. Further, the use of foresight techniques to be able to imagine possible futures can be fruitful, especially as for some high impact and low likelihood scenarios there may not be much extant evidence on which to base policy[217]. Where evidence does exist, processes to draw lessons from previous crises, including an evaluation of which responses were effective, is important to carry these lessons into planning for the future[218]. And, finally, build-in thinking on the increasingly transboundary nature of crises, both in a geographic and policy meaning of the word, and, more broadly, on the implications of crises affecting complex systems, including accepting and adjusting for the fact that in the face of complexity some impact of crises may be unknowable in advance[219].

Specific **vulnerabilities to the EU's food system** identified during the evidence-gathering process include reliance on certain critical inputs, such as certain ingredients (e.g. additives) from potentially unreliable trading sources; the need to monitor system-level resilience, but also resilience at specific stages of production, e.g. farm-level resilience, or on a sector basis, e.g., resilience of the poultry production sector[220]. As for other economic sectors, the update of the Industrial Strategy foresees that there will be a thorough mapping of each industrial ecosystem, one of these being the agri-food ecosystem. The presence of primary producers and consumers (i.e., not only purely industrial actors) in the agri-food ecosystem adds to the importance of being thorough in the mapping of its specific risks and vulnerabilities.

Given the dynamic nature of threats and vulnerabilities, as well as of crises once they would hit the food system, **robust monitoring systems** are a requirement for effective contingency planning[221]. Further, experience shows that every crisis is different, and monitoring systems must be flexible and encompassing enough that a broad range of relevant information is captured, often through the effective transmission of reliable qualitative information. When a crisis emerges, early-warning systems can provide precious time for responding, for example based on the identification of weather-related risks through satellite data[222]. The importance of

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[214] Poppe, K., presentation at JRC Workshop, 20 May 2021; Haniotis, T., presentation at JRC Workshop, 20 May 2021.
[215] Pursiainen, U., presentation at JRC Workshop, 20 May 2021.
[216] Perry, R.W. and Lindell, M.K., idem, 2003.
[217] Report of the 5th SCAR Foresight Exercise Expert Group, Natural resources and food systems: Transitions towards a 'safe and just' operating space; Poppe, K., presentation at JRC Workshop, 20 May 2021; Eriksson, E., presentation at JRC Workshop, 20 May 2021.
[218] Villasante, S., presentation at JRC Workshop, 20 May 2021; Horobin, D., presentation at JRC Workshop, 20 May 2021.
[219] Boin, A., presentation at JRC Workshop, 20 May 2021.
[220] Meuwissen, M., presentation at JRC Workshop, 20 May 2021.
[221] Pursiainen, U., presentation at JRC Workshop, 20 May 2021.
[222] Baruth, B., presentation at JRC Workshop, 20 May 2021.

market transparency and market information systems was particularly highlighted during consultation, as was the need to science-based decision support tools and platforms[223]. The EU in this domain benefits of a large number of information and early warning systems in place covering many areas of the food system: these should eventually completed on some aspects of the food system (ie consumption and consumption patterns) and made more performant (where possible: a study should be carried out on potential arising from big data and the Internet of Things and of the development of blockchain technologies for example in allowing actors in the food system and policy-makers to benefit from better information in times of crisis) thanks to the progress of digitisation, in particular to benefit from real-time information. Contingency planning should indeed also be able to be nimble and **provide swift responses**, to avoid having the crisis escalating.

Following the contingency planning preparation stage, and further along the crisis management cycle, comes **crisis response**. This step happens once the crisis occurs, and involves activating the procedures, tools and measures that were previously put in place[224]. These may include several routine tasks related to the containment of the source of the crisis and the mitigation of its effects. There are appropriate legal bases and decision-making processes for the adoption of crisis response tools and instruments of the policies concerned and contingency planning should facilitate and ease the mobilisation of such instruments, not to duplicate the work or make the mobilisation of the existing tools more difficult.

Finally, consideration has to be given to **the resources needed** for effective contingency planning, including financial, staffing, or equipment aspects, and keeping in mind the cross-policy, and multi- level governance aspects of preparation. In practice, many of these resources may already be available, and they should be mobilised effectively towards contingency planning from a food system's perspective. This should include appropriate training and exercise for the staff involved in these activities, if appropriate also for the policy-makers.

With this information on threats and vulnerabilities, policy-makers and stakeholders can be more effective in mitigating risks and preparing for crises. In practice, responses by these actors can focus on diversification strategies, reasonable system redundancies, and on a modular approach to food systems[225].

Contingency planning through improved processes

At the core of the EU's contingency plan to improve food security should be improved ***ex ante* coordination**, which is needed to organise a concerted response when a crisis occurs. In particular, there is a need to maintain effective means to address transboundary crises in the food sector[226].

Effective coordination processes for contingency planning are **participatory and collaborative**[227]. Given the way the EU is organised, with Member States and supra-national

[223] Antón, J., presentation at JRC Workshop, 20 May 2021.
[224] Pursiainen, U., presentation at JRC Workshop, 20 May 2021.
[225] Antón, J., presentation at JRC Workshop, 20 May 2021.
[226] Boin, A., presentation at JRC Workshop, 20 May 2021; Rudloff, B., presentation at JRC Workshop, 20 May 2021.
[227] Antón, J., presentation at JRC Workshop, 20 May 2021.

institutions, multi-level governance is a requirement for contingency planning[228]. EU food security crises would, almost by definition, be transboundary in nature[229]. Multi-level governance may also benefit from being extended to the subnational entities, including regions or cities[230]. Communication and coordination with international organisations (such as FAO, OECD, etc.), neighbouring countries, and major trading partners can be of benefit to the EU, to promote international policy consistency and draw on each other's expertise. The private sector. The EU's contingency plan to improve food security would benefit from incorporating these elements as needed.

Finally, one key element of collaborative preparation for crises is the opportunity for creating bonds of trust between the individuals who will be called to respond when a crisis occurs. Developing trust and establishing a network between participants ('social capital'), is likely to lead to more transparent communication and thus to a more effective response to crises[231].

In terms of processes of **communication to the public** in the context of crises contingency planning, information should be factual and proportionate and therefore contribute to assuage immediate fears that may lead to collectively counter-productive behaviours, such as the hoarding of food or inputs needed for food production. Special communication skills to combat misinformation and attempts to undermine trust in public authorities and experts, in particular in social media platforms, may be needed to avoid unnecessarily escalation and creating 'crises within a crisis'[232]). This includes the need for a coordinated communication between the EU and the Member States, including at regional or local level, and where needed also the stakeholders.

[228] Poppe, K., presentation at JRC Workshop, 20 May 2021; Trondal, J., presentation at JRC Workshop, 20 May 2021.
[229] Boin, A., presentation at JRC Workshop, 20 May 2021.
[230] Boin, A., presentation at JRC Workshop, 20 May 2021.
[231] Horobin, D., presentation at JRC Workshop, 20 May 2021.
[232] Boin, A., presentation at JRC Workshop, 20 May 2021; Poppe, K., presentation at JRC Workshop, 20 May 2021.

ANNEX I - LESSONS LEARNED FROM THE COVID-19 CRISIS

Introduction

The year 2020 saw the world face a global pandemic that disrupted life in a variety of ways. We observed lockdowns in many countries, health systems at the limit of their capacity and threats of empty shelves. Consumers stockpiled at the beginning of lockdowns that led to temporary peaks in sales of certain retail commodities (EC, 2020q). COVID-19 came as a shock but is still not over. The pandemic affected every industry including the food sector (Staniforth, 2020) in the short and long-run.

On a macro perspective, the food supply chain (FSC) was remarkably resilient and food security[233] was not endangered. Global prices of main commodities stayed strikingly stable[234]. The impact of the crisis on the agri- food sector has been limited and was much less than with other sectors, largely due to its resilience. The crisis rather sped up already ongoing trends such as e-commerce (EC, 2020p; EC, 2020q). While markets overall succeeded, there were local temporary challenges.

The European Green Deal[235] is a comprehensive strategy with several elements with the overall goal to make Europe climate-neutral by 2050. One element is the Farm to Fork Strategy that covers a range of initiatives around a healthy and sustainable EU food system. One is to develop a contingency plan by the Commission. This plan should be activated when there is a crisis that affects the entire or part of the food system in the EU and puts food security within the EU in danger. It will include the creation of a coordinated crises preparedness and response mechanism. There will be other crises affecting the food system in the future, e.g. other pandemics (Bakalis, et al., 2020) natural catastrophes, food-borne diseases, wars, etc. The contingency plan aims to account for those unforeseen crises. It is complementary to actions to prevent or reduce the likelihood of crises, including actions to restore the health of the natural systems through the Biodiversity Strategy for 2030.

As announced in the Farm to Fork Strategy, the Commission will draw on lessons learnt from past crises, including the ongoing COVID-19 pandemic in developing the contingency plan. We can learn from vulnerabilities and strengths in the food system. New ways of working, investments, and reforms can enhance the resilience of the food sector[236] to even bounce forward in a sustainable manner without compromising other goals, such as those in the Green Deal (OECD, 2020b; JRC, 2020).

This annex starts with outlining the main disruptions in the EU food sector. We continue with an overview of public sector measures and highlight supportive ones and room for

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[233] "Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (World Food Summit, 1996).

[234] See graphs in Annex on global food price index and selected agricultural commodity prices.

[235] The EU Green Deal thrives to make Europe the first climate-neutral continent. It is a plan to make the EU's economy sustainable by increasing efficient use of resources by means of a circular economy and restoring biodiversity. More information can be found here: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.

[236] The term 'food system resilience' has been defined (Tendall, et al., 2015) as the 'capacity over time of a food system and its units at multiple levels, to provide sufficient, appropriate and accessible food to all, in the face of various and even unforeseen disturbances.'

improvement. The annex ends with reflections on the crisis and conclusions. The focus is on the production side; even if we refer to consumers to explain the effect demand changes had on the EU food sector. The sources are a mix of existing literature on COVID-19 and other crises, and interviews with different European stakeholders in the food sector and policy-makers[237].

Disruptions in the agri-food sector

Agricultural activities are usually dependent on the season and weather; hence, these need to follow a strict schedule. In addition, all processes and stages in the FSC are strongly connected; a delay at one end affects the whole chain. Any disruption might have negative effects on food quality, freshness, and food safety, and hinder access to markets and affordability (FAO, 2020a).

Still, agriculture has been amongst the least affected sectors and, in general terms, food kept being available during the crisis (FAO, 2020b). There have been some disruptions on the production side and one can distinguish between three main types: Agricultural production and incomes, FSC disruptions and shifts in consumer demand (OECD, 2020a; OECD, 2020b). One needs to differentiate between the initial weeks of the COVID-19 pandemic during the "first wave" and later continuous changes in production and consumption[238]. A crisis is (WUR, p.11) "an unforeseen, rare, and severe market disturbance caused by a sudden disequilibrium in supply and demand, resulting in price or income drops" (ECORYS; Wageningen Economic Research, 2019). We moved from the crisis to a persistent change in living, working and consuming.

A novelty in the COVID-19 crisis were disruptions in transport and logistics and labour that influenced agricultural production and supply chains. We will focus on these in the following overview.

There is no homogeneous picture across stakeholders and countries. For example, Spain and Italy had much less time to respond during the first wave than other countries as they were more significantly impacted sooner. In addition, supply chain stakeholders as well as commodities were affected to a different degree. The private sector reacted to the crisis with different measures. This annex outlines main differences and includes some examples.

Agricultural production and incomes

COVID-19 affected all FSC stages; agricultural production, postharvest handling, processing, distribution/retail/service, and consumption (Aday & Aday, 2020). In the following section, we mainly focus on agricultural production and postharvest.

Some sectors in the agri-food sector experienced **labour shortages** due to initial borders closures within the EU and outside (OECD, 2020a). Travel bans that started in March 2020 within the European Union, as well as the closure of the Schengen Area, caused a threat to lack of available labour in several EU countries. Shortages of labour are particularly severe with those businesses that require high amounts of seasonal labour and/or labour-intensive production (OECD, 2020c). Despite allowing seasonal workers to cross borders by Mid-

[237] See interview guiding questions in Annex, interviews are included in references.

[238] Due to economic change, there was and still is more demand from food banks in Europe from jobless including families with kids. Over 80% of European food banks experienced an increase in demand in March 2020 (FEBA, 2020).

March[239], not all countries followed immediately. This caused labour shortages, especially in the fruit and vegetables sector as well as input delays for processing companies (Copa Cogeca, 2020h; Copa Cogeca, 2020f; PROFEL, 2020a). Time sensitive and labour intensive commodities, e.g. asparagus and strawberries, were particularly at risk (Copa Cogeca, 2020c).

Some national and private activities aimed at recruiting local workers for the harvest. Several Member States set-up online platforms to recruit national seasonal workers (OECD, 2020a). For example, French farms put out calls for unemployed urban workers to help in the fields. Cooperatives also tried to overcome agricultural production disruptions by hiring workers via online platforms. The response of these activities was limited, technology did not become an established way to hire workers. Hiring still mainly depends on agencies or private contacts and there is potential to use more technology in the future (Copa Cogeca, 2020a). Consequently, special planes flew in farmworkers, mostly paid by employers (Nature Plants, 2020; Agro Alimentarias, 2020a; OECD, 2020a).

