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IMPACT ASSESSMENT REPORT

Accompanying the document

Directive of the European Parliament and of the Council

amending Directive 2008/98/EC on waste

{COM(2023) 420 final} - {SWD(2023) 420-422 final} - {SEC(2023) 420 final}

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Glossary

Term or acronym	Meaning or definition
Closed loop recycling	Recycling process that aims to reach a sustainable supply chain in which all elements used to produce a good can become part of a new equal or similar product without losing their properties.
COP15	The 15th Conference of Parties to the UN Convention on Biological Diversity adopted the "Kunming-Montreal Global Biodiversity Framework" (GBF). Target 16 includes halving global food waste by 2030.
Disposal	Any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy[1].
EEA	European Environment Agency
EPR	Extended producer responsibility
ESPR	Ecodesign for Sustainable Products Regulation legislative proposal by the European Commission
Eurostat	Eurostat is the statistical office of the European Union situated in Luxembourg. Its mission is to provide high quality statistics for Europe.
GHGs	Greenhouse gases
HH Textile	Hydrostatic Head Textiles are fabrics used in textiles to make the clothing item waterproof against liquids trying to pass through the fabrics.
JRC	Joint Research Centre
Open loop recycling	Recycling process which serves as to either convert the elements composing a used product into raw materials for a new good or into waste product.
PC	Public consultation
PRO	Producer responsibility organisation
Proximity principle	Wastes should be disposed of as close to the source as possible.
Recovery	Waste operation the principal result of which replaces other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function[2].
Recycling	Any operation which reprocesses waste materials into useful products, materials or substances.
SCIP	Database for information on Substances of Concern In articles as such or in complex objects (Products) established under the Waste Framework Directive.
SDG Target 12.3	United Nations Sustainable Development Agenda 2030, includes a target (Sustainable Development Goal (SDG)

[1] Annex I of Directive 2008/98/EC on waste sets out a non-exhaustive list of disposal operations.
[2] Annex II of Directive 2008/98/EC on waste sets out a non-exhaustive list of recovery operations.

	12.3) to halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses, by 2030.
Separate collection	The collection where a waste stream is kept separately at the point of its generation and collection by type and nature so as to facilitate a specific instrument. See Article 3(11) of the Waste Framework Directive.
Self-sufficiency principle	At Community and, if possible, at Member State level. Member States need to establish, in co-operation with other Member States, an integrated and adequate network of waste disposal facilities. See Article 16 of the Waste Framework Directive.
UN	United Nations
Waste hierarchy principle	Waste hierarchy is the five-step EU waste management principle established under Article 4 of the Waste Framework Directive that orders from most to least preferred the methods of managing and disposing waste as it follows: i. prevention, ii. preparing for reuse, iii. recycling, iv. recovery, and v. disposal.

1. INTRODUCTION

This impact assessment (IA) studies a possible revision of the Waste Framework Directive[3] (WFD) to contribute to the ambition of the European Green Deal (EGD)[4] in terms of reducing waste generation. No formal evaluation was conducted because the transposition and implementation of the last amendment of the WFD in 2018 are not yet completed (see Annex 5 for details).

The WFD aims for waste not to harm the environment and human health, and implements the 'polluter pays' principle through extended producer responsibility (EPR) schemes. The WFD mandates Member States to set up separate collection[5] for bio-waste (including food waste) by 31 December 2023 and for textiles by 1 January 2025. It also mandates the Commission to assess by the end of 2023 the feasibility of establishing an EU-wide food waste reduction target to be met by 2030. Even though textiles and food waste have their own specificities, they share a common legal basis with the WFD and are subject to the same overarching objectives. Therefore, both waste streams are covered by this IA.

As regards textiles, the IA examines different policy options to improve textile waste management in line with the 'waste hierarchy'[6] enshrined in the WFD, prioritising waste prevention, re-use and recycling of textiles over other recovery options and disposal. As regards food waste, it explores different policy options for setting EU-wide food waste reduction targets.

The Circular Economy Action Plan (CEAP)[7] and the EU Strategy for Sustainable and Circular Textiles ('Textiles Strategy')[8] call for reinforced and accelerated EU and Member State action to **prevent textiles waste and to improve the circularity of textiles**, as it is a resource intensive sector alongside food causing significant negative environmental externalities, where financing and technological gaps impede progress towards the transition to a circular economy.

The introduction of EU-wide food waste reduction targets, as called for by the Farm to Fork Strategy[9] aims to contribute towards a sustainable food system that is more resource efficient while minimising impacts on the environment. Reducing food waste also **contributes to food security**, currently at the centre of the political agenda. This will in turn improve food affordability, for instance, by helping consumers avoid purchasing food that is then disposed of.

Table 1 – Mapping of the main links of policy priorities to the WFD

Policy area	WFD contribution and relevance

[3] OJ L 150, 14.6.2018, p. 109–140
[4] COM/2019/640 final
[5] Article 3(11) of the WFD defines 'separate collection' as "the collection where a waste stream is kept separately by type and nature so as to facilitate a specific treatment".
[6] The waste hierarchy is a central concept in the WFD that establishes an order of preference for managing and disposing of waste: prevention first (including re-use) followed by waste management operations: preparing for re-use, recycling, recovery and last disposal. It is operationalised through specific rules and performance targets, such as setting separate collection obligations and targets for prevention, recycling or diversion from landfill.
[7] COM/2020/98 final
[8] COM/2022/141 final
[9] COM/2020/381 final