Still, labour shortages did not cause major disruptions. For example, Germany, which was in need of seasonal workers from several countries like Poland, Bulgaria, and Ukraine, still overcame most labour shortages by a cooperation with local authorities and a quarantine system (DBV, 2020a). These activities were based on the EU policy measures green lanes and allowing seasonal workers to cross borders. Green lanes aimed at guaranteeing the European Single Market. Border crossings were asked to work quickly. The measures were not limited to specific groups of goods[240] and included transport workers (EC, 2020s). In total, more than 40 000 seasonal workers entered Germany between April and Mid-June and were essential for the German harvest period (DBV, 2020b).

Social distancing [241] created an additional challenge once labour was available. Highly mechanized production of arable crops often had social distancing already in place. Labour-intensive agriculture, such as fruit and vegetable farming, faced next to a lack of seasonal labour the challenge to enforce social distancing on the field. Changes in ways of working was necessary, e.g. working in shifts (Laborde, et al., 2020).

The impact of the COVID-19 crisis **on agricultural inputs** was limited. In March, closing borders or slowing down the transnational movement of seeds could have affected production, certification, distribution, and cost of seed negatively. This, however, was not the case on a large scale. Spring and harvest seed was already in the respective countries before travel bans and eased the possible impact (OECD, 2020c). The initial concern of access to pesticides, mainly sourced from China, disappeared as China rather quickly ended the lockdown. Access to fertilisers also was not at risk with comparatively low prices. Local temporary disruptions were due to delays in transport (OECD, 2020d). For feed, global soya use increased leading to a tightening of stocks. In addition, there were some initial disruptions at ports due to COVID-19 in exporting countries such as Brazil. However, these have been quickly resolved. At the

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[239] We will cover green lanes and border crossings of seasonal workers in section 'Policy measures'. These mainly overcame border issues and eased disruptions in agricultural production.

[240] Even if all goods were included in green lanes, a range of goods were classified as essential such as fresh food and essential food products, agricultural production inputs and medicine. These goods were supposed to be prioritized (EC, 2020s).

[241] "Social distancing is an action taken to minimise contact with other individuals; social distancing measures comprise one category of non-pharmaceutical countermeasures (NPCs) aimed at reducing disease transmission and thereby also reducing pressure on health services." (European Centre for Disease Prevention and Control).

same time, global soya production was expected to reach a new record in 2020, based on a recovery in the US and continuous increases in Brazil and Argentina (EC, 2020q; EC, 2020p). Supplies of organic feed input was an initial concern in March as supplies tightened (Coceral, et al., 2020b).

The agricultural sector connects to other sectors. There were initial alarms about lack of **access to machinery, and spare parts of machinery**. At the end of March, there was a joint statement by CEMA, CEETTAR and CLIMAR[242] that agricultural machinery and their spare parts / servicing must qualify for the green lanes (CEMA, 2020). Fears did not materialize and agricultural machinery was often included in exceptions from movement restrictions (OECD, 2020e).

Producers, who already delivered their produce through diversified channels, were better off to meet changing demands than those who only used **specific distribution channels** such as open markets or HORECA that experienced a collapse during the COVID-19 crisis (OECD, 2020a). Farmers that offered tourism on their farm lost the additional income source (DBV, 2020a).

Cooperatives set-up online meetings to enable continuous **exchange and support**. Next to learning from each other, they also helped to find alternative sales channels. The lack of broadband internet on the countryside as well as the lack of digital capacity especially with older farmers put a limit on these initiatives (Copa Cogeca, 2020a; Agro Alimentarias, 2020a; DBV, 2020a).

Overall, the impact on **agricultural production and income** was limited. Preliminary results from Eurostat[243] show that the value of EU agricultural output declined by 1.6% in 2020 compared to the previous year, and was still slightly higher than the average of the previous three years. There are differences across countries, the Netherlands for example was particularly hit hard due disruptions in the potato and flower sector. Preliminary estimates show an overall drop in EU entrepreneurial farm income[244] of 7.9% compared to last year. This estimate does not include additional monetary support under the temporary framework of state aid[245] (Matthews, 2021).

Private sector measures targeted agricultural production and income along the food chain. Food companies supported other actors in the food chain. For instance, Nestle extended payment terms for HORECA clients (Nestle, 2020). Food processors worked closely with farmers. Potato processors asked farmers to produce less while offering to pay the same amount despite lower production (EUPPA, 2020). Retailers levelled their influence to support farmers. For example, Carrefour stores in Belgium, who usually only buy local products in a 40km radius, changed their policy to buy from farmers all over the country. On the other hand, Spar in Austria launched an initiative 'best from home' and started buying from farmers in a 30km radius to help them compensate for the loss in other sales channels (Eurocommerce, 2020d).

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[242] CEMA: Association representing the European agricultural machinery industry, CEETTAR: European Confederation of Agricultural, Rural and Forestry Contractors, CLIMMAR: *Centre de Liaison International des Marchands de Machines Agricoles et Réparateurs.*

[243] Eurostat, Economic accounts for agriculture – values at current prices, EU27.

[244] Entrepreneurial farm income = Agricultural output - compensation of employees + subsidies on production (while subtracting other taxes on production) - rents - interest paid.

[245] The temporary framework for state aid allowed countries to support their agricultural sector. The Netherlands notified € 650 million under the framework.

Disruptions in the seafood sector

Fisheries production and incomes

The closure of hotels, restaurants and catering (HORECA) meant that the effects of COVID-19 were felt immediately by both the fishery and the aquaculture sector due to the loss of these outlets for fresh species, which can account for up to 50% of market outlet for fresh fish in some countries such as Italy. In many Member States (MS), fishmongers, markets, and fresh counters in retail stores were also closed, leading to a further substantial drop in demand for fresh seafood. Restrictions on travel were imposed, flights were cancelled, airfreight capacity heavily reduced, and airfreight rates increased. As a result, access to fresh products to foreign markets reduced substantially or disappeared

Many fishing fleets in the EU rely heavily on exports, both intra- and extra-EU. These fleets are highly affected by the reduced demand in Europe and lack of airfreight capacity to distant markets. However, in order to adapt to the reduced demand, several POs have organized a rotation of vessels according to expected buyers at auctions. The purpose was to maintain profitable prices and a minimum activity for the auctions.

Social distancing measures have created difficulties for many fishers. Some, unable to comply with the distancing measures, have been forced to stay in port. Others have been forced to stop fishing as they have been unable to replace their crew due to travel restrictions, and crew replacement remains an issue for the long-distance fishing fleet.

Data suggests that COVID-19 resulted in a decrease of 18% in the employment on-board for the EU fishing fleet in 2020[246], with significant impacts also upstream in the value chain.

In addition to the employment level, as the crew wage in some Member State fleet segments is correlated to the value of landings, there has been a general decrease of the crew wage compared to previous years.

Food supply chain disruption

There were also early reports of disruptions downstream from the farm gate. These included a reduction in available workforce, interruptions in transport and logistics and delayed FSCs. Consequently, production and distribution costs increased (OECD, 2020a).

At the beginning of the pandemic, free **movement of workforce** was limited. Next to the effect on seasonal workers for agricultural production, employees that regularly cross borders to go to work experienced troubles as some Member States added additional barriers. In March, Czech authorities required employees who crossed the border to Austria and Germany a special pass issued by the border authorities (Eurocommerce, 2020b).

Initial border closures and additional measures and checks have led to **congestion and delays in transport and logistics**. For example, in early March, there were long lines of lorries at the Slovenian borders due to additional border checks from Italy, Hungary, and Croatia. The passage through Slovenia also was limited due to Slovenian restrictions (Total Slovenian news,

[246] Scientific, Technical and Economic Committee for Fisheries (STECF) - The 2020 Annual Economic Report on the EU Fishing Fleet (STECF 20-06), p 56.

2020). Trucks from and to Italy were only allowed in convoys (~25 trucks) guarded by police and had to cross the country without stopping (Coceral, et al., 2020a). Austria checked every transporter in the early days of the pandemic (TomatoEurope, 2020). These measures led to significant delays. For example, a truck round trip Hungary-Italy that usually takes 36-48 hours, took seven days at the beginning of March (Coceral, et al., 2020a). These mainly affected the transit of perishable products (OECD, 2020b), but also posed logistical challenges to long-shelf products as it delayed production and delivery (PROFEL, 2020a).

Workers in quarantine affected the availability of truck drivers to cross borders (Eurocommerce, 2020a). The logistics sector moved from trucks to rails to reduce the number of drivers needed (JOC, 2020). Truck traffic reduced by more than 50% in Spain and 37% in Italy at the beginning of the pandemic. In mid-April, the total truck distance in Europe was 24% lower than usually (OECD, 2020d). Truck drivers that were still driving faced additional challenges in the early days with closed truck stops and sanitary stations. Many Member States reacted swiftly to keep service stations open (Politico, 2020).

Costs increased across all types of transport. Several shipping containers were located in Chinese ports at the beginning of the pandemic. Restrictions led to a shortage and thus to an increase in prices. There was a trickle-down effect on the price of cargo hampering trade (OECD, 2020b; EUPPA, 2020). As mainly essential products were moved across borders, truck companies added additional 'empty kilometres' increasing transport costs (EC, 2021b). Lower trade volumes in international freight raised costs (OECD, 2020b).

Certification checks, including those that are required to facilitate trade, such as physical inspections of goods to certify compliance with sanitary and phytosanitary requirements (SPS) had to be handled (OECD, 2020b). However, digital versions of SPS solved the problem quite rapidly (OECD, 2020a).

Supply chain disruptions, in particular, affected **food-processing plants**. The food industry is an already quite well equipped sector with high safety and hygiene standards. Still, sickness among workers led to additional labour shortages and reduced or stopped production (OECD, 2020a). Many companies in food processing updated their safety protocols and incorporated protocols for new employees (PROFEL, 2020a; TomatoEurope, 2020). Digitalization also helped to enable social distancing. Smart working procedures allowed to only leave essential workers in the factory (TomatoEurope, 2020; EUPPA, 2020).

Still, outbreaks of COVID-19 in processing plants were prominent in the news. Germany had the highest number of outbreaks in slaughterhouses and meat processing plants. Other European countries, such as Ireland and Poland, also had significant outbreaks. These often linked to the precarious living and working situations of many migrant workers. Many live in small flats with several co-workers (Deutsche Welle, 2020). Social distance inside the plants is difficult because workers stand side by side on production lines (Aday & Aday, 2020).

Access to input and additional protective gear for processing and retail companies created initial disruptions. The first lockdown affected maintenance services for relevant machinery, limiting access for processing companies. These burdened the functioning of the sector (TomatoEurope, 2020). Access to packaging material was limited or delayed due to disruptions in trade (CELCAA, 2020), for example for packaging of eggs (Aday & Aday, 2020). Food originally produced for HORECA had to be repackaged to smaller portions for retail (Eurocommerce, 2020a). Some stakeholders lacked protective gear at the beginning of the pandemic. Once it was available, it added costs of production (TomatoEurope, 2020; Coceral,

et al., 2020b). However, in the second wave there was a coordinated mask supply and few shortages (Eurocommerce, 2020a).

Supply chain disruptions led to additional costs for retail stores. There was a **labour shortage** as a proportion of staff was absent either due to sickness or the need to take care of children at home. Retail stores had to hire temporary workers to help in the stores. At the same time, the **workload increased** due to additional hygiene requirements. To ensure safety for consumers and employees, e.g. to keep a minimum distance, created additional time and costs. Panic buying of consumers at the beginning of the pandemic as well as changed consumption patterns also added to additional workload. Shelves had to be refilled more regularly and the assortment needed to be adapted (Eurocommerce, 2020a; Mercadona & Asedas, 2020). Reliance on a few suppliers in some cases led to temporary shortages in stores underlining the need for a diversified supply chain, both European and global to meet demand (Eurocommerce, 2020a).

An additional challenge could have been a higher incidence of **unfair trading practices** in the EU that affected the supply chain. Claimed examples are unilateral changes to contracts by claiming *force majeure* circumstances or unilateral changes to pricing for the supplier, particularly for perishable products, with no change in consumer price. Another claimed example is the unilateral removal of fresh products from stores and consequently refusing deliveries (Copa Cogeca, 2020d).

On the other hand, the outstanding cooperation across the whole food chain was highlighted by several stakeholders (FoodDrinkEurope, 2020; Eurocommerce, 2020a; Agro Alimentarias, 2020a). **Horizontal cooperation** targeted supply chain disruptions (Copa Cogeca, 2020i; Eurocommerce, 2020a; FoodDrinkEurope, 2020). Retailers cooperated by exchanging information about stocks to manage supply chain disruptions and changes in demand (OECD, 2020a). Carrefour offered other retailers to use their online platform to sell their products (Eurocommerce, 2020a). Farm cooperatives enabled coordination and access to protective gear for farmers (Agro Alimentarias, 2020b). Food processing cooperatives exchanged ideas of how to handle safety issues (PROFEL, 2020a).

Vertical cooperation complemented horizontal measures. Close connection to EU institutions proved crucial, as well as good cooperation with EU professional organisations, sector associations, company members, counterparts at national level and other agri-food chain organisations (FoodDrinkEurope, 2020). Private stakeholders along the food chain cooperated to ensure food security in a team effort (Eurocommerce, 2020a; Agro Alimentarias, 2020a).

The COVID-19 crisis had implications for **food loss and waste**. Supply chain losses increased because of logistical bottlenecks and a loss in demand for perishable goods that are often consumed away from home (e.g. milk, eggs and fresh fish) (OECD, 2020a). Farmers that had no outlet for their products had to discard their produce in some cases, such as potatoes or raw milk. There was also an effect on vegetables due to labour shortage for the harvest (Copa Cogeca, 2020f).