The 8th Environment Action Programme (8th EAP)[10] *Timeline: 2022-2030*	Speed up the transition to a climate-neutral, sustainable, non-toxic, resource-efficient, renewable energy-based, resilient and competitive circular economy to attain the EU's 2050 vision of living within planetary boundaries.
Circular Economy Action Plan (CEAP) *Timeline: since 2020*	Increase circularity of resource intensive sectors, such as textiles and food[11] for people, regions and cities. Prevent or reduce waste generation. Enhance the implementation of the polluter pays principle. Strengthened markets for secondary raw materials and more circularity. Reduce environmental impacts through improved waste management.
Bioeconomy Strategy[12] *Timeline: Updated bioeconomy strategy published in October 2018*	Calls for actions to reuse, reduce and recycle bio-waste streams. Principles such as the circular economy, cascading use of biomass and the waste hierarchy are at its core.
Ecodesign for Sustainable Products Regulation (ESPR)[13] *Timeline: Commission proposal published in March 2022*	Make sustainable products the norm in the EU by setting minimum requirements to improve their circularity, energy performance, promote/support sustainable production and consumption models and stimulate re-use, repair and recycling.
EU Strategy for Sustainable and Circular Textiles ('Textiles Strategy') *Timeline: Published in March 2022*	Calls for urgent action across the entire lifecycle of textiles to ensure sustainable textile products and circularity to retain textiles' value in the economy for as long as possible and to reduce dependencies on virgin raw materials.
Farm to Fork Strategy *Timeline: Published in May 2020*	Reduce food waste levels. Establish a baseline for food waste levels, considering new data measured by MS and propose legally binding targets to reduce food waste across the EU by 2023.
Commission analysis of the drivers of food security[14] *Timeline: Published in January 2023*	Food waste is one of the main drivers affecting food security from both the supply and demand sides. Food waste reduces productivity and can reduce food availability. Additionally, reducing food waste could contribute to food price decreases, thereby potentially improving economic access to food.
Proposal for a legislative Framework for a Union Sustainable Food System ('FSFS') *Timeline: planned for Q3 2023*	Food waste reduction will be part and parcel of the future legislative proposal establishing a framework for a Union Sustainable Food System. There will be synergies between the two initiatives (e.g., when MS implement national food waste prevention programmes to meet the set targets, they would need to take into account the general principles of FSFS, where applicable and relevant).
Food Information to Consumers[15] – revision of EU rules on date marking	Clarify wording of 'use by' and 'best before' dates to prevent food waste linked to the misunderstanding and/or misuse of these dates.

[10] OJ L 114, 12.4.2022, p. 22–36
[11] https://single-market-economy.ec.europa.eu/industry/transition-pathways_en.
[12] European Commission, Directorate-General for Research and Innovation, *A sustainable bioeconomy for Europe: strengthening the connection between economy, society and the environment: updated bioeconomy strategy*, Publications Office of the European Union, 2018, https://data.europa.eu/doi/10.2777/792130
[13] COM/2022/142 final
[14] SWD(2023) 4 final, *Drivers of food security*
[15] OJ L 304, 22.11.2011, p. 18–63

REPowerEU[16] *Timeline: Published in March 2022*	Increasing production from 3.5 (2021) to 35 (2030) bcm of biomethane from sustainably sourced feedstock, including food waste, to strengthen security of energy supply and reduce dependence on Russian fossil fuels. While food waste reduction is not expected to contribute to this target, indirect effects (e.g. freeing land for non-food uses) may have limited impact.
Social Economy Action Plan[17] *Timeline: Published in December 2021*	Sets waste management rules to provide opportunities for social enterprises and circular business models.
Chemicals Strategy for Sustainability[18] *Timeline: Published in October 2020*	Protect citizens and the environment from harmful chemicals, ensuring all chemicals are used more safely and sustainably and prioritising innovation for substituting substances of concern across sectors, such as textiles.
Zero pollution action plan[19] *Timeline: Published in May 2021*	Mandate that waste is managed without endangering human health and harming the environment. Promotes the waste hierarchy to reduce pollution.

Both Council[20,21] and Parliament[22,23] call for and welcome the Commission's approach to improve the sustainability and circularity of textiles. They call on the Commission to prioritise waste prevention, introduce EPR, promote high-quality recycling, increase recycling capacity and demand for recycled textiles, and adopt EU end-of-waste criteria for textiles as well as promote the resilience and social justice of the ecosystem.

Parliament has called for the reduction of food waste and advocated setting specific food waste prevention targets: at least 30% and 50% reductions by 2025 and 2030, respectively[24, 25, 26, 27]. In 2016, Council[28] called on Member States to confirm their commitment to achieving SDG 12.3 through a range of initiatives, supported by the Commission in key areas such as food waste monitoring. Subsequent updates on progress made in Member States were adopted through Council Conclusions in 2018[29] and 2020[30].

[16] COM/2022/108 final
[17] COM/2021/778 final
[18] COM/2020/667 final
[19] COM/2021/400 final
[20] Council of the EU, More circularity - Transition to a sustainable society – Council conclusions, 4 October 2019.
[21] Council of the EU, Draft Council conclusions on Making the Recovery Circular and Green – Approval, 11 December 2020
[22] OJ C 298, 23.8.2018, p. 100–111 (Resolution on the EU flagship initiative on the garment sector)
[23] OJ C 465, 17.11.2021, p. 11–29 (Resolution on the New Circular Economy Action Plan)
[24] OJ C 227E, 6.8.2013, p. 25–32 (Resolution on how to avoid food wastage)
[25] OJ C 265, 11.8.2017, p. 65–75 (Resolution on resource efficiency: moving towards a circular economy)
[26] OJ C 307, 30.8.2018, p. 25–43 (Resolution on resource efficiency: reducing food waste, improving food safety).
[27] OJ C 270, 7.7.2021, p. 2–20 (Resolution on the European Green Deal)
[28] Council of the EU, Food losses and food waste - Council conclusions, 28 June 2016.
[29] Council of the EU, Food losses and food waste: assessment of progress made on the implementation of June 2016 Council conclusions - Information from the Presidency and the Commission - Exchange of views, 28 March 2018
[30] Council of the EU, Food losses and food waste: assessment of progress made in implementing the Council conclusions adopted on 28 June 2016 – Information from the Presidency and the Commission, 9 November 2020

Support of the EU and Member States for halving global food waste by 2030 was also confirmed in 2022 at COP15 (Target 16)[31].

As a follow-up to the Conference on the Future of Europe, the Commission announced in 2022, a "new generation" of citizens' panels to consult randomly selected citizens before certain key policy proposals, with the first panel of this type organised to support this initiative on the topic of food waste. This citizens' panel however provided recommendations[32] that have a broader scope than the current initiative. It will support the overarching work of the Commission on food waste and serve as a guide to help Member States in achieving their target.The panel outcome has been annexed to this impact assessment (see Annex 16).

A European Court of Auditors report recommended to strengthen and better coordinate the EU Strategy to combat food waste. While noting measures set out in the 2015 Circular Economy Package, it expressed criticism of the Commission for, in their view, decreasing its levels of ambition over time, including on setting waste reduction targets and delaying obligations for Member States' reporting on food waste[33].

The preparatory work for this assessment, including the studies and the public consultation, looked into other areas governed by the WFD: waste prevention practices, waste separate collection systems and waste oils. The preliminary analysis shows that implementation of the '2018 waste package' is still ongoing and that further information and data are necessary to comprehensively evaluate the Directive and assess the necessity of additional EU action (see Annex 8 for details).

2. TEXTILES

2.1. Facts, figures and context

This section summarises the main facts, figures and context related to textiles and the implementation of the waste hierarchy (see Annex 6 for details).