New regulations posed additional challenges for some stakeholders of the food chain. For example, on 1 April 2020 Regulation 2018/775 entered into force. Accordingly, the country of origin of the primary ingredient of a food needs to be indicated. Processing companies affected by the COVID-19 crisis faced challenges to have the right labels in place for the due date. Eventually, discussions with Member States led to more flexibility in the enforcement of these food-labelling provisions for a limited time (PROFEL, 2020b).

Shift in the structure of demand

Shift in the structure of demand occurred that related to both, closure of HORECA and changed consumption behaviour at home with a surge of home cooking to the detriment of most convenience foods. The changed consumer demand due to COVID-19 differed based on several factors such as the price of products, income level of consumers and sociodemographic situation (Bakalis, et al., 2020).

There was a large **increase in retail demand for certain product groups** during the first wave (OECD, 2020a). Some consumers started precautionary buying of a few goods in the very first weeks, especially long shelf-life products, such as pasta, rice, flour and yeast, and canned goods. The demand for different fruits increased away from short shelf-life fruits, such as strawberries, and towards longer shelf-life products, such as apples and oranges. It was a mix of a logical reaction of consumers, suddenly living and working at home with children home schooling, and irrational buying due to the uncertainty of the situation (Mercadona & Asedas, 2020; Eurocommerce, 2020a). Still, while some prices increased moderately (i.e. up to +5%) in April-May 2020 for fresh fruit and vegetables, the situation quickly normalised.

As COVID-19 continued, there was a **trend towards local and healthy foods**. Consumers also bought more products for baking and cooking at home. The demand for organic products increased. At the same time, there was an **amplified focus on price**, especially for those, whose economic situation changed by losing jobs or moving into short-term work (Eurocommerce, 2020a; Copa Cogeca, 2020d). Still, saving rates were all-time high in the second quarter of 2020, nearly 25% and the highest for decades (Eurostat, 2020). Overall, HORECA and quality sectors suffered while other sectors like fruit and vegetables were less affected (Copa Cogeca, 2020c; Agro Alimentarias, 2020a).

Consumer change disruptions were product specific and often a combination of other external effects. The brief overview of commodities below indicates main changes to outline the effect on the food sector and is not a holistic impact assessment. The flower and plants sector suffered most and lost nearly all its demand. The consumption of alcoholic beverages decreased along with the close down of HORECA despite concerns of increased drinking at home to overcome loneliness (spiritsNews, 2020). Consequently, hops, malting barley and wine sales dropped tremendously. For wine, stocks were in addition all-time high. This was a combined result of COVID-19, large harvest of the previous year, trade tensions affecting EU exports and decreased demand over time.

High quality cuts of meat produced as well as seafood products typically sold fresh for HORECA were difficult to reroute, especially by the same price. Next to rerouting to retail, export and selling directly to consumers via online platforms helped, for example for sheep. Pork meat also suffered by lower pay out prices due to long waiting times in yards and therefore increased weight of pigs[247]. Pork prices were also affected by the African swine fever (ASF) and the import ban on pigs from Germany to China (EC, 2020n; DBV, 2020a). Poultry demand went initially down due to closure of fast food but was positively influenced by a demand shift to less expensive meats (EC, 2020q).

Sectors like arable crops, dairy, olive oil and fruit and vegetables suffered little by shifts in demand. Potatoes were affected due to lockdown measures reducing demand for frozen potatoes (for production of fries, mostly consumed in food services, fast food, and other

[247] Supply chain disruption due to the virus in slaughterhouses.

restaurants) (Agro Alimentarias, 2020b; Copa Cogeca, 2020b; Copa Cogeca, 2020c; EC, 2020q; DBV, 2020a).

Businesses along the food chain partly adapted to shifts in demand, for example by switching production lines and increasing their capacity to manage larger inventories (OECD, 2020a). HORECA products were partly rerouted to retail with limited impact (EUPPA, 2020; Agro Alimentarias, 2020a). Either the amounts were too little to compensate for the loss or products were offered at a high discount leaving little margin for the producer (FoodDrinkEurope, 2020).

Changes in consumer demand were approached by the private sector by **innovations, investments, and communication**. Innovations to satisfy changed demand helped some sub-sectors. For example, recent innovations in the potato sector of products to fry at home experienced a sales boost as consumers started preparing more food at home (EUPPA, 2020). Communication eased shifts in initial disruptions of consumer demand. Retail stores supported communication to avoid panic buying and calm down consumers (Eurocommerce, 2020a; Mercadona & Asedas, 2020). Mercadona in Spain released general recommendations of how to do grocery shopping that was announced on different channels including social networks using the phrase "It will end. Overcoming fear together #Covid_19" (Mercadona, 2020).

Consumers shifted to **buying online** due to confinement rules and social distancing needs. Around 15% of consumers[248] have tried an online grocery website that they have never used before. However, the share of online sales in total sales is still rather low, for Germany it was 1.5% before the crisis. Still, the COVID-19 crisis gave online grocery shopping a tremendous boost (Mc Kinsey, 2020). Those, who already had an online sales channel infrastructure, were better equipped to meet new demands. Others increased their investments in their online sales channels (Mercadona & Asedas, 2020; Eurocommerce, 2020a).

The **fishery and aquaculture sector** has been particularly hard hit by the market disruption. The COVID-19 outbreak, lockdown and subsequent economic contraction has had significant socio-economic impacts on the EU fisheries and aquaculture sector.

On the demand side, the sudden closure of sales venues, markets, outlets and distribution channels (HORECA) drove prices and volumes to drop substantially as demand got weaker due to lower purchasing power. There were difficulties in continuity buying seafood products (demand shifted from perishable to preserved products, disruption of the supply chains).

On the supply side, there was a slowdown of international trade, a decrease in fishing activity, partly because of declining demand but also due to health measures (need to maintain the safety distance between crew members at sea); and an increase in the cold storage and processing of seafood. Sustaining business operations the crisis in the backdrop became a top priority in order for the sector to safeguard its immediate viability and preserve activity in local communities.

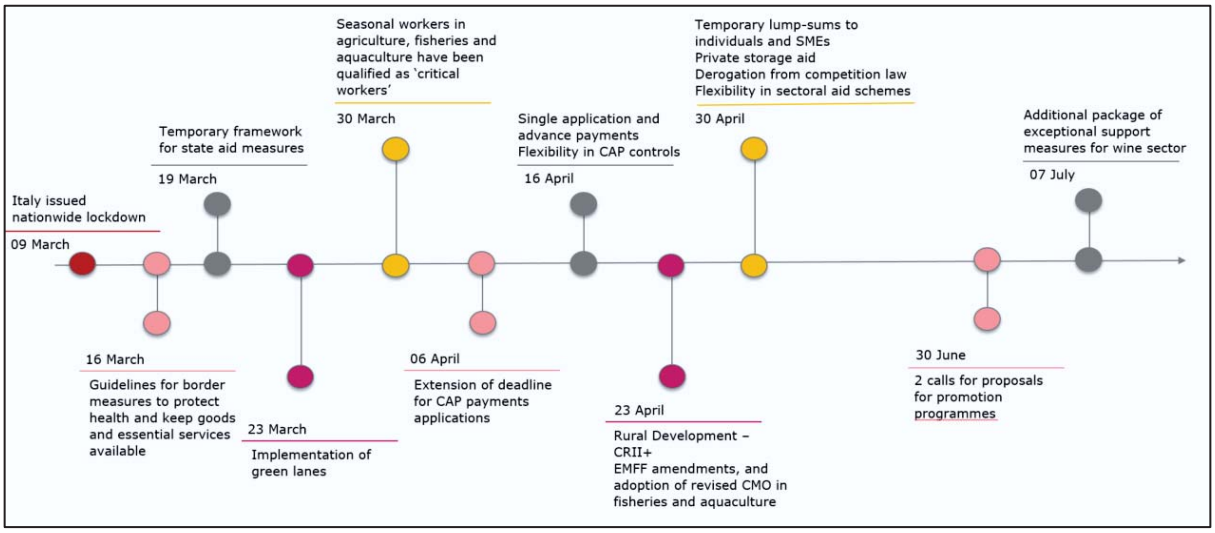
However, the sudden change of consumption of fishery and aquaculture products as a result of the lockdown did not last. Most EU consumers maintained their consumption of these products, and the limited share of consumers who decreased their consumption (10%) are most likely to name financial reasons as the main cause[249].

[248] In Germany, France, UK, Spain and Italy.
[249] Eurobarometer on EU consumer habits regarding fishery and aquaculture products, EC, 2021.

The effect of policy measures adopted in the context of the COVID-19 crisis

Several policy measures were released on EU and national level to ease the impact of the crisis. Although COVID-19 seems exceptional, various events and shocks affected food systems before (Aday & Aday, 2020). The following section will provide a differentiation between measures already applied in previous crises as well as novelties with COVID-19. We close with potential improvements as well as a short reflection on the crisis. The assessment is based on existing literature and interviews of several stakeholders in the food sector and is presented here to serve as a vehicle for discussion[250].

FIGURE 16 TIMELINE OF EU MEASURES



Supportive and established policies

Disruptions in the beginning of the COVID-19 crisis as outlined above were subsequently reduced by diverse policy measures (FAO, 2020b) that have already been used in previous crises such as the Russian Embargo or the Dairy crisis. A short overview at the European level is presented below[251].

In April, a number of measures aimed to increase cash flow of farmers and ease disruptions on agricultural income. The **Coronavirus response investment initiative plus** (CRII+) added flexibility and simplification in the use of the European structural investment funds (ESIF), including the European agricultural fund for rural development (EAFRD) (EC, 2020b). The Commission also adopted **higher advances of payments for farmers**. This increased the advances of direct payments (from 50% to 70%) and rural development payments (from 75% to 85%) (EC, 2020d). Payments started in mid-October (EC, 2020m). The scope of the European Maritime and Fisheries Fund (EMFF) was also extended to allow compensations to fishers for the temporary cessation of their fishing activities caused by the pandemic and to aquaculture farmers and operators from the processing sector for economic losses caused by a public health crisis. The **temporary framework for state aid** allowed Member States to complement EU level measures to increase cash flow for farmers, operators in the seafood sector and market companies. Another way of support was the **extension of the CAP payment**

[250] A timeline of selected national responses to the COVID-19 crisis with respect to border measures and EU policy measures can be found in the Annex.

[251] An overview by type of measure can be found here: https://ec.europa.eu/info/food-farming-fisheries/farming/coronavirus-response_en#measures.

application deadline (EC, 2020l). While these measures were judged positively, there were claims that the amount of support should be higher (Copa Cogeca, 2020i).

In the **seafood sector**, besides the amendment of the EMFF and the temporary framework for state aid, the Commission provided rapid support to the sector through amendment to the **Regulation on the common organisation of the markets (CMO)** to allow for crisis measures and compensations payments. EUR 136 million in 22 Member States were planned for COVID-19 support measures under EMFF. 61% of the funds were spent on temporary cessation support, 17% on compensation to aquaculture producers, and 14% on support to the processing sector. Over 8,200 operations were selected, from the diversification of a marine plant farm into producing hand sanitiser to innovative fish delivery services via vending machines and online tools. Support from the European Regional Development Fund were also made available. Furthermore, the sector welcomed an emergency fund[252] adopted to help the sector and marine communities to adapt, recover and evolve in the face of the existing difficulties.

In May, additional exceptional supportive measures targeted disruptions caused by changes in consumer demand. The **Common Market Organisation** (CMO) regulation for agricultural markets from 2013, mainly based on well-established instruments[253], offers several **measures to act in a crisis** that have already been used in the Russian Embargo and the Dairy crisis. Article 219 empowers the Commission in case of market disturbance to adopt delegated acts to address the market disturbance without consulting Member States. Article 220 enables timely exceptional support measures due to risks related to animal and plant health. Article 221 ensures the power for measures to resolve specific problems, and article 222 enables to stabilise severely imbalanced markets and includes the possibility of collective action[254]. This includes joint promotion measures, private storage or market withdrawal and temporarily derogating from competition rules (European Parliament, 2013).

The Commission supported **private storage aid for milk and meat, and reopened this possibility to fishers and – for the first time – to aquaculture producers** to allow temporary withdrawal of products (EC, 2020e). Storage opportunities were very helpful for the sector (DBV, 2020a). Other measures allowed **flexibility for market support programmes** in several sectors such as **wine and fruit and vegetables** to limit available supply and rebalance the market. In addition, the EC temporarily adopted **derogations from certain EU competition laws** (Article 222 CMO) **for the milk, flower, and potato sectors**. These allowed stakeholders to self-organise and implement market measures to stabilize the sector for a maximum of 6 months (EC, 2020e).

In June, the EC launched **two additional calls for promotion programme** proposals that complemented the additional market measures from May to ease disruptions in consumer demand. Those were valid for the following sectors hit hardest by the COVID-19 crisis: Fruit and vegetables, wine, live plants, milk and milk products, and potatoes (EC, 2020a).