The textile industry is an essential part of EU manufacturing. The EU textiles, wearing apparel and leather manufacturing market consists of around 226 600 companies in 2021, over 99% of which are SMEs[34], and employed around 1.7 million people[35]. In 2021, the EU textile and clothing sector had a gross turnover of €191 billion[36].

Over the last two decades, the EU textile industry has transformed itself from mass low value-added production to high-quality products, especially in high-end and

[31] Where reference is made, in this document, to SDG Target 12.3, this also encompasses the EU's commitment to Target 16 of the COP15 Global Biodiversity Framework.
[32] European Citizens' Panel on Food Waste, *Final recommendations*, February 2023
[33] European Court of Auditors, *Combating food waste: an opportunity for the EU to improve the resource-efficiency of the food supply chain. Special report No 34, 2016*, Publications Office of the European Union, 2017, https://data.europa.eu/doi/10.2865/272895
[34] The European Commission defines SMEs as having less than 250 persons employed. They should also have an annual turnover of up to EUR 50 million, or a balance sheet total of no more than EUR 43 million (Commission Recommendation of 6 May 2003).
[35] Eurostat data set 'Enterprise statistics by size class and NACE Rev.2 activity' (SBS_SC_OVW), combing NACE codes C13, C14 and C15.
[36] Ibidem.

luxury fashion, technical textiles[37]. Italy, Germany, France, Spain, Portugal, Poland, Romania, Netherlands, Austria and Belgium represent the most important Member States in terms of textile and apparel production in the EU. Southern Member States tend to focus on clothing, while technological-intensive textile industries are mainly located in Germany, Italy and Austria. Generally, textile production is frequently clustered in concentrated manufacturing hubs.

However, most production of the textiles consumed in the EU takes place in third countries, mainly in Asia. Consequently, **most of the environmental pressures of the EU consumption of textiles occur in third countries**[38]. The EEA estimates that to produce the amount of clothing, textiles and footwear consumed in the EU in 2020, 80% of primary raw materials, 88% of water and 92% of land used and 73% of greenhouse gas (GHG) emissions took place outside the EU. Additionally, almost 13 million full-time equivalent workers were employed worldwide in the supply chain[39].

Textiles are highly globalised, with the EU being a significant importer and exporter. It has been estimated[40] that in 2019 the import of fibres, yarns, fabrics and particularly finished products in the EU jointly corresponded to 13.5 Mt[41]. Women's clothing and other knitted and woven garments were the main exported textile products, accounting for 24% and 23% of total exports that year. Switzerland, the UK, the USA and to a lesser extent China are the main destinations of EU textile exports accounting for 46% of total EU textile exports. A significant amount of textile goods is also traded over national borders within the EU. A total of 6.5 Mt of textile goods moved within the EU in 2019.

The growing trend of online shopping exacerbates so-called 'fast fashion'[42], which is characterised by more frequent fashion collections being placed on the market[43] with low-priced products that do not internalise environmental externalities[44], encourage customers to shop impulsively and incentivises purchasing larger quantities of clothes[45]. This increasing textile consumption leads to increasing volumes of textile waste.

Figure 1 shows the mass flow analysis for textile generation and waste management in the EU. Data on **generation and management of textile waste in EU** vary from different sources, depending on the scope of the textiles covered, reference years and the methodology of calculation/estimation. This IA mainly rests on the results of an ongoing JRC study[46] for the reference year 2019, which covers all kinds of textiles along the whole value chain, starting from fibres production to the end-of-life of textile products. The

[37] https://single-market-economy.ec.europa.eu/sectors/fashion/textiles-and-clothing-industries/textiles-and-clothing-eu_en
[38] European Environment Agency, 2019
[39] EEA. Textiles and the environment: the role of design in Europe's circular economy (2022). Available at: https://www.eea.europa.eu/publications/textiles-and-the-environment-the.
[40] Flows are represented as tonnes, and refer to annual mass units
[41] European Commission, Joint Research Centre. *Techno-scientific assessment of the management options for used and waste textiles*. 2023 (under development)
[42] What is fast fashion and why is it a problem? | Ethical Consumer
[43] Lai, O., *What is fast fashion*, Earth.org, 2021, https://earth.org/what-is-fast-fashion
[44] Stakeholder workshop.
[45] European Commission, Joint Research Centre, 2021, https://data.europa.eu/doi/10.2760/858144.
[46] European Commission, Joint Research Centre. *Techno-scientific assessment of the management options for used and waste textiles*. 2023 (under development)

apparent consumption[47] of textiles in the EU (i.e. domestic retail and textiles placed on the market for business-to-business applications) was estimated to be around 12 Mt.

Total textile waste generated, covering clothing and footwear, home textiles, technical textiles, and post-industrial and pre-consumer waste, was estimated at 12.6 Mt, including fractions that are discarded during textile production (post-industrial waste, 11% of total waste), at the retail stage (pre-consumer waste, 3%), and by households and commercial entities waste (post-consumer waste, around 87%). Post-industrial and pre-consumer waste is likely to consist of fewer fibre types and material blends[48] that make it easier to identify[49] and be treated. Such waste is typically collected by waste collectors based on commercial contracts, whereas municipalities, social and commercial enterprises are engaged in collection of post-consumer household textiles. **Post-consumer textiles** waste[50] generated in 2019 amounted to **10.9 Mt. Clothing and footwear waste amounted to 5.2 Mt, equivalent to 12 kg per person per year in the EU**.

There are large variations across national separate collection systems in terms of their scope. The most common systems cover clothes and household textiles (and often footwear) for re-use purposes and at times also for recycling. Mattresses, carpets and other similar bulky materials with textile components are typically collected as bulky waste. Only about **2.4 Mt textiles are separately collected every year in the EU (around 22% of total generated post-consumer textile waste and around 39% of textile waste covered by collection systems). Therefore, about 8.5 Mt (78%) of textile waste is largely discarded in household mixed waste and end up incinerated or landfilled.**

Collected textiles are sent to sorting facilities, to be separated into re-usable[51] and recyclable fractions[52]. **EU sorting capacity is insufficient to manage the textile waste generated within the EU and is estimated to stand at 1.8 Mt with the remaining of separately collected textile waste (>50% of the total exports or 0.5-1.0 Mt) being exported in an unsorted fashion to third countries**. This can be mainly attributed to the lower cost of the sorting process in these third countries and the capacity gap in the EU.

Re-use within the EU of separately collected waste is estimated at about 8% (0.19 Mt). It is the so-called '*cream*' fraction (i.e. the fraction with the highest economic value) within the collected material and generates an important share of the revenues for the sorters[53].