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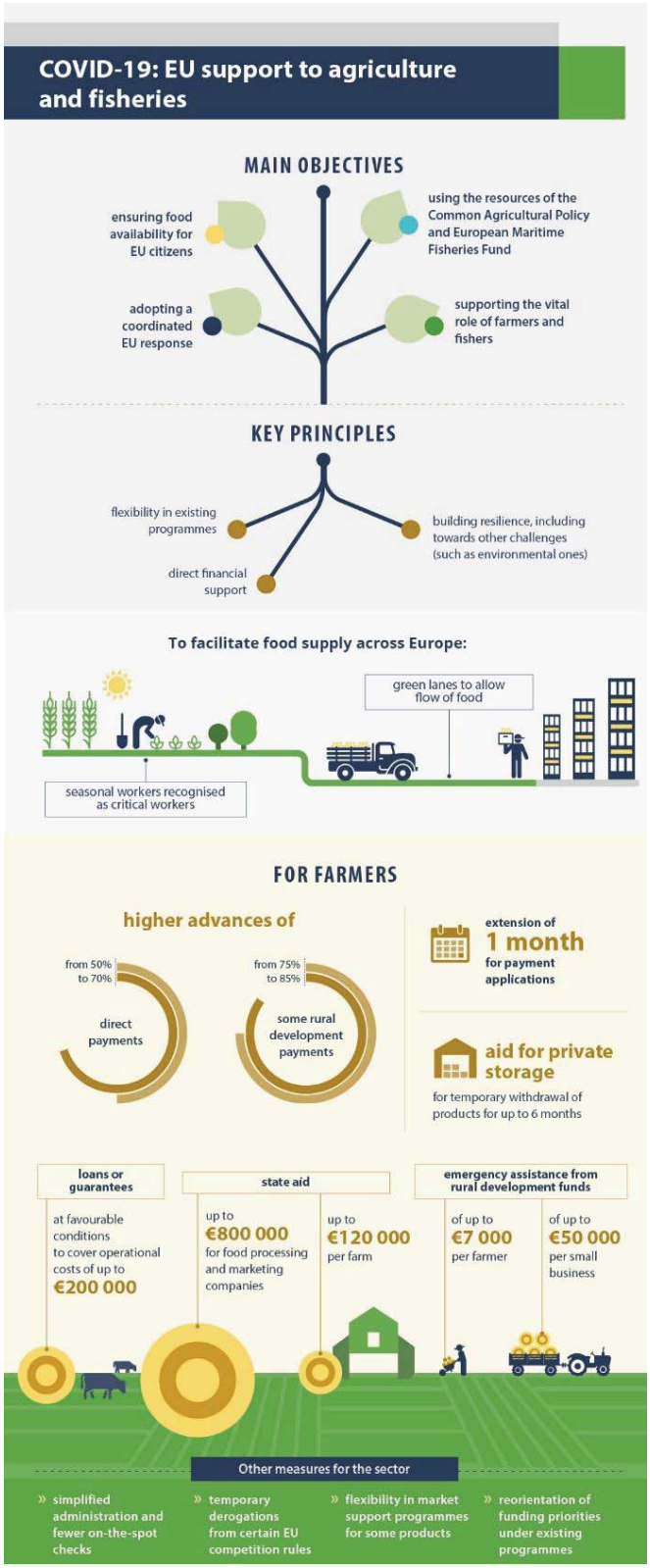
[252] SURE - European instrument for temporary Support to mitigate Unemployment Risks in an Emergency.

[253] Newly Implemented Measures In 2013 Were The Crisis Reserve, Involvement Of Producer Organisations In Temporary Collective Action And Implementation Of Support Packages When Faced With Severe Crises (Agrosynergie, 2018).

[254] Temporarily Article 101(1) TFEU regulating common rules on competition is not applied to agreements and decisions of certain stakeholders in the agri-food sector.

Some sectors particularly affected received **specific support**. In July, additional measures for wine included measures such as derogation from competition rules (Article 222, CMO), to allow stakeholders to self-organise their sector and implement market measures to stabilize the market for a maximum period of 6 months. Additional support was the increase of the EU's contribution of all national support measures to 70%, as well as advanced payments for crisis distillation and storage (EC, 2020c). Previous crisis management also targeted particularly affected sectors, e.g. during the Russian embargo peaches and nectarines, or the dairy crisis namely dairy to support where mostly needed.

FIGURE 17. INFOGRAPHIC ON EU SUPPORT TO



Access to timely information and transparency helps in making rational choices. Previous crises put information systems in place, such as **Agricultural Market Information System (AMIS)** or the Milk Market Observatory (MMO) for dairy, to allow for access to information across countries. The launch of the AMIS in 2011 by the G20 ministers of Agriculture aimed to enable timely and accurate access to information in a transparent manner after the 2007-2008 food crisis. The crisis showed serious deficiencies in the quality of information, in particular with respect to forecasts and the level of stocks. AMIS was launched as a team effort for major players on the agri-food markets, public and private. Available data improved existing information systems and enables a joint understanding of food price developments and stocks (G20, 2011)[255]. The EU and other countries made use of AMIS to share information and increase market transparency during COVID-19 (OECD, 2020a).

In the seafood sector, the Commission managed to closely monitor the developments in the market through its market intelligence tool, **the European Market Observatory for Fisheries and Aquaculture Products** (EUMOFA[256]), which provided prompt and targeted monitoring of the market developments, with a focus on those species most affected by the COVID-19 crisis and in close cooperation with stakeholders and national administrations.

Guidance from EU level increased transparency and supported in limiting the effect of supply chain disruptions. The publication "Coronavirus: EU guidance for a safe return to the workplace" (EC, 2020g) proved very beneficial in guiding processing companies how to handle a COVID-19 outbreak in a most efficient manner (PROFEL, 2020a).

The **communication of the absence of food safety risks** was essential. The European Food Safety Authority claimed already early in March that food is no source or transmission route for COVID-19 and that food is safe (EFSA, 2020). The World Health Organisation and the FAO released a guidance early April stating that it is highly unlikely that food or food packaging can transmit COVID-19 (FAO;WHO, 2020). Overall, that allowed food to pass borders without the fear of transmission[257].

Summarizing the measures above, a **mix of measures** was used to approach the crisis. An assessment of previous crises shows that the combination of measures is more successful than individual ones. For example, in the Dairy crisis, private storage alone had little effect as the amounts were too big. But, private storage was effective together with other measures, such as public intervention and the milk reduction scheme (Agrosynergie, 2018). Hence, the flexibility to have different measures available that can be released quickly[258] is crucial to approach crises and support stakeholders. The CMO regulation for agricultural products, Articles 219 to 222, includes key elements of emergency responses and offered solutions for different types of crises with a range of available measures.

There are several positive examples from **MS activities**. Authorities cooperated with the private sector to jointly overcome the new challenges posed by COVID-19 (TomatoEurope, 2020). Some supported to overcome supply chain disruptions. Austria, Bulgaria, and

[255] Next to the platform, it consists of The Global Food Market Information Group, a Secretariat, and a Rapid Response Forum. The latter enables early discussions about critical market conditions and ways to approach them (AMIS, 2020).

[256] www.eumofa.eu.

[257] There were some incidents when China restricted import of foods from some countries as they claimed to have found the virus on food packaging. Some countries blamed China for unjustified trade restrictions (Reuters, 2020).

[258] Without confirmation of EP and Council.

Romania set up online platforms to connect farmers and consumers for direct purchases, although with limited impact. Others supported short supply chains. Italy and Portugal launched promotion campaigns to support consumer purchases of national products. Regulatory and administrative flexibilities were allowed for a limited time. For instance, Denmark increased flexible working hours in slaughterhouses to be able to both, produce meat and allow for social distancing. Poland extended the validity of health certificates for livestock. There are examples of countries that approached food waste and engaged actively in rerouting food supply. Czech Republic shared food from the school's food programme to food banks as schools closed (OECD, 2020a). Member States used the temporary framework for state aid to support particularly affected sectors like potato and flowers (Matthews, 2021).

Specificities of COVID-19

The novelty with COVID-19 compared to previous crisis affecting food, was that specific measures targeted disruptions in **logistics and transport and labour**. These are new elements beyond classical agricultural, fisheries and aquaculture policy and needed experts from other areas, such as trade and health.

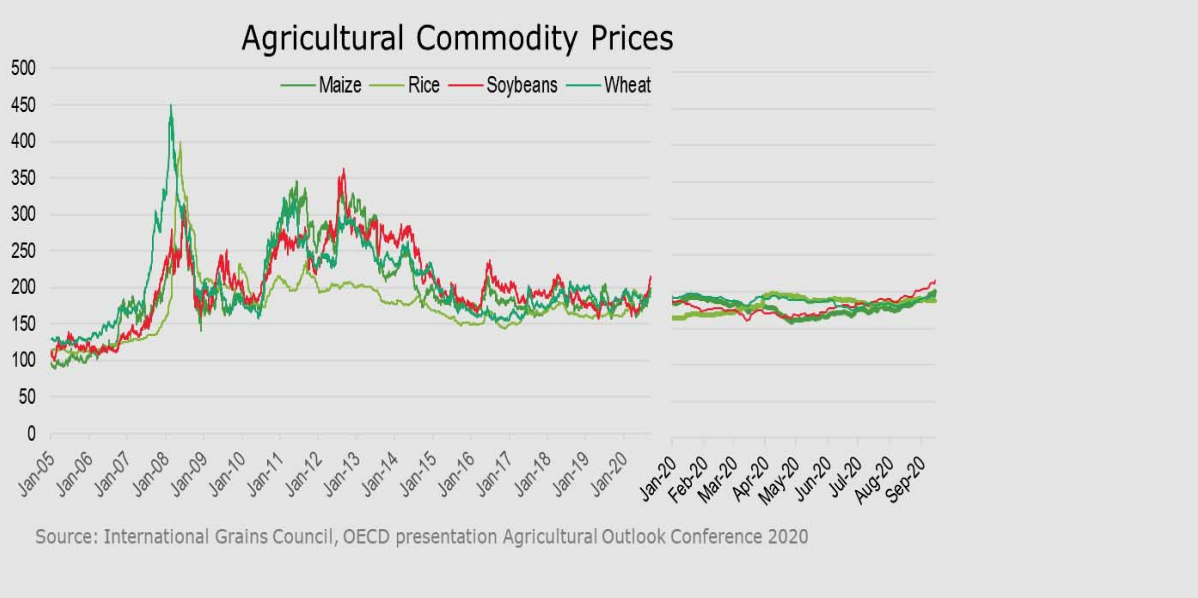
In March, the communication on **green lanes** were released to overcome initial disruptions in logistics and transport and enforce the Single Market. Even if the Single Market is established, the guideline green lanes is a novelty. It also covered procedures on how to handle health and safety issues. It ensured that EU-wide supply chains continued to operate after some countries closed their borders at the beginning of the pandemic. Crossing the border, including any checks and health screening, was supposed to not take more than 15 minutes to minimize procedures and checks (EC, 2020k). Shortly after, cross-border and then seasonal workers were included in guidelines to ensure **free movement of critical workers** to ease labour shortages (EC, 2020i).

Stakeholders across the whole food chain pleaded to keep markets open. Overall, open borders and allowing seasonal workers to cross borders proved to be extremely helpful to all stakeholders in the sector (PROFEL, 2020a; Eurocommerce, 2020a; Copa Cogeca, 2020a).

Even if the approach for COVID-19 is special, the learning of the relevance of **open trade to keep the food market functioning** (FAO, 2020c) is not new. During the 2007-2008 food crisis, many major producer countries imposed export restrictions on staple foods such as rice and wheat. In total, more than 55 countries applied food trade measures. Export restrictions and hoarding increased the price effects or even caused them, consequently destabilising international markets (FAO, et al., 2011). We observed similar tendencies in March 2020. At the peak, 21 countries had announced or introduced temporary export restrictions. However, by early July, only two countries imposed export restrictions and on a very small share of trade (Laborde, et al., 2020). AMIS provided relevant information on food prices and stocks of key stable crops to support in making rational decisions and keeping borders open (FAO, 2020c).

FIGURE 18 - FAO YEARLY FOOD PRICE INDEX

FIGURE 19 - PRICE DEVELOPMENT ARABLE CROPS



The Commission also supported in **adapting checks and controls** for stakeholders to focus on the essential aspects of operating. It reduced the number of physical on the spot checks and encouraged the use of technology (EC, 2020d). Digital versions of SPS were accepted that also overcame a lack of labour and was in line with social distancing needs (OECD, 2020a). The additional flexibility was very welcome in handling the crisis (Agro Alimentarias, 2020a).

Room for improvement

One main area of room for improvement is **enhanced coordination, both ex-ante and cross-policy**. A couple of examples below highlight the additional needs.

Uncoordinated border closures especially at the beginning of the crisis led to additional challenges. Green lanes were not fully established in all countries, with partly differing rules (Coceral, et al., 2020b). Some Member States restricted export temporarily, with potentially damaging effects[259]. For example, in April, Romania imposed an export restriction on several agricultural commodities outside the EU. The export ban led to

[259] Martin, W. and Anderson, K., 2012. Export restrictions and price insulation during commodity price booms. American Journal of Agricultural Economics, 94(2), pp.422-427.

disruptions for farmers and traders. Vessels were temporary blocked and led to financial losses for traders (Coceral, et al., 2020c). National rules changed very quickly and it was difficult to keep an overview due to both, overflow and lack of information (EC, 2020t).

For seasonal workers, **diverging national rules** were applied for many months. For example, the definition on what is a 'red' zone affecting quarantine times depending on which country to enter differed by country (Copa Cogeca, 2020i). That circumstance led to differences even for bordering countries. In April, Finland allowed Ukrainian seasonal workers to enter the country, while Sweden did not allow foreign labour to enter (Copa Cogeca, 2020f). There were additional problems on a case-by-case basis, especially for Eastern Europe. In Romania, there were challenges to arrange flights, as Germany only allowed Romanian seasonal workers to enter by plane up until 1 June (Copa Cogeca, 2020h). Social distancing, an essential measure to limit the spread of COVID-19, was not provided during all travels. There were cases of seasonal workers, who crossed borders in crowded charter planes to reach their working destination (Euractiv, 2020b).

The **amount of support for the food sector beyond the EU policies differed across countries**. The temporary framework for state aid measures allowed Member States to support stakeholders beyond the EU measures (EC, 2020m). In mid-May, eight countries have used this additional possibility. Half of all support paid in the EU under this framework was by the Netherlands for the sectors flowers, horticulture and potato. There were claims that these national measures could distort EU competition (Copa Cogeca, 2020g; Euractiv, 2020c). On the other hand, these sectors were the most vulnerable to the crisis and Member State support allowed to support sectors most in need beyond of what was available on EU level.

A strong focus on local food sourcing by some Member States partly aggravated disruptions and added further frictions to intra EU food trade. Demand for local buying was both consumer-driven and privately and politically initialised. The latter was claimed to cause supply shortages and higher prices for consumers (Eurocommerce, 2020a). There were different levels of local food sourcing. One was the minimum proportion of shelves reserved for national products. For example, Bulgaria announced grocery chains need to sell Bulgarian food and source 90% of milk sold from Bulgaria. Reliance on a few suppliers increased and put food security at risk (OECD, 2020a). These measures worked against Article 34 of the Treaty on the Functioning of the European Union (TFEU). It prohibits measures that have an effect equivalent to quantitative restrictions (European Parliament, 2020). Other countries made a call to buy national food. Poland publicly denunciated companies that sourced raw products from outside Poland. France encouraged consumers to buy French, while Portugal promoted local products by a website promoting local producers (EC, 2020r). All these approaches were closely monitored by the Commission.

There were other uncoordinated actions in food retail. To discourage panic buying some Member States partly banned promotions, such as Belgium, that led to effectively higher prices for consumers (Eurocommerce, 2020a).

Another critique point is the **lack of harmonisation at EU level**. COVID-19 is a health crisis affecting the food sector, while health is not a European competence. Health policies are national policies that differed across countries and caused confusion. Social distancing measures varied widely across countries, not only in distance but also in way of calculating the maximum amount of customers in store. This added higher logistical efforts for international retailers to abide by different rules. In addition, there were different classifications of what items are allowed to be sold during lockdowns (Eurocommerce, 2020a). France for example classified wine stores as essential stores (The Local, 2020). The food sector in total has not been labelled as essential on EU level despite many

references to the word 'essential' in the public[260]. Outbreaks of COVID-19 in processing companies were handled very differently at the beginning. Communication across countries via cooperatives and EU level guidelines helped to harmonize (PROFEL, 2020b).

Even on the national level, regulations differed within one country across regions/federal states. A national player could be faced with several different rules resulting in a lack of transparency and increased transaction costs (PROFEL, 2020a; Agro Alimentarias, 2020b; Eurocommerce, 2020a).

A lack of information and coordination between public and private stakeholders led to some measures far from business reality. Some Member States not only applied social distancing rules in retail stores, but also limited opening hours. This eventually led to more people in stores in shorter timeframe. In some cases, social distancing rules were based on fire regulations. The number of customers to enter a store was based on an arbitrary share of customers allowed based on fire regulations (Mercadona & Asedas, 2020).

The **technological capacity** differs widely between Member States. Next to financial and market measures, increasing resilience of stakeholders can support in overcoming crises. One room for improvement would be to increase targeted financial support to enable more innovation in the sector. Stakeholders should have similar technological capacities across Europe including infrastructure and proficiency (EUPPA, 2020; Agro Alimentarias, 2020b).

Reflection on the crisis

Looking at the outcome of the COVID-19 crisis so far based on private and public measures, there are a few reflections. These might be worth to focus on for any upcoming crisis for even better preparedness of the sector.

Resilient food systems require **collective action** along the entire chain (Bakalis, et al., 2020). The relationship between authorities and companies is key to handle a crisis with giving every stakeholder group responsibility and flexibility to act (TomatoEurope, 2020; Agro Alimentarias, 2020b). A crisis mechanism should include private and public stakeholders along the whole food chain. Then, they can monitor and propose strategies to increase resilience by targeted coordination (FAO, 2020a). A team effort of public and private stakeholders as well as international organizations should enable investments and reforms to enhance resilience of the food sector (OECD, 2020a).

Increased transparency and information across countries would support food stakeholders. If full harmonisation across the countries on EU level were not possible, at least one "EU stop shop" that has all information in one place would go a long way. A central help desk could lower costs for receiving information on anything the food sector needs to know about differences across countries. This should include working processes and adaptations, employee safety and communication to consumers (PROFEL, 2020a; EUPPA, 2020).

Increased coordination ex-ante and cross-policy would ease impacts of any upcoming crisis. Uncoordinated actions from Member States led to additional disruptions and confusion. A crisis mechanism as outlined above can serve this purpose. Learnings can be drawn from the Foot-and Mouth Disease (FMD). After the 2001 FMD outbreak several measures were put in place to increase resilience in case of a new outbreak. Some were linked to better coordination and cooperation, including a global cooperation together with

[260] See reference on essential goods defined in communication on green lanes in footnote 8.

the FAO and the World Organisation of Animal Health (OIE). Their work included a technical guidance for affected countries to overcome an FMD outbreak (FAO, 2021). Contingency plans were made obligatory for Member States with a "worst-case scenario". These include all areas to handle a potential outbreak, such as financial and personal resources, responsibilities and ways to communicate. Laboratories must collaborate with the respective EU Laboratory. The EC is now a key stakeholder in managing any potential upcoming outbreak (EC, 2021a; EC, 2003).

Automation and technology can support in disease related crisis such as allowing for social distancing along the production process (Aday & Aday, 2020). There is still significant room for using technology for production and interaction with consumers to make the food chain more resilient. The use of information technology via block chain could be one solution (Bakalis, et al., 2020). Digitalization requires certain basics to be in place, a sufficient broadband infrastructure and a digital literacy of stakeholders. Government solutions can close the digital gap by means of infrastructure and trainings (Agro Alimentarias, 2020a; FAO, 2020b). On the flip side, an increased reliance on technology might increase our vulnerability for certain types of crises, such as cyber-attacks or crises caused by instability of the system, like a blackout. Increased usage of technology needs to come along with increased security and back-up plans in case we cannot fall back to a technological solution (Financial Times, 2020).

Incentives and investment support for companies to innovate could help private stakeholders to handle a crisis. Companies that already invested in innovations, were adaptive to change their ways of working and using different sales channels. Consequently, they handled the crisis better than others (Eurocommerce, 2020a; EUPPA, 2020).

Voluntary short supply chains can contribute to a resilient food sector. Short supply chains already gained traction before COVID-19, to reduce the number of intermediaries between farmer and consumer. Short supply chains could be one way of providing a beneficial framework for sustainable, healthy, and, in some cases, local food, while increasing resilience. At the same time, mostly food is a multicomponent formulation that consist of ingredients that are not locally available and diversification is essential (Bakalis, et al., 2020). Hence, the balance between short and long supply chains might be key.

Forecasts and simulations might become essential in the short and long-term. For the short-term, demands could be determined and production adapted accordingly. Overall, an analytical approach allows a more rational response to crises based on data and transparency avoiding quick emotional responses. For the long-term, foresight and planning already gained importance in the EC. In September 2020, the first strategic foresight report was adopted to enable future-proof strategies and to align short and long-term actions (EC, 2020f; TomatoEurope, 2020). There will be crises, we cannot predict, but by means of foresight one can establish the baseline and measure the impact[261]. One means is also scenario analysis to calculate a number of "What if" measures. The agri-food sector can learn from other sectors more familiar with scenario analysis, such as civil protection. As a by-product, those scenarios also can show why the EU is supporting the agricultural sector (Siracusa, 2020).

Looking back at all previous crises including COVID-19, the **agricultural crisis reserve** has never been used. It was included in the 2013 CAP reform, and a tool for additional financial support due to crises affecting production and/or distribution. € 400 million (in 2011 prices) is originally deducted from the previous year's budget from farmers' direct

[261] Moller, B. et al. (2020), *Three scenarios for Europe's food sector in 2035*, Fraunhofer ISI.

payments. Once the reserve is not used, farmers receive back the amount the following year. Else, it needs to be reconstituted the next year. In the future, the reserve will not be automatically paid out to farmers and rather kept as a reserve if not used. With this tool untouched, other available measures might have been enough to respond to crises (Euractiv, 2020a; EC, 2018). At the same time, this sends a signal. Some stakeholders raised the question of how much more severe a crisis needs to be than COVID-19 to leverage the fund and support severely affected sectors (Agro Alimentarias, 2020b).

It is crucial to keep in mind that crisis measures, while being flexible, should be 'exceptional' to avoid becoming a safety net[262] and limit farmers' inherent resilience capacity. Any support should avoid to distort market signals for producers to limit their flexibility to react to changes in the market. Exceptional measures should be timely limited and exchanged by structural measures to address the cause of the crisis as well as structural adaptation (EC, 2019a).

Specific points relating to the lessons learnt from COVID-19 pandemic in the seafood sector

In the seafood sector, it is observed that **sustainability pays back** in times of crisis. Despite the effects of the crisis, the EU fleet as a whole continues to be profitable at an overall level. This indicates a notable resilience of the EU fleet, which is the result of the efforts made by the sector in previous years to achieve **sustainable fishing in growing number of stocks in conjunction with low fuel prices.**

Furthermore, specifically in aquaculture, even with volatile market conditions, **organic certified aquaculture products have, in general faced the pandemic well**. Reportedly, presure on prices for conventional farmed fish have, to some extent, affected prices for organic products, but consumers with a preference for sustainable certified products seem to have a high degree of loyalty to organic farmed fish despite the higher price.

Diversification is crucial. There was a sudden change in demand of fresh fisheries and aquaculture products due to closing of the HORECA sector and the drastic fall of out-of-home consumption. However, this was compensanted by the very good response of processing and in particular canned industry, which could respond to changes in consumption behaviours.

The **close relations with stakeholders** (Advisory Councils) helped identify most urgent needs and actions to be undertaken by the Commission to alleviate the impact of the pandemic on the sector. It was based on their recommendations that the specific amendments to the EMFF and CMO took place. This resulted in the **good outcome of the measures adopted** such as those supporting Producer Organisations through the cold-storage aid mechanism to help in price stabilization. Fishers, retailers and processors were confronted with limited stocking capacity.

Markets understanding, emerging technologies, social innovations, a diverse portfolio of active stewardship of human actions are key to support a resilient seafood system.

[262] Direct payments also provide a type of safety net and build a buffer during crises. In 2019, direct payments made up around 70% of the whole CAP expenditure (OECD, 2020e).

In the fisheries and aquaculture sector, the crisis highlighted the interconnection between the different stages of the supply chain and the need to ensure continuity along the chain, without any weak link, to supply the market from sea to plate. In some Member States, the COVID-19 crisis has reinforced the vertical cooperation within the value chain to adapt the strategy of all stages depending of the needs of the other actors along the chain (e.g. need for more pre-packed fish at retail stage requires adaptation at processing and production stage). For that purpose, it has been crucial to set-up proper consultative bodies or rely on existing ones. Interbranch organisations recognised under the CMO for Fishery and Aquaculture Products can be interesting tools to initiate the cooperation within the chain and increase reactivity of the supply chain as a whole in case of new crisis. In the seafood sector, recognised professional organisations, in particular producer organisations, have played a crucial role during the health crisis for the implementation of emergency measures, in particular for adapting their production and marketing strategies for adapting supply to the market developments, thus showing the importance to continuously support these organisations to allow them to react rapidly to disruptions of the market.

In view of the amendments to the EMFF and their success, the European Commission **has already taken note of the lessons learnt from the crisis.** The new fund for 2021-2027 (European Maritime Fisheries and Aquaculture Fund –EMFAF-) supports measures to build up and strengthen the resilience of the sector. Furthermore, it includes a new scheme providing financial compensation in times of exceptional events causing a significant disruption of markets, upon recognition of the occurrence of such events by the Commission. This will allow a rapidly and agile activation by the Commission of exceptional temporary emergency measures.

Conclusions

The food sector **proved resilient** in face of the COVID-19 crisis. One main advantage was an already quite **prepared sector**, as agriculture, fisheries and aquaculture naturally deal with crises related to weather, climate change and zoonosis with an efficient policy framework.

There is a **strong European integration of agriculture, fisheries** and **aquaculture** formulated in the **CAP** and the **CFP**. **EU measures are able to be launched quickly** within the framework of the existing CAP and CFP, and their market pillars: the CMO regulations. Main measures such as green lanes and recognizing seasonal workers as essential workers have been put into place already in March 2020. In April 2020, several measures to increase cash flow of farmers followed. Policy measures not only have financial and market effects but also a political effect. **Announcements send signals** and set expectations and influence behaviour (EC, 2019a).

The 'European Union guidelines for state aid in the agricultural and forestry sectors and in rural areas 2014 to 2020'[263] do not define crises, nor did the CMO, despite regular calls. Any definition might exclude unforeseen events. Maintaining **freedom of action** is a crucial element of resilience.

One of the most important measures was to enforce the Single Market. Ensuring a **Single Market with "no borders in the EU"** including transport and access to labour proved essential**,** as 'the lighthouse of the EU' (EC, 2021b). An established principle was

[263] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014XC0701(01)&from=EN.

translated into new measures such as green lanes to respond to a crisis with unique challenges. Other connected sectors such as **transport, logistics and labour** could be combined in a common response to support the food sector.

Several aspects are crucial for the enforcement of the Single Market. These are to monitor protectionist tendencies and avoid fragmentation and disruption of supply chains (Copa Cogeca, 2020a; FoodDrinkEurope, 2020; Agro Alimentarias, 2020b; Eurocommerce, 2020c). Trade needs to be facilitated very practically. For COVID-19 the digital issuance of permits and certificates as well as inspections and audits adjusted by social distancing needs were part of the efforts (Laborde, et al., 2020). Next to trade within the EU, keeping trade with outside the EU was as crucial (IFPRI, 2021).