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[47] Import of finished textiles + finished textiles produced in the EU – finished textiles produced in the EU that are exported.

[48] Elander, M., *Automated feeding equipment for textile waste: experiences from the FITS-project*, Mistra Future Fashion, 2019.

[49] European Commission, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, Duhoux, T., Maes, E., Hirschnitz-Garbers, M., et al., *Study on the technical, regulatory, economic and environmental effectiveness of textile fibres recycling: final report,* Publications Office, 2021, https://data.europa.eu/doi/10.2873/828412

[50] Unwanted consumer textiles can be exchanged, sold, donated or discarded as waste either via textile separate collection or in the mixed waste bin. For ease of reading, this document will use the term *textile waste* even if part of the unwanted clothes is provided to be re-used.

[51] The European Recycling Industries' Confederation (EuRIC) is the umbrella organisation for European Recycling Industries.

[52] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., *Circular economy perspectives in the EU textile sector: final report*, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144.

[53] Nørup, N., Pihl, K., Damgaard, A., Scheutz, C., 2019a. Evaluation of a European textile sorting centre: Material flow analysis and life cycle inventory. Resources, Conservation and Recycling 143, 310–319. doi:https://doi.org/10.1016/j.resconrec.2019.01.010

Export is the most common fate of separately collected textile waste sorted in the EU (0.85 Mt; 48% of the total sorted). **This means that annually a total of 1.83 Mt of used and waste textiles are exported to third countries, mainly to Asia and Africa** (jointly receiving close to 90% of the EU exports)[54]. Although the main purpose of the exports is re-use, it is likely that a large share of the textiles sent to Africa is ultimately not re-usable and may contribute to adverse environmental and social impacts in the country of destination[55].

There are different assessments of the overall reusability of discarded clothing and household textile waste ranging from 45%[56] to 65%[57]. The fraction after sorting that does not meet the quality requirements is mostly **recycled (corresponding to 32% of the separately collected waste** or 0.8 Mt), and low amounts of waste-to-energy recovery or disposal (5-10%) are generated after the sorting process. Together with the recycled share of post-industrial and pre-consumer waste, the total mass that enters textile recycling plants, effectively corresponds to the **estimated recycling capacity in the EU** (0.70-0.85 Mt/year).

Some Member States have established national textile management regulations assigning responsible to actors for the collection of waste. **France and soon also the Netherlands are the only Member States with a mandatory EPR scheme**, which mandates textile producers to organise collection of re-usable textiles and textiles waste. Sweden, Germany, Bulgaria, Belgium and Spain are planning to adopt EPR schemes and other Member States are carrying out feasibility studies. There are differences in the scopes, reporting and regulation of the producers and other operators across Member States.

The formal re-use sector, dominated by social enterprises, is currently the most active in separate collection and sorting of textiles, with a business model based on the sale of the best quality textiles. Most sorting presently takes place manually, which is time-consuming and costly, but essential to separate out textiles for reuse. Automatic sorting is still in the initial stages (<1% of post-consumer textiles sorting) and needs considerable investments to scale up and improve; however, it seems likely that in a near future automated sorting could become complementary or partially replace the sorting of textiles that are destined for recycling. Currently two main types of recycling technologies are used for textiles: mechanical and chemical recycling. Additionally, textile waste can be thermally recycled, but at present, this process is not implemented at industrial scale in the EU. Most of the fraction recycled in EU is converted into low value products (e.g. wipers, cleaning cloth, insulation materials) by means of mechanical recycling, and the share that is actually

[54] EEA, 2023. EU exports of used textiles in Europe's circular economy. Available at: https://www.eea.europa.eu/publications/eu-exports-of-used-textiles/eu-exports-of-used-textiles.

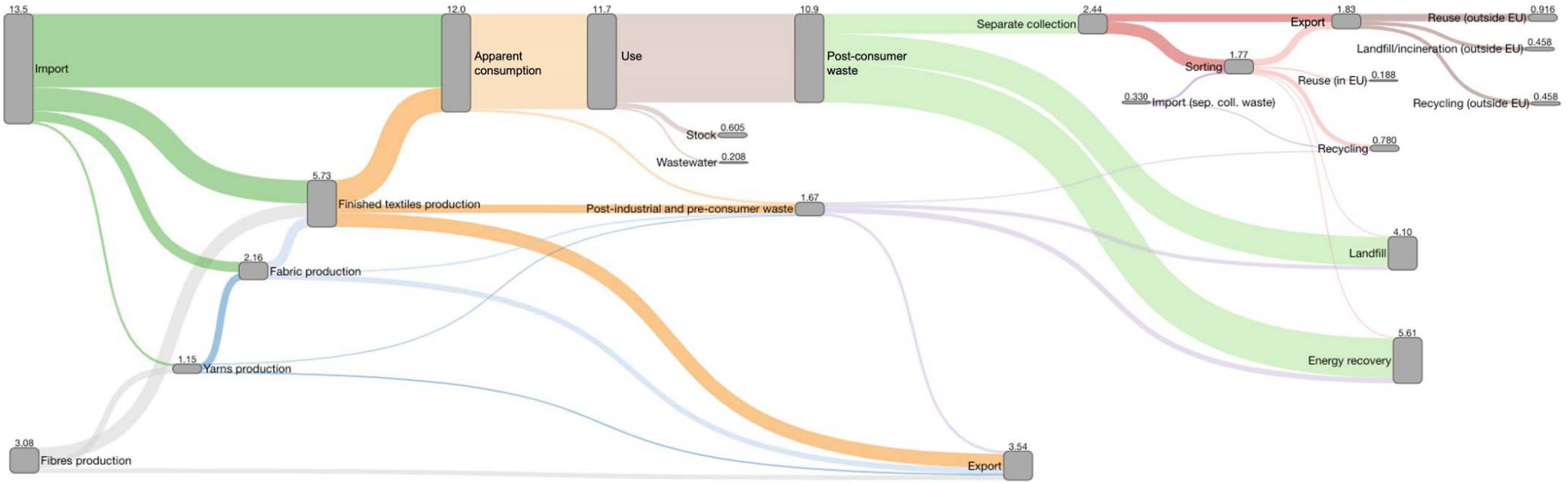
[55] Cobbing, M., Daaji, S., Kopp, M., Wohlgemuth, V., 2022. Poisoned Gifts From donations to the dumpsite: textiles waste disguised as second-hand clothes exported to East Africa. Available at: https://www.greenpeace.org/static/planet4-international-stateless/2022/04/9f50d3de-greenpeace-germany-poisoned-fast-fashi

[56] Alcin-Enis I., Kucukali-Ozturk M., Sezgin H. (2019) Risks and Management of Textile Waste. In: Gothandam K., Ranjan S., Dasgupta N., Lichtfouse E. (eds) Nanoscience and Biotechnology for Environmental Applications, *Environmental Chemistry for a Sustainable World*, vol 22. Springer, Cham. https://doi.org/10.1007/978-3-319-97922-9_2.