Overall, **guidance and flexibility to act** were key aspects that stakeholders along the food chain appreciated. Most of the EU level measures haven been well received by the food sector, with some stakeholders rating the management of the food chain a 9.5 out of 10 (Mercadona & Asedas, 2020). The measures available are plentiful and proved to be useful for a range of crises beyond COVID-19.

Overall, the assessment of the crisis management is positive. Still, very much in the spirit of 'Never waste a crisis', there are **learnings** to improve measures and preparedness for the future. **Increased coordination and cooperation, information and communication** are key elements to be addressed via a crisis mechanism as envisaged in the contingency plan.

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Questionnaire - guidance stakeholders

1. Overall, how prepared have you been for the crisis? What could you have done better to better prepare yourself?
2. What were the main challenges you faced during the first COVID-19 wave?
3. What were the main measures you took to handle the crisis?
4. Has the crisis changed your approach and planning for risk management? If yes, in what way
5. Which structures (private and/or public), that already existed, were helpful in handling the crisis, if any?
6. How did certain EU and/or national policies support your business? Which ones?
7. Were there certain policies/decisions that were counterproductive and if so, which ones? How could things be done better in future?
8. Were there decisions by the private sector that helped dealing with the crisis? Others counterproductive?
9. What role did digitalization/technology play in handling the crisis and what role do you foresee for the future?
10. What are main differences in handling the 2nd wave?
11. What is your overall assessment of your handling the crisis? And of that of public authorities?
12. How could the EU food chain become more resilient for future crises?

Detailed timeline of COVID-19 measures, including selected national responses

Date	Description	Type	Notes
19 December 2019	An outbreak of a disease caused by a novel coronavirus is reported in Wuhan, China	Event	
30 January 2020	COVID-19 is declared a Public Health Emergency of international concern by the World Health Organisation (WHO)	International response	
9 March	Italy as the first European country issues a nationwide lockdown	National response	
9 March	Announcement EFSA: no evidence that food is a source or transmission route of COVID-19	EU Policy response	
11 March	Austria first European country that notifies the Commission of reestablishment of temporary controls at the internal Schengen borders	National response	
16 March	Guidelines for border measures to protect health and keep goods and essential services available	EU Policy response	
17 March	Estonia and Hungary temporarily introduce border controls	National response	
18 March	Austria temporarily reintroduces border controls	National response	
19 March	Finland temporarily introduces border controls	National response	
19 March	Temporary framework for state aid measures	EU Policy response	Allows Member States to channel up to € 100 000 to

			individual farmers who are facing liquidity shortage The ceiling of the de minimis aid was increased to € 20 000 (and up to € 25 000 in specific cases) Food processing and marketing companies can benefit from a maximum of € 800 000.
20 March	Belgium temporarily introduces border controls	National response	
23 March	Implementation of the 'green lanes‘	EU Policy response	Guideline to enforce Singe Market. Priority to “essential” products including food, but not limited to it.
24 March	Lithuania temporarily reintroduces border controls	National response	
26 March	Portugal temporarily introduces border controls	National response	
27 March	Spain temporarily introduces border controls	National response	
30 March	Seasonal workers in agriculture, fisheries and aquaculture are qualified as ‘critical workers’	EU Policy response	
6 April	Extension of application deadline for CAP payments	EU Policy response	Extended by one month from 15 May to 15 June
16 April	Single application and advance payments	EU Policy response	Increase rate for advance payments from 50% to 70% in direct payments and from 75% to 85% in rural development
16 April	Flexibility in CAP controls	EU Policy response	Possibility to replace physical inspections and on-the-spot checks with alternative control evidence, such as geo-tagged photos, satellite images, documents, video meetings, etc.

23 April	Amendments EMFF and Fisheries CMO regulations	EU Policy response	It allowed for crisis measures and compensations payments such as reopening of storage mechanism (including for aquaculture farmers), increase of support to market instruments (production and marketing plans), support for the temporary cessation of fishing activities, compensation to producers and processors, and specific measures for the outermost regions. Operations supported under these temporary measures are retroactively eligible as of 1 February 2020 until 31 December 2020.
23 April	Rural Development – CRII+	EU Policy response	Introduces exceptional flexibility and simplification in the use of the European structural investment funds (ESIF), including the European agricultural fund for rural development (EAFRD). - Flexibility in the use of financials instruments - Reallocation of funds - Postponement for the submission of annual reports - No amendments to partnership agreements required
30 April	Temporary lump-sums to individuals and SMEs	EU Policy response	Maximum amount not exceeding € 5 000 per farmer and € 50 000 per SME
30 April	Private storage aid	EU Policy response	Private storage aid for skimmed milk powder, butter and certain types of cheese as well as some beef and sheep and goat products

30 April	Derogation from EU competition law	EU Policy response	Allows operators to organise and implement market measures at their level for a maximum period of 6 months
30 April	Flexibility in sectoral aid schemes	EU Policy response	Flexibility in the implementation of market support programmes for wine, fruits and vegetables, table olives and olive oil, apiculture and the EU's school scheme (covering milk, fruit and vegetables)
8 May	Applications for licences on tariff rate quotas	EU Policy response	MS' license issuing authorities will be enabled, for a transitional period (until 31 July 2020), to accept electronic copies instead of original paper documents with regard to operators' applications for licenses on tariff rate quotas (TRQs) on agricultural products and for licenses on Basmati rice.
30 June	2 calls for proposals for promotion programmes	EU Policy response	Fruit and vegetables, wine, live plants, milk and milk products, and potatoes for transformation are the sectors eligible for the promotion support of € 10 million (€ 5 million for multi programmes and € 5 million for simple programmes).
7 July	Additional package of exceptional support measures for wine sector	EU Policy response	
21 July	Adoption of Recovery Package, Next Generation EU	EU Policy response	
21 December	First COVID-19 vaccine authorized for use in the EU	EU Policy response	The EU granted a conditional marketing authorisation for the COVID-19 vaccine developed by BioNTech and Pfizer

More information can be found here:

Timeline of EU action: https://ec.europa.eu/info/live-work-travel-eu/coronavirus-response/timeline-eu-action_en

COVID Social Impact Timeline: https://www.etui.org/covid-social-impact

Overview temporary border controls: https://ec.europa.eu/home-affairs/what-we-do/policies/borders-and-visas/schengen/reintroduction-border-control_en

Overview of travel restrictions: https://www.euractiv.com/section/politics/news/all-you-need-to-know-about-europe-lifting-its-internal-border-restrictions/

First meeting Joint AGRI-MARE GREX on the F2F food contingency plan to ensure food supply and food security in the EU in times of crisis – 20 January 2021 - What are the lessons learnt from COVID-19 and other crises with regard to food security in the EU?

Opening by M. Michael Scannell, DG AGRI

M. Scannell highlighted the resilience of the EU food system in ensuring the supply of quality and affordable food to citizens during the Covid-19 pandemics, thus avoiding a food security crisis on top of the sanitary crisis, in close collaboration with MS and stakeholders. However, despite the fact that the food supply chain was resilient overall, some national measures were interfering with the functioning of the Single Market and the food system during the early stages of the crisis. This is why in its Farm to Fork Communication, the Commission decided to come forward with a contingency plan. He was further looking forward to a constructive collaboration on this sensitive initiative and expressed his commitment to work fast and constructively to meet the deadline for the Communication.

Setting the scene

The COM presented context, scope and timeline with regard to the Contingency plan by underlining that this initiative does not aim for a legislative proposal and that it complements a further initiative planned under Farm to Fork Action n°1 (legislative framework for sustainable food systems planned for 2023). Moreover, the COM informed on the stakeholder consultation and presented the preliminary results on the feedback to the Roadmap, highlighting broad. Participation of observers was very active. In substance they raised questions on the link between this initiative and the Sustainable Investment Regulation, called on the COM to ensure the labour force in the food and feed chain receives priority status at MS level, underlined the importance of giving the contingency plan a broad scope not strictly limited to pandemic situations and avoiding both extra and intra EU trade restrictions, as well as considering transport and logistics as an essential activity. Observers also suggested involving the private sector's crises management experts and taking inspiration from crises mitigation strategies available in other sectors, MS, or other parts of the world, expressed concerns with the narratives on national food sovereignty and highlighted the importance that a crisis response mechanism should take into account the structures that are already in place.

Lessons learnt from COVID-19 for the agricultural and food markets

DG AGRI, MARE and SANTE presented a brief overview of their respective lessons learnt (see presentations published on circabc and in the expert groups n substance, participants and observers that expressed themselves highlighted the key-role of producer organisations and stressed the difference of impacts in EU regions, enquired about COM's perspective on workers' health and safety measures, and stressed the importance of communicating to consumers that derogations from controls will not necessarily put at risk food safety.

Testimonies from the ground

A series of stakeholders representing the various stages of the food supply chain provided insights on how they managed to cope with the pandemic and what were the challenges

they had faced or were currently still facing. This included presentations from the primary production stage (agricultural cooperative, fish PO), food industry, transport, trade, retail, labour union and the food banks (see presentations published on circabc and in the expert groups register).

Second Joint AGRI-MARE GREX on the F2F food contingency plan to ensure food supply and food security in the EU in times of crisis – 25 February 2021 - What are the threats to EU food security?

State of play on the process

· Final roadmap feedback analysis: COM received 68 contributions showing a broad support for the initiative.

· GREX planning: The next joint GREX of 26 March will reflect on preparedness in different MS, third countries and of coordination at international level.

Main threats to food security

· Slido question 1: on threats considered having the greatest impact on EU food security. Answers identified "protectionism" being among the most important one, as well as climate and weather-related threats, specifically named like climate change, droughts, weather and climate risk. In addition, "interdependencies" and "internet failure" received high scores as well (out of 35 participating voters).

· Geneva Centre for Security Policy on how to approach crises management: The expert mentioned in particular two dimensions underestimated in relation to food: the impact of 'just-on-time' algorithms on vulnerabilities of the food chain (as soon as something happens, it cascades); the need to ensure primary transport of food (from production to users / retailers). Preparedness implies to identify well what crises we are talking about.

· JRC on Mega trends and external shocks. The presenter went through mega trends identified by the JRC and described which ones were likely to impact food security (likelihood/ impact).

· Slido question 2: The second Slido question was linked to the JRC presentation on 14 megatrends and it focused on their disruptive potential EU food security. 38 voters participated, and a great majority (61%) of them identified "Climate change and environmental degradation" having the greatest disruptive potential.

Focus on selected disruptors

· Munich Re (climate change aspect): experts from Munich Re made a presentation on increased probabilities of extreme events (frost, drought, heat waves) and also showed that the probability of extreme events occurring simultaneously in several production areas (and potentially leading to global crop failure that trade would not be able to buffer out, contrary to localised extreme events) is growing.

· NATO: the presenter presented its recent and renewed framework on "resilience", where one of the 7 items to assess in resilience deals with food and water supply (together with basic government services, transport, energy, communication-IT, etc..). NATO issues guidelines to its members on the matter and explained resilience assessment is a national competence.

· Q&A:

The main threats to EU food security were subject to a discussion that evidenced climate change and environmental degradation were clearly picked by participants as the major threat. Other main threats mentioned by participants were internet failure and the complexity of value chains and their interdependencies. Pandemics were not mentioned prominently.

Vulnerabilities in the supply chain

· Food industry vulnerabilities: FDE described its perception of vulnerabilities at the stage of the food chain : free movement of goods, logistic and transport, workers, packaging, markets.

· Feed vulnerabilities: FEFAC also described the vulnerabilities detected during COVID on the feed industry: logistics, uncertainties around national restrictions to free movement of goods, shortage of micro nutrients, lack of safety equipment, animal production markets affected. Import dependency for some feed raw material and micro nutrients were stressed as well risks for the integrity of the chain in times of crises.

· Seafood processors' vulnerabilities: AIPCE reflected on specific vulnerabilities in the fish sector with limited capacity to increase domestic supply in a context of import dependency. Climate change, geopolitics, disruptions in transport and logistics, availability of key inputs and workers, degradation of the sector's image (food safety, plastic pollution). ,

·Q&A: The discussion showed that overall there is a wide range of products offered by the EU agriculture allows reasonable possibilities to diversify sourcing domestically ('we produce a little bit of all' Food Drink Europe). But some vulnerabilities linked to ingredients and inputs sourced/imported from single concentrated suppliers abroad were mentioned (mainly micronutrient such as vitamins, amino acids and additives, but also some macronutrients like organic soya meal). Diversification looked more problematic in the fish sector. A mapping of which goods is the EU highly dependent on imports would be useful according to certain stakeholders.

Ways to overcome vulnerabilities? The case of strategic reserves

• SAIS Bologna Centre, John Hopkins University. Professor Gilbert started with a presentation framing the issue. Food reserves make sense in net importing areas (which is not the case in the EU, except for some commodities like soy or maize), he discussed the relative advantages and drawbacks of trade, public buffer stocks and export restrictions versus constitution of reserves.

• The Swiss Federal Office for National Economic Supply presented the compulsory stockholding scheme in place in Switzerland, where companies have to keep in stocks some months of demand coverage for some commodities and inputs.

• The Finnish experience was presented by COPA. Strategic reserves are in place in Finland due to the adverse climatic conditions and the geopolitical situation of the country. Grains and seeds are stored by private companies for a state agency.

• Q&A: The discussion on strategic food reserves showed most policies dated from the cold war have been dismantled in Europe in the last 30 years, as trade rendered them meaningless to ensure food security. Rising risks could change the perception. Costs of such systems range between 5 and 8 €/capita/year compensating the immobilisation of the

goods and their existence has a depressing impact on agricultural prices (Finland). The debate showed mixed opinions, with some calling the EU to gather strategic reserves like China, while others questioned the relevance of keeping strategic reserves.

Third Joint AGRI-MARE GREX on the F2F food contingency plan to ensure food supply and food security in the EU in times of crisis – 26 March 2021 - How are the EU, Member States, third countries and international organisations prepared to handle crises?

State of play on the process

State of play and brief overview of the stakeholder questionnaire. Contributions could be made until 3rd of May. Answers would be part of the Staff working document to be published together with the Communication expected in the fall. GREX planning: the next joint GREX on 21 April will reflect on crisis preparedness of companies within the EU food system.

3 MS' experience and third countries' preparedness to handle crises

Experiences from Member States (DE, DK and IT):

In DE, two frames of governance are in place: the Ministry of Agriculture (on food security) and the Ministry of Interior (on critical infrastructures). The COVID-19 crisis showed that in case of crisis, food cannot be seen in isolation and need to be addressed in conjunction with other critical infrastuctures. The main challenges identified were how to ensure the interactions between the critical infrastructures (interface needed), and coherence across relevant policies.

In DE, public strategic reserves are in place (held by the federal government). The government also recommends households to keep private stocks corresponding to 10 days of consumption.

o Q&A: There were questions on how ministries communicate with each other and the plans on a local level. In general, it is based on subsidiarity principle.

In DK, the structure is comprehensive network with a high number of people and agencies involved (from the Prime Minister Office to local agencies). Stakeholders are also involved. General principles followed are those of cooperation, precaution, subsidiarity and similarity (apply same working methods in times of crisis and normal times). The structure proved to be efficient during COVID-19. The approach is rather open and bottom-up as any level of the structure can trigger the system in order to get a reply in 1 hour as was the case for COVID-19. A great part of the response is based on peer-to-peer exchanges and open-minded approach (specific response for a specific type of crisis, no onesize-fits-all approach).

o Q&A: A discussion on the simulation exercises carried out in DK followed. They are carried out every second year and agencies are committed to the exercise. Scenarios simulated are chosen from a catalogue of scientifically probable ones. Learning points are sent as a report to the Prime Minister and then integrated.

In IT, the administration relies on a wide range of risk assessment (natural hazards, weather forecast, system of early warning). During COVID-19, these different work streams on general crisis management facilitated communication and response, while highlighting the

need for a more holistic approach including of resilience and a wider framework to increase responsiveness.

o Q&A: The interplay between the different work streams during COVID19 showed that while the general framework responded well, it is not intended to respond to unforeseen challenges.

Experiences from third countries (JAPAN, US):

In Japan, the response is systematic based on preparedness arrangements. A shift from disaster prevention to disaster mitigation aimed at increasing the resilience of the system. At the core of the COVID-19 response was continuous and accurate information flows to the public and stakeholders (with dedicated manuals) and emergency staff support dispatched by the national government to local governments affected the most. Japan has established as a priority ensuring people's income would come back to normal after a crisis. Emergency support would for instance be provided to farmers. Experience linked to Italy regarding the importance of correct information (short video clips on stocks and ongoing imports in ports were provided to national media); and linked to Denmark in terms of sector specific business contingency plans (6 sectors; each including agricultural producers, food processors and distributors)

o Q&A: Regarding public stockholding, Japan keeps public stocks of rice and recommend private households to keep stocks corresponding to 2 weeks of consumption. Trading companies also keep stocks.

The US response to COVID-19 was to reinforce and complement standing measures supporting farmers and vulnerable groups of civil society. The food industry responded well to the unexpected surge in grocery shopping. The initiative "Farmers to Family" food boxes during COVID19 was accepted well and appreciated by farmers and vulnerable groups, but more expensive in comparison to other support programmes such as food stamps.

o Q&A: on public stockholdings, the US does not have them but read-to-eat meals are available, in the army and communities, to be provided in case of natural disasters.

Inter-governmental cooperation

This session complemented the previous ones by experiences in crisis management from inter-governmental cooperation (AMIS, DG ENER).

The experience on international cooperation in the agricultural and food sector shared by the Agricultural Market Information System (AMIS) of the G-20 highlighted the persisting need for reliable data to assess if a crisis is unfolding as well as the need for cooperation, transparency and a unified approach among countries to avoid panic on the markets.

AMIS additionally shared three lessons learnt regarding the perspective on policy: (1) Anticipation is key to react also to unexpected crises, increasing the importance of monitoring, a global system and information sharing. (2) Understanding causality ensures an appropriate response (multi-causality of price distortions). (3) Each crisis is unique and requires a unique set of solutions. Crisis measures should not become permanent or else they risk prolonging the critical situation.

o Q&A: This intervention was followed by a discussion on transparency as well as the control and approval of data, elaborating the process of cross checking the numbers and publishing only peer-validated numbers.

Experiences from the European energy sector (DG ENER)

The resilience measures for oil and gas supply and energy security strategy are based on transparency, coordination and monitoring, which are ensured by a reporting obligation. The EU regulatory framework provides for various emergency procedures in case of major supply disruption. The type of response depends on the scenarios or level of emergency. The oil and gas supply for example is secured through emergency stocks. MS have the obligation to develop contingency plans and keep stocks corresponding to 61 days of average net consumption, or 90 days of average imports, whichever is the greatest (some MS favour public stocks, other request private companies holding the stocks, some adopt a mixed approach). MS have a reporting obligation about those stocks. An oil coordination group exists, chaired by the Commission, with the participation of MS representatives. Stakeholders may be invited to attend the meetings.

o Q&A: This presentation was followed by a discussion on the related costs of the measure. Despite elevated costs of holding gas and oil stocks, they provide a degree of resilience.

Reliance on trade

Lastly, the meeting was closed with a session discussing the role of trade in ensuring food supply and food security (DG AGRI, DG MARE, Wageningen University, JRC and Freshfel). The facts & figures on EU trade flows for agriculture and fish products show that the EU27 is a net importer only for certain commodities. For most of them, the EU is self-sufficient or net exporter. Intra-trade within the Single Market is crucial for ensuring food supply of agricultural products at MS level. There is however a significant trade deficit for fishery and aquaculture products. The majority of produced, consumed and traded products in the EU are wild products whereas farmed products constitute the majority of global trade. The consumption of fishery and aquaculture products in EU27 remains stable. (DG AGRI, DG MARE).

According to a study from Wagening University, based on a bio-physical model with no economic impact assessed, NL could ensure food supply in case of autarky under the condition that they drastically change diet. The study did not envisage however what would happen in case of a succession of bad years (and the absence of trade to provide a buffer), for example due to climate change.

According to the work of the JRC, trade and flexible trade policies can balance market and act as a buffer in extremely unfavourable agro-climate conditions, depending on the elasticity of the system. Trade liberalisation and stockholding policies could further contribute to adaptation as they allow markets to better adjust to adverse climate extremes.

The fresh fruit and vegetable sector can turn its inherent vulnerabilities proactively in preparedness as it is used to dealing with imbalances and challenges (perishability of the products, fragmentation of the production, occasional food safety incidents).

Understanding the market structure is important for an appropriate crisis response, especially given the seasonality of the produce (Freshfel).

Fourth Joint AGRI-MARE GREX on the F2F food contingency plan to ensure food supply and food security in the EU in times of crisis – 21 April 2021 - How are companies in the EU food system prepared to handle crises?

State of play on the process, B. LANOS DG AGRI

The commission presented the state of play of the consultation process and a brief overview of the stakeholder questionnaire. Contingency plan webpage on EUROPA available now. GREX planning: the next joint GREX on 20 May will be a workshop organised in collaboration with the Joint Research Centre and will aim at exploring contingency planning with regards to food supply and food security from an academic perspective.

A view on Global Risks in 2021

The World Economic Forum (WEF) presentation on the Global risk landscape complemented previous GREX on risks. WEF indicated (like speakers in previous GREX) environmental and climate risks as the most likely and with the greatest impact (exacerbating other risks), along with pandemics or social risks, such as livelihood crisis (unemployment, social insecurity). They evoked 'frontier risks' as those less on the radar than others, representing new possible shocks with high uncertainties, concerning their likelihood and impact (i.e. geomagnetic disruptions, artificial intelligence escaping control, accidental wars etc.). WEF insisted on the importance of cross cutting framework, clear and evidence based communication to the public, public-private partnerships (close coordination and communication between stakeholders and MS) and the scaling up of best practices.

Crisis preparedness in the transport and logistics sector (DG MOVE, IATA, UNISTOCK)

Concerning transport and logistics, the Green Lanes communication was praised by all participants. DG MOVE confirmed a future freight transport contingency plan is currently being prepared at the request of the Council. Coordination and cooperation between COM and MS will feature high. The absence of priority for any goods (all freight transport should flow quickly, no good is more priority than other, even the perishable ones) will continue to be a characteristic: the logistics of segregating between types of goods would be difficult and the definition of where priority should stop is impossible in view of the interdependencies of supply chains.

The prioritisation of the safety of workers, including cross borders, was particularly stressed. Both air and road transport industries were quite resilient and adapted with agility to the challenges of the crises, with air transport being more impacted (local regulations and cargo workers not considered as essential workers), but already back to pre COVID level (even higher in the case of North Pacific flows), thanks to transformation of passengers planes into cargo ("preight" flights).

Crisis preparedness in the inputs and packaging sector (EUROSEEDS, FEFANA, EUROPEN)

For the input sector, the dependence on the global supply chain posed challenges, especially in the beginning of COVID-19 crisis. Delays for sourcing of raw material for feed additives (chemical precursors and/or substances themselves) and packaging (paper and cardboard, ink) had a ripple effect on the rest of the food chain, although in general not to a major extent during COVID. Artificial disruptions should be avoided (e.g. due to container capacity): feed ingredients companies try to have at least two suppliers per product sourced (no single sourcing). Local and global sourcing are also seen as complementary. The just-in-time algorithms were also mentioned to be questioned and reviewed now (post COVID) by companies. The seed industry was able to avoid disruptions (all farmers could sow on time), also thanks to a policy of diversification of places of RD, production and processing/packaging ("spread the risk"). Stability and

continuity of policies was quoted as an important element to allow companies being better prepared to crises.

Companies' and producers' preparedness to handle crises (ARLA, NESTLE, ROYALD AHOLD DELHAIZE)

Companies in the core agri-food chain (Arla, Nestlé, Royal Ahold) presented their operative responsiveness arrangements and the way they reallocate resources to essential production. At retail stage, panic buying caused the greatest disruption. The wellbeing, health and safety of employees (and farmers for the coop) was a key element mentioned by all speakers. In the case of Arla, the cooperative status helped with a closer relationship with farmers and even more sense of community. Crisis management led by zone or country CEO's based on continuous reporting and monitoring ensured production according to market needs: data was key for this purpose (including data provided by market observatories). Recognition of food as an essential activity with regards to the movement of workers (essential workers) was a great relief to maintain production and flow of food in the chain. Cooperation between companies and stages of the food chain was also mentioned as useful to jointly communicate and reduce tendency to panic behaviour.

Long and short supply chains: diversification and food system resilience

A discussion on long and short supply chains/local food systems (defined in a presentation by DG AGRI) in terms of food resilience highlighted the need for global food supply chains to fulfil food supply requirements (currently only one third of food supply can globally be considered to be local according to a Nature scientific article presented during the GREX by its author, Pekka Kinunnen). According to a presentation by Eurovia-Via campesina, local demands can however be met with short supply chains, depending on the local production and limited to a low percentage of the food supply. As a short-term response, short food supply chains can contribute to buffer certain type of crises, thanks to lower vulnerabilities to logistic and long-haul transport and are often linked to a sense of community, trust and solidarity.

Fifth Joint AGRI-MARE GREX on the F2F food contingency plan to ensure food supply and food security in the EU in times of crisis – 20 May 2021 – JRC Workshop

The fifth meeting of the series was combined with a technical workshop co-organised with the JRC and is subject to a specific full technical report[264] that will be published separately.

Sixth Joint AGRI-MARE GREX on the F2F food contingency plan to ensure food supply and food security in the EU in times of crisis – 16 June - How to best organise a coordinated approach?

Approval of the agenda and state of play on the process, by B. LANOS, DG AGRI

The COM presented the housekeeping rules to ensure a smooth running of the meeting. The state of play was presented followed by the aim of the meeting. The aim was to discuss with MS mechanisms and ways to connect and build upon existing structures and to

[264] https://publications.jrc.ec.europa.eu/repository/handle/JRC125831.

understand how to best organize a coordinated approach. The next joint GREX on 15 July will present the outline of the Communication and other documents envisaged for Q4-2021.

Summary of the results from the stakeholder questionnaire by M. FLEURECK, DG AGRI

The targeted stakeholder questionnaire was open to all and closed on 3d May. Overall, 253 contributions were received (13% private companies, 25% trade and business associations, 45% individuals and 17% others). The aim of the questionnaire was to gather views on lessons learned, on the threats to EU food security, on crisis preparation and management in the food system and at public administration level. The final results will be included in the Communication and the accompanying Staff Working Document(SWD).