[57] Tojo, N., Kogg, B., Kiørboe, N., Kjær B. and Aalto K., *Prevention of Textile Waste. Material flows of textiles in three Nordic countries and suggestions on policy instruments*, NORDEN, http://dx.doi.org/10.6027/TN2012-545.

recycled for further applications as apparel is low (2% of sorted material, see Annex 6 for details).

Figure 1: Mass flow analysis for textile generation and waste management in the EU (for the status quo reference year 2019). The mass flows in each node are expressed in Mt/year[58]



[58] European Commission, Joint Research Centre. *Techno-scientific assessment of the management options for used and waste textiles*. 2023 (under development)

2.2. Problem Definition

2.2.1. What are the problems?

Despite waste prevention being a key objective of the WFD and the implementation efforts at national level including by private actors, waste generation continues to increase and only a 'relative decoupling' of waste generation from economic growth can be observed[59]. Currently, around 78% of the post-consumer textiles waste is not separately collected and ends in mixed household waste, destined to be incinerated or landfilled. This is not in line with the waste hierarchy, is resource inefficient and leads to environmental harm in the EU and in third countries through excessive levels of GHG emissions, water consumption, pollution and land use.

The separate collection obligation for textiles in the WFD is coming into force on 1 January 2025. According to information from Member States, it is estimated that the separate collection systems, and the sorting and recycling infrastructures, which are unlikely to be ready to handle the expected additional amounts to be collected, mainly those diverted from mixed household waste. Sorting infrastructure is expected to take place in most Member States close to the waste collection and at a higher scale in those where the market conditions are favourable (e.g. lower costs, existing upscaleable infrastructure and skills, proximity to recycling/production hubs and ports). Recycling infrastructure is not expected to take place in all countries and are likely to be located in regions close to the textile production centres, existing infrastructure bases.

Key environmental, economic and social consequences

The textile sector is resource intensive. As previously mentioned, in relation to both the production of raw materials and textile most of the pressures and impacts related to the consumption of clothing, footwear and household textiles in the EU occur in other regions of the world. The majority of these negative impacts are borne by Asia, where most fibre production and textile manufacturing take place. **The textile sector is the fifth largest sector in terms of GHG emissions, thus being a significant contributor to climate change**. According to the EEA, textile purchases in the EU in 2017 generated about 654kg of CO_2 emissions per person[60]. It also has high impacts in terms of chemicals and water pollution. Therefore, preventing, re-using and recycling textile waste can help reducing the environmental footprint of the sector.

Additionally, the waste management costs of used clothing and household textiles are not addressed in the price of new products. On average, the costs of collection and treatment would equate to approximately 12 cents per item. However, these costs vary by item type, with those involving a mix of textile fibre types and the inclusion of disruptors (for example buttons and zips) costing more to manage and those that comprise a single fibre type with no disruptors such as t-shirts costing less. Given the large volumes of textile wastes currently disposed of in residual waste, the cost of disposal and the environmental externalities of that disposal including emissions from incineration and landfilling are also not internalised. Other externalities include notably the environmental and social impacts

[59] European Environment Agency, *Waste prevention in Europe,* 2021, Waste prevention in Europe — European Environment Agency (europa.eu).

[60] European Parliament, *The impact of textile production and waste on the environment,* 2020, https://www.europarl.europa.eu/news/en/headlines/society/20201208STO93327/the-impact-of-textile-production-and-waste-on-the-environment-infographic.

of textile waste exported to third countries disguised for re-use purposes, in particular, in relation to exported non-sorted textiles.

Fragmented definitions lead to administrative burden and pose barriers to cross-border shipments. Different policy and regulatory signals in each Member State and information gaps hamper the scaling up of the recycling industry and re-use and disrupt the level playing field of the single market. This obstructs not only the transition to a circular economy in textiles, but also prevents jobs and value-added being created in the EU. The insufficient sorting and recycling infrastructure is likely to lead to textiles not being treated in line with the waste hierarchy even once the separate collection obligation comes into force. Low added-value manufacturing mainly occurs in third countries. Production and disposal of imported textile waste create significant negative societal impacts at local, regional and global levels[61].

The **visual problem tree** is presented as part of the intervention logic in Section 2.4 (see Figure 3).

2.2.2. What are the problem drivers?

Several regulatory, market and behavioural problem drivers can be identified hampering the treatment of textile waste in line with the waste hierarchy, namely, prioritising prevention, re-use followed by preparation for re-use and recycling, and minimising treatment of textile waste as residual waste (see Annex 7 for details). The **visual problem tree** is presented as part of the intervention logic in Section 2.4 (see Figure 3).

Regulatory failures

While specific waste management and reporting obligations are defined in the WFD in relation to textiles, the underlying definitions of 'textiles', 'used textiles' and 'waste textiles' that set out the scope of those obligations are either non-existent or subject to broad and inconsistent interpretation among the operators and Member States. Therefore, it is uncertain which 'textiles' are covered under the separate collection obligation set out by the WFD, both in terms of textile types and sources of waste. Member States and regional authorities do not apply in a harmonised way the definition of 'textile waste' and 'used textiles' to similar separate collection approaches and materials or products. The information reported by Member States on re-use of textiles and textile waste management under the WFD presents significant gaps and robustness concerns due to all of the above notions being subject to different interpretations nationally.

The industry stakeholders have consistently raised that non-harmonised application of definitions results in uncertainties to the waste management and re-use operators as to the legal status of the material they handle. Therefore, the potential to transport those materials to other regions, Member States or outside the EU for re-use, preparation for re-use or recycling is hampered to respond to the market needs for demand of used textiles and recycled fibres and create economies of scale that are needed to scale up re-use and recycling activities. These uncertainties increase the costs and legal and administrative risks to the economic operators and hinder the potential for creating economies of scale which can only be achieved at regional and cross-border level. Non-uniform application of the textile waste and used textile (i.e. product not waste) concepts complicates the enforcement of EU rules on waste shipment and undermines re-use operations due to administrative and legal uncertainties of the concerned shipments. It also generates textile

[61] Ellen Mac Arthur Foundation, 2017, https://ellenmacarthurfoundation.org/a-new-textiles-economy.

waste data that is not comparable or robust across Member States, which in turn hampers proper waste management policy, infrastructure and investment planning by the Member States and used textile and textile waste operators.