Building up on current systems in place (DG ECHO, DG SANTE)

To connect and build upon existing structures, colleagues from DG ECHO and DG SANTE provided a good overview of EU crisis response systems currently in place:

Introduction to the EU Civil Protection Mechanism (UCPM) by DG ECHO:

- The Emergency Response Coordination Centre (ERCC) is an element of the Union Civil Protection Mechanism (UCPM), which is set to strengthen the cooperation between the Union and the Member States and to facilitate coordination in the field of civil protection in order to improve the effectiveness of systems for preventing, preparing for and responding to natural and man-made disasters.
- The ERCC is involved in the coordination of responses to different types of incidents, including natural disasters, public health emergencies, etc. Where requested, the ERCC can coordinate and co-finance the deployment of Member States' assistance in the context of a food crisis, for instance in co-financing the transport of foodstuffs or deploying teams of experts.
- The ERCC organises regular meetings of civil protection authorities and generates numerous informational materials aimed at monitoring and analysing ongoing and anticipated emergencies/crises, including, potentially, with a food crisis component.
- Both the UCPM and the ERCC have well-established arrangements with access to full-time, 24/7 staff and response capacities, as well as an extensive network of expertise at both national and international level.
- UCPM capabilities are maintained through regular trainings and exercises.
- UCPM has been activated 102 times in 2020.
-

Introduction to the mechanism in case of Food Safety incidents by DG SANTE

- The legal framework from DG SANTE in case of Food safety incidents covers food and feed incidents related to biological, chemical and physical hazards.
- Three levels are foreseen in the general plan.

  1. Preparedness (crisis coordinators network, alert and information systems (interconnected), laboratories, training and exercises, continuous collection, monitoring and analysis of information);

  2. Enhanced EU coordination (analysis of the alert information system, involve EU agencies, use of crisis coordination network, organisation of audio- and video-conferences, initial assessment of impact, coordination of communication lines); and

3. Setting up a crisis unit (never happened so far).

In conclusion, permanent action is needed. Enhanced preparedness at EU and national level in a structured way is of increasing importance. Cooperation is essential using existing networks.

Six breakout sessions with a moderated discussion on how to build the most efficient system for a coordinated approach.

Three sets of questions were discussed, on the pre-crisis situation, the early crisis and for when the crisis has unfolded. Topics included:

- Organisation of a dedicated structure
- Detection of a crisis
- Organisation of a coordinated response when the crisis emerges
- Useful tools to react quickly in times of crisis
- Ensure that there is trust in times of crisis
- Communication
- Measures to manage the crisis

The minutes of the session will also be available on the dedicated webpage on the EUROPA website.

Third session: Plenary session on the outcomes of the discussion

Across the groups, many ideas have been confirmed and supported.

- Communication is paramount in times of crisis.
- Before the crisis occurs, monitoring and regular meetings were identified as core elements of the EU approach. Maintaining a dialogue between MS and relevant stakeholders of the food sector, will also contribute to build trust (among stakeholders, as well as with the public). Trust should be built continuously and before the crisis starts.
- During the initial crisis response, coordination and a coherent communication strategy were identified as core elements to respond to a crisis and to e.g. prevent panic buys. Transparency and sharing available and science-based information should be part of that communication strategy.
- According to the discussions, the EU approach;
    - Should include a forum specialized on/dedicated to communication/coordination, which is adaptable to the crisis situation (including ad hoc experts).
    - Should be flexible and agile, allowing a unique and tailored response to the unique crisis.
    - Should connect existing crisis management measures and tools or incorporated them directly.
    - Would ensure a coherent message to the MS and stakeholders, which is adapted to the national context and disseminated to the public.
    - Would include a permanent group with regular meetings (monitoring etc.) and ad hoc activities and crisis responses.
    - Should involve local/regional authorities as well as stakeholders (retailers and industry organisations) in the communication strategy can prevent miscommunication and further ensures coherence.

- Stakeholders, especially EU organisations, should be permanently represented in the forum as strategic contact points.

Seventh Joint AGRI-MARE GREX on the F2F food contingency plan to ensure food supply and food security in the EU in times of crisis – 15 July

This meeting was the last of the consultation process and was dedicated to a presentation by DG AGRI to the members the elements of reflection gathered during the consultation process that may feed the contents of the future Communication, first concerning, risks, vulnerabilities, strengths and resilience of the EU food system in times of crises, second concerning the possible actions foreseen in the Contingency Plan.

Main feedback expressed:

• wish that better data is gathered on stocks (both commercial and strategic) and expressed the need of proper training activities for building capacities to respond to crises.

• doubts that the complexity of the seeds supply chain with multiple stages in different places of the world was a vulnerability.

• importance of having a balance between types of food supply chains (from short or local to longer ones), the latter praising the need to have a well functioning Single Market, the former evoking the role of short and local chains to respond to consumer demand during COVID.

• appropriate policy tools should help farmers to face price volatility and that there is a need to ensure the right to food including healthy and quality food for all in times of crises.

• a food security problem in the EU is likely to also be a global food security problem, and that account should be taken of the global picture and the international community in the EU contingency planning.

• necessary links with market observatories and CDGs.

ANNEX III – SUMMARY OF QUESTIONNAIRES ADDRESSED TO MEMBER STATES

As part of the GREX meetings, Member States were asked to reply to a series of questionnaires, in which they could indicate their lessons learnt from COVID-19, their perception of threats, and their state of crisis preparedness.

Lessons learnt from the COVID-19 pandemic

During the COVID-19 crisis, the main challenges to food supply/food security across MSs were related to **logistics**. While MSs indicated no significant disruption of food production in general, the demand shift from HORECA to retail posed challenges. Another bottleneck identified was the shutdown of some large processing plants. Overall, the open boarders for both goods and workers were perceived as critical to face these logistic challenges.

Other issues mentioned were an increased production cost, the vulnerability of perishable goods, and difficulties in the procurement of inputs (seeds, fertilisers, feed and additives, raw materials and ingredients), packaging (EU labelling rules compliance challenging) and cleaning products (cleaning of production facilities). In some cases, problems occurred due to non-food uses of agricultural sector production (e.g. medical or pharmaceutical use).

Providing adequate care for seasonal **workers** was also mentioned as one of the challenges faces by MSs, this was also due to difficulties in accessing personal protective equipment (PPE). Shortage of labour linked to illness, confinement measures or lacking of access to childcare (besides cross-border issues) were also mentioned in regards to workers.

On the cooperation between the EU and MSS, several MSS expressed in interest in sharing best-practices and better coordinating information.

Main threats to EU food security

MSs identify **disruptions of free trade, availability of labour and climate change** and **environmental issues** (such as soil degradation, biodiversity loss, intensive agriculture & chemicals, water resources) as their top treats to EU food security. This is followed by threats posed by import dependency, human or animal diseases and food safety.

Other signs of caution in regards to food security are disruptions in **energy** supplies or of the **internet** network. Low **production standards** in third countries, the lower level of **technology** in some MSS, a low degree of producer organisation and underdeveloped short supply chains add constraints as well. Unforeseen large-scale **demand shifts** (e.g. COVID-19 HORECA) or a lack of instruments and financing to address risks and disruptions increases vulnerability.

From an **environmental** perspective, the main threats to food security are associated to **climate change** (such as reduced yields as well as extreme weather events, reduced nutritional quality of food, increased food prices, etc.[265]), **environmental degradation** (biodiversity, the loss of genetic resources[266] and agricultural land as well as the deterioration of soil quality) and **access to water resources**. Other issues as unsustainable imports (e.g. of feed protein), food waste and loss and increased demand pressures on production (population growth and rising global incomes), bioterrorism or trade-offs

[265] IPCC, Special Report - Climate Change and Land, Chapter 5 – Food Security, 2020.
[266] On biodiversity loss and global food security see: IPBES, Global assessment report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, 2019.

between environmental policy and food production have been mentioned as possible threats in the near or distant future as well.

Main threats from a **socio-economic** side are **producer viability and income** (e.g. due to reduced capacities; uncertainty and volatility; increased sustainability requirements; limited workforce; or ageing) followed by the **reduction in consumption volumes** (e.g. economic crises, economic inequality and rising inequalities). **Labour shortages** and low labour adaptabilities to change were seen as other socio-economic threats. Related to this are supply chain disruptions due to limitations in free movement of people and goods (including inputs, consumables, capital goods such as machine parts or PPE). A lack of transparency concerning e.g. the level of stocks, and macro issues such as mass migration caused by environmental issues (such as deforestation, lack of access to water etc.) were mentioned in this regard.

In terms of **geo-political** threats, international military conflict was seen as having potentially the biggest impact followed by **large-scale restrictions to trade and protectionism** alongside the previously mentioned issues on environmental degradation and the difficulty to coordinate on an international scale.

Livestock was cited as **the most vulnerable sector** due to multiple simultaneous threats: energy and water use, diseases, feed supply, labour availability. Similarly, crops was identified as second most vulnerable sector due to its dependency on climate and weather, perishability and labour availability. The **processing industry** was also mentioned frequently due to the dependency on labour and vulnerability of worker health and the impact of safety risks. Sectors not investing in 'future proofing' (digitalisation, etc.) are also under greater threat than others.

Regarding **national contingency plans**, of the MSs who responded, more than half confirmed they have a contingency plan almost all of which said it included food security. Of the remaining MSs currently not having a contingency plan, several are preparing the plan or/and the legal basis for it. Of the MSs with a contingency plan, about half said their plan included strategic reserves, mostly stockpiles of raw agricultural materials. In rare cases, the plan also included private stockpiles. However, the public stocks have not been used since the 1960s.

Level of preparedness

A close look at the level of preparedness and the MS level showed that within most MSs who answered the questionnaire, the **responsible institution at MS level** has a targeted focus on Crisis management, followed by monitoring and management of inventories. In some MSs, different administrations/agencies are responsible for one or the other.

The MS **procedures in case of crisis** are diverse. In some MSs the alert system can be triggered through a **bottom-up approach**, while in some others it is **data-driven** based on the monitoring of overall food availability. In some MSs, a **cross-sectorial crisis unit** is summoned by the prime minister or even president, in which all relevant ministries are represented.

In regards to the **administration involved** the procedure ranges from central administration or from one being ministry in charge (commonly the one responsible for civil protection), to both central and regional governments. Stakeholders are approached from two different direction across MS, in some **communication** is initiated from stakeholders to administration and in others from administration to stakeholders. In other

MSs, communication on crisis development is coordinated at a national level and disseminated to the other levels.

The **main strategy to ensure food supply** indicated by most MSs is the **release of food strategic stocks**. Individual MSs also mentioned governments buying food, handling out food parcels to citizens, bans on hoarding and distribution regulations, setting-up the logistics for an emergency value chain or even derogations to the Food Law. The strategy to ensure food supply chosen needs to respond to the magnitude of the crisis. Therefore, the strategies range from a local level and supply of basic human needs (such as water, food and shelter) to national level once the FSC is affected.

The **instruments most commonly used** among MSs are **legal documents** (Law, Act, Regulation) already implemented. Some MSs made no reference to a specific document. Individual MSs also sent out a memorandum to stakeholders or used an EU regulation, as a public intervention.

The issues addressed in the **legal instruments** are mainly **on monitoring, food reserves distribution**, **food supply** (production, logistics), derogations of the food laws, sharing and access to private data or precautionary measures on long-term crisis preparedness.

Regarding the **monitoring**, most MSs are having annual or regular reports on the state of markets and prices. Some MSs have no formal monitoring and rely on close contact/ market observation with main economic operators. Several MSs use balance sheets to monitor the national food supply. Stakeholders are involved differently among the MSs. While in some MSs, stakeholders are invited to report voluntarily, in other there is no obligation for maker participants to report on stocks and in other MSs it is mandatory in case of a crisis.

The **indicators** used for monitoring range from **self-sufficiency** for food and critical inputs or food security, **level of stocks or stock-to-use ratio** or the **evolution of price**. In some MSs a combination of indicators is used to better estimate the level of food security, for example: self-sufficiency and the ability to trade; others economic hardship and consumer confidence; import dependence, level of stocks, shortages, risk pictures, potential alternatives; or risk assessment for establishment of food reserves, effectiveness of the programme, international obligations, national security.

For these indicators the majority of MSs do not have a **threshold** to trigger crisis response. In one MS a minimum period during which citizens should be able to fulfil their food requirements is used as an estimate. In other MSs the evaluation encompasses the socio-economic context. Again other MSs use as an indicator the market interventions in place or rather once their limit has been reached. The need for a threshold also depends on the response trigger. As in some cases a central unit or even the Prime Minister triggers the response, a threshold is difficult to define given the compilation of various information sources and macro perspective.

In terms of **future preparedness**, several MSs are reviewing their national contingency plans in terms of national strategic reserves, COVID-19 measures taken and their necessity. MSs also indicated they plan to review their plans based on the EU contingency plan. While in some MSs this process in ongoing as we are moving forward after the COVID-19 crisis, for other MSs reviewing crisis preparedness is an ongoing process. Part of this is to regularly review the preparedness and response planning to reinforce the efficiency and the flexibility of crisis management. There is also a Nordic Council of ministers in which preparedness and resilience of food systems is part of the agenda.

According to some MSs, **reforming the use of food reserves** should be part of this review, while for other MSs, the top priority is to prepare for, anticipate and resist initial impact as well as longer term consequences. This includes issues related directly to food and drink but also cross-functional issues such as the logistics sector and **critical infrastructures**. Other MSs propose as part of the restructuring a civil emergency planning system or to include a **regular review of national risks** (e.g. every 3 years). Research and scaling up **training activities** on crisis management are also suggested. For some MSs **data security** as well as monitoring/evaluation is an important part of the reviewing process. A definition of security of supply and the role of agencies as well as a clear distinction between preparedness and emergency is also mentioned.