The present approaches to separate collection in relation to the assignment of the responsibility for it (i.e. municipalities, commercial/social enterprises, producers), the scope of separate collection systems and the state of implementation of the rules indicate significant inconsistencies and likely delays in full roll-out of the separate collection systems and infrastructure for subsequent treatment. Textile waste management actors are also typically small commercial or commercial enterprises. These inconsistencies and fragmentation hamper the mobilisation of the textile and waste industry at EU level and commitment of the investments for the necessary collection, sorting, recycling and research and development activities.

Most Member States do not yet have full separate collection schemes in place and a clear organisation and attribution of the responsibility for its collection and subsequent treatment, with textile collection for re-use mainly operating informally through social enterprises and commercial collectors. These national policy discussions and investment decisions are also impacted and delayed to varying extent awaiting the outcome of the on-going EU level policy discussions in the context of this initiative, primarily the possibility of introducing a harmonised EPR scheme for textiles. Thus, timely implementation in view of scaling up re-use and recycling is unlikely, in particular, since these regulatory barriers impede investments.

Several Member States have chosen to implement the separate collection obligation by establishing an EPR for textiles (i.e. entrusting textile waste management to producers) and several more are also considering taking this route to ensure treatment of textile waste in line with the waste hierarchy and the financing for such activities. However, **the varied national approaches to regulating EPR scope, its operational and organisational features lead to regulatory fragmentation, increased compliance costs for the obliged industry to abide by heterogeneous levels of regulations in each Member State they operate in as the same activities, products and economic operators are subject to different rules in different Member States**. This regulatory fragmentation would hamper their ability for coordination and investment in sorting, re-use and recycling which are intrinsically cross-border activities. As further schemes will be adopted by Member States (legislation is in preparation or discussions are at an advanced stage in several countries, e.g. Sweden, Belgium, Bulgaria, Spain, Slovakia), it is expected that the divergences identified in the case of French, Dutch and Swedish systems will continue to grow across the EU, as Member States determine the scope and nature of their own schemes. To prevent this, the textile and waste industrial stakeholders as well as NGOs are unanimously calling for mandating and harmonising EPR for textiles at EU level.

National and regional variations in the scope of separate collection systems for textiles and other materials (e.g., footwear, accessories, leather goods) that are or would be collected through the same separate collection systems impact the material composition of the collected material and the cost and therefore the feasibility of subsequent sorting for re-use or recycling since sorting operations generally have predefined acceptance criteria for the material composition it may process. It also undermines sorting activities at scale at regional level serving several countries.

In addition, **the current EU sorting capacity will be insufficient to process all separately collected textiles and would need to be significantly scaled up, primarily**

through manual sorting and, most likely, in all Member States and particularly in regions in the vicinity of recycling facilities and markets relevant for the uptake of used and recycled textiles. Delays in national waste management policy planning and implementation and regulatory fragmentation that undermine consistency, scale and cross-border movement of collected, sorted or recycled textile as outlined above are all factors that hamper the ability of the textile value chain to take coordinated steps towards circularity. It undermines the scoping of feedstock sources and composition as well as investment planning and certainty for the sorting, processing and recycling infrastructure.

Despite most of collected textiles being exported outside the EU, there is also a lack of reliable information on the fate of exported used textiles outside the EU and the share that is treated as waste in the receiving countries since the classification codes relevant for the export of used textiles do not distinguish between sorted or unsorted used textiles and therefore the share of the present waste textiles. In fact, there are conflicting reports from various sources with several indicating that a considerable share of second-hand (exported as non-waste) clothing arriving from the EU is treated as waste, namely, recycled or disposed of[62].

Waste prevention action and monitoring is insufficient as consumption and generation trends increase and national waste prevention programmes rarely include monitoring indicators or targets to monitor and assess the effectiveness of the measures and policies.

Market failures

The 'fast fashion' which offers low-priced textiles the production of which does not take into account negative environmental externalities encourages consumers to over-consume. This leads to an increase in the quantity of textiles consumed and the velocity with which textiles are being discarded. **Textile producers lack incentives designing long-lasting, re-usable or recyclable products[63], which hampers the development of circular business models[64].** It also leads to some textiles not being fit for recycling.

There is a significant funding gap for the financing of textile management in line with the waste hierarchy. Any separate collection and sorting of textile waste that currently takes place in the EU is financed by the re-use market by selling the 'crème' for a profit. And it relies heavily on the export of the textiles with the declared purpose of re-use. However, global re-use markets are saturating, and the exported re-usable textiles price per tonne is decreasing[65]. Based on the estimated composition of separately collected textile waste once the separate collection obligation is fully implemented, this financing model will no longer be feasible since the cost of managing the sorting and treatment of the non-re-useable fraction will be greater than the revenues from selling the 'crème' or other re-usable fractions in the EU and global re-use markets. Furthermore, the sorting and recycling facilities are costly and lengthy to set up, including, in view of training professional sorting personnel since the vast majority of sorting is carried out manually.

The global reuse markets are saturating, contributing to increased waste generation as products of low quality have a shorter longevity. Also, the informal resale by consumer-to-consumer (C2C) of 'crème' clothes is subject to a considerable growth impacting the

[62] EEA, 2023. EU exports of used textiles in Europe's circular economy. Available at: https://www.eea.europa.eu/publications/eu-exports-of-used-textiles/eu-exports-of-used-textiles
[63] Stakeholder workshop, call for evidence.
[64] Stakeholder workshop, call for evidence (Policy Hub, Circularity for Apparel and Footwear).
[65] See footnote 41.

profitability of the waste management operators resale operations. **The C2C used textile market has also shown to encourage customers to buy more** reused products because they are cheaper.

Certain information and technological barriers are also hampering recycling of textiles. The composition of textiles waste is largely unknown, constituting an information constraint, resulting in increased sorting and monitoring costs, hindering recycling of many fibres/compositions. In addition, uncertainties in relation to the quality of recycled textiles may reduce their demand. This is partially due to the disparate way in which Member States collect and treat textiles and partially due to information on textiles not reaching or reaching in unreadable way (due to lack of automatic sorting) the waste operators. While mechanical recycling is currently well developed as is the predominant recycling process applied, it also generates lower quality secondary raw materials. The upscale of uptake of this material is hampered by the low primary material costs which don't take into account the environmental externalities and the demand for recycled materials. For recycling of a broader variety of fibre compositions and technologies that deliver high quality secondary raw materials suitable for textile product applications, the technology readiness levels for scaling up at industrial level are not yet attained, but close. Considerable investments are needed in the research and development for developing automatic sorting and recycling technologies to address the growing amounts of recyclable textiles post 2025.

Behavioural drivers

Despite increasing awareness, the 'use-and-dispose' culture or 'take-make-use-throw' mindset is still largely fostered across the whole supply chain and adopted by consumers increasing the volumes of textile waste are generated. **Consumers are mostly unaware of the negative environmental externalities of production and end-of-life management of textiles, impeding a change in consumption habit**s.

2.2.3. How likely is the problem to persist?

Since waste generation continues to be positively correlated with economic growth ('relative decoupling'), it is likely that waste generation is expected to increase in line with the economic recovery following the COVID-19 pandemic. Despite EU initiatives, such as the '2018 waste package' and efforts at Member States level to prevent textile waste and manage it according to the waste hierarchy, consumption and production patterns are still expected to lead to **growing amounts of textiles being placed on the EU market**, being consumed and eventually given for re-use or discarded (see Figure 2).

The Textiles Strategy proposes actions for the full lifecycle of textile products, by targeting the way textiles are designed and consumed. As part of the implementation of the **ESPR, eco-design requirements for textiles will aim at increased product durability, reparability, recyclability and the use of recycled materials**. Such measures would contribute to reducing textile waste generation and facilitating increased recycling rates but not before the end of the decade.

The future review of the **Textile Labelling Regulation** will also have an impact on the baseline. It is expected to potentially increase the demand for higher quality textiles products, ease sorting and recovery of materials and fibre-to-fibre recycling, play a role in reducing energy consumption in washing and in extending the durability and maintaining the quality, and facilitate the second-hand market across Member States via the 'uniform size labelling'.

The Commission proposal for the **Waste Shipments Regulation** (WSR)[66] aims to restrict the export of waste to non-OECD countries unless the country can demonstrate its ability to manage waste in an environmentally sound manner. It also looks to establish in the future clear criteria to differentiate between used goods and waste to prevent waste from being falsely exported as used goods and therefore limit illegal shipments. The development of such criteria could complement the measures taken in the context of the Textile Strategy, including for textiles under the WFD as *lex specialis*.

The JRC has commenced assessments underpinning the development of end-of-waste (EoW) criteria for textile waste in early 2023. Where further adoption of such criteria at EU level by the Commission takes place, such harmonised EoW criteria are expected to bring legal certainty and contribute to smoother shipment of materials derived from treated textile waste for re-use and recycling within the EU and to third countries.

Determining the impact of the **separate collection obligation** under Article 11 of the WFD that requires separate collection for textiles from 1 January 2025 is challenging (see details in Annex 7). Currently, separate collection sits at around 39% of textile waste covered by collection systems. By relying on JRC[67] and McKinsey[68] studies, it can be shown that under very optimistic and stylised assumptions, the estimated separate collection rate in the EU would reach between 60-80% by 2035 (according to McKinsey), under more realistic assumptions between 50-55% by 2035 and under more conservative considerations at around 40-44% (according to the JRC). Benchmarking the experience with glass further corroborates that the JRC estimates seem plausible. This means that after 10 years of the binding separate collection obligation unfolding its effect, roughly 50% of the generate post-consumer textile waste that would be covered by separate collection systems is likely to be separately collected. A preliminary JRC estimate for 2030 would suggest post-industrial waste generation of 13.3 Mt yr-1 and separate collection of 3.15 Mt yr-1. This would result in an EU-level average estimate for separate collection of roughly 41-45% in 2030.

Member States are setting up collection systems, but they are not encouraged to accelerate the implementation given that the re-use market growth is likely to be limited and automated recycling is still being developed from a technological perspective. A timely implementation of the separate collection obligation is also likely to be challenging according to the surveys of the Member States implementation progress. An **increased collection capacity would require a CAPEX of €500 million,** equivalent to an annual average of €63 million[69] (see Annex 6 for details).

Figure 2 below shows the mass flow analysis for textiles and textile waste in the EU in 2035 (the underlying assumptions are detailed in Annex 7). The share of separately collected textile waste that is re-used is estimated to fall from 45% in 2019 to 41% in 2035. This will challenge the re-use actors' business model because of limited increase in their revenues from re-use and additional costs of collection, sorting, recycling and disposal of the non-re-useable textiles. The re-use sector is expected to double in five years, but this is driven by resale platforms where consumers sell their 'crème' directly at the detriment

[66] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0709
[67] See JRC, 2021. Circular economy perspectives in the EU Textile sector
[68] McKinsey & Company, 2022. Scaling textile recycling in Europe–turning waste into value
[69] European Commission, Joint Research Centre. *Techno-scientific assessment of the management options for used and waste textiles*. 2023 (under development).

of professional re-use actors, putting further strain on the municipal, commercial and social enterprises managing separately collected waste[70].

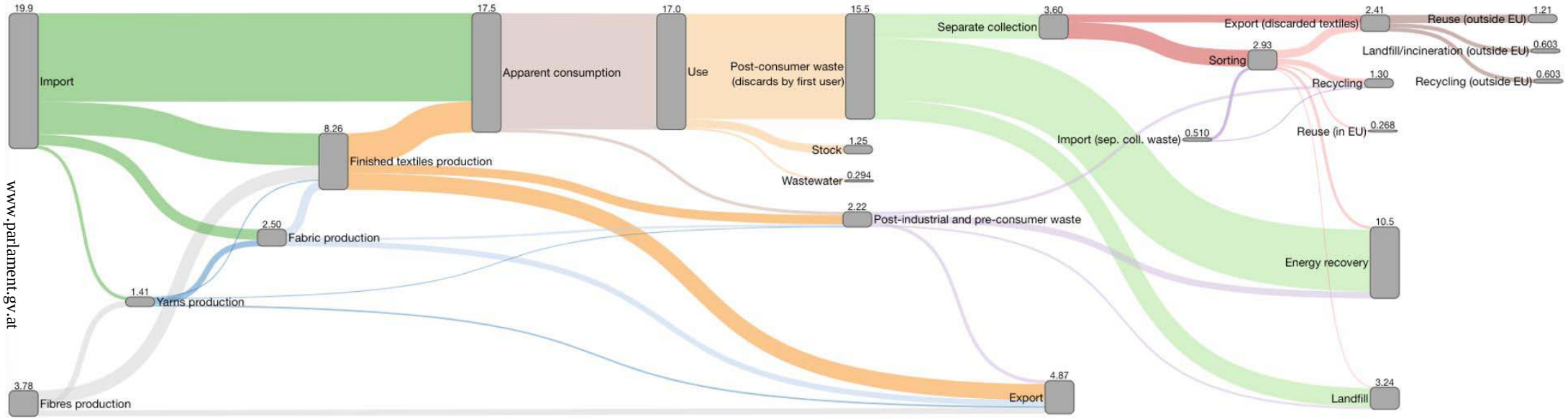
The increasing amount of post-consumer textile waste generated in 2035 (15.5 Mt compared to 11 Mt in 2019) is estimated to result in higher levels of separate collection, reaching 3.6 Mt by 2035. This will lead to equivalent sorting needs. Manual sorting will keep playing an essential role, especially for reuse purposes. Sorting efficiency can be improved thanks to automatic technologies[71] but they are still in development and currently are not widely applied to support subsequent pre-processing and the recycling processes. Significant R&D investments are therefore needed to raise the technology readiness levels for a variety of sorting and recycling technologies to increase the fibre and material diversity that can be treated by them.

As implicitly shown in Figure 2 in 2035, recycling is estimated to reach 53% of separate collection of post-consumer waste (36% within the EU and 17% outside the EU). The recycling share within the EU is thus expected to increase by four percentage points, up from 32% in 2019. Energy recovery from textile waste through incineration will remain the dominant treatment for textile wastes that are not separately collected and those that cannot be re-used or recycled. **The share of post-consumer, and post-industrial and pre-consumer waste that is incinerated for energy recovery is expected to increase from 45% in 2019 to 60% in 2035**, mainly by diverting waste landfilling to incineration. **Landfilling is expected to account for 18%** of post-consumer, and post-industrial and pre-consumer waste.

[70] Ibidem.

[71] European Commission, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, Duhoux, T., Maes, E., Hirschnitz-Garbers, M., et al., *Study on the technical, regulatory, economic and environmental effectiveness of textile fibres recycling: final report,* Publications Office, 2021, https://data.europa.eu/doi/10.2873/828412

Figure 2 - Mass flow analysis for textile generation and waste management in the EU (for the baseline scenario for 2035). The mass flows in each node are expressed in Mt/year[71]



[72] European Commission, Joint Research Centre. *Techno-scientific assessment of the management options for used and waste textiles*. 2023 (under development)

2.3. Why should the EU act?

2.3.1. Legal basis and nature of the legal instrument

Article 192 of the Treaty on the Functioning of the European Union (TFEU)[73] empowers the EU to act in the field of environmental policy to preserve, protect and improve the quality of the environment, and protect human health and contribute to the prudent and rational utilisation of natural resources; and promote measures at the international level to deal with regional or worldwide environmental problems.

The initiative would be realised through a targeted amendment of the Directive 2008/98/EC on waste (WFD) which is the only legal vehicle to regulate textile waste prevention and management in the EU and is based on Article 192(1) TFEU. While there are several legal acts regulating textiles products (e.g. REACH, Textiles Labelling Regulation, ESPR), the WFD is the only legal instrument regulating all aspects of textile waste management, including the specific obligations to ensure separate collection, treatment and reporting requirements.

The targeted amendment of the WFD would build on these existing requirements to remove identified regulatory barriers and address market failures by making those provisions clearer, more specific and harmonised to reduce the scope of potential national divergences and create the conditions for the scaling up re-use and recycling of textiles infrastructure. In addition, the creation of the EPR for textiles obligations would follow the minimum requirements established in EU law and aim for harmonisation. This objective would be further pursued by mandating the Commission to adopt more detailed rules through implementing acts, such as on sorting and reporting requirements, calculation rules for the collection target and fee modulation. Clear application dates for the individual measures would be defined in line with the feasibility of implementing them and the necessary adaptation time needed for the obliged stakeholders.

2.3.2. Subsidiarity: Necessity of EU action

Given the transboundary nature of textiles value chain from an economic, environmental and social perspective (see Section 2.1), **the sale, consumption and end-of-life management of textiles is intrinsically linked to the functioning of the single market and global value chains.** The high dependency on raw materials highlights the importance of boosting circular business models to lower the use of primary raw materials and help mitigate the associated with its negative environmental externalities.

The collection, sorting and recycling systems need to be scaled up to be prepared for the upcoming separate collection obligation and its full implementation since several regulatory and market failures that impact all Member States and actors across the textile value chain currently obstruct sufficient provision of collection, sorting and recycling capacity. **The absence of a common EU approach to textiles management risks creating or further entrenching a regulatory fragmentation and disrupted waste and material flows, thereby hampering cross-border movements of textiles (products, used and waste textiles) and coordinated action and swift investments across the EU**. There are high risks for further increase in the regulatory fragmentation and administrative burdens on the industry stakeholders, mainly SMEs, resulting from diverse application of the polluter pays principle through national extended producer responsibility schemes for

[73] OJ C 326, 26.10.2012, p.47, https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=OJ:C:2012:326:FULL

textiles. Addressing transboundary environmental externalities, including GHG emissions and the export of textiles (and waste disguised as non-waste) to third countries is more effectively addressed by EU action, in particular, as the key problem drivers relate to regulatory failures resulting from lack of harmonised definitions and regulatory fragmentation and a funding gap common to all Member States.

The WFD regulatory approach of harmonising certain elements of waste management (definitions, quantitative or qualitative objectives operationalising the waste hierarchy, polluter pays principle, reporting requirements) and leaving room for national and local-specific implementing measures (waste management planning and permitting of waste) is consistent with EU level action limited to only the extent strictly necessary.

2.3.3. Subsidiarity: Added value of EU action

An increased harmonisation of the approaches to textile waste management in terms of scope of textiles targeted, clear definitions, minimum shipment and treatment requirements to operationalise the waste hierarchy, organisational features of textile collection systems and burden sharing would provide legal certainty for the needed concerted action by the concerned stakeholders across the textile value chain (Member States, social enterprises, waste managers, producers, other economic players, citizens) to invest in the development of infrastructure across the EU to maximise re-use and recycling. These operators achieve economic efficiencies due to economies of scale and lower compliance costs by only having to adhere to one EU-wide uniform regulatory approach, for which EU level action is required. **A harmonised approach to closing the financing gap through common rules on EPR while reducing other regulatory barriers hampering greater uniformity of textile waste for sorting inputs and outputs and shipments across country borders for sorting, re-use and recycling would considerably reduce economic burdens on the industry and SMEs, maintaining their competitiveness.** The combined improvement of environmental quality can be considered an important co-benefit.

2.4. Objectives: What is to be achieved?

2.4.1. General objective

The overall objective of the WFD revision is **to reduce environmental and climate impacts, increase environment quality and improve public health associated with textiles waste management in line with the waste hierarchy** (see Figure 3).

2.4.2. Specific objectives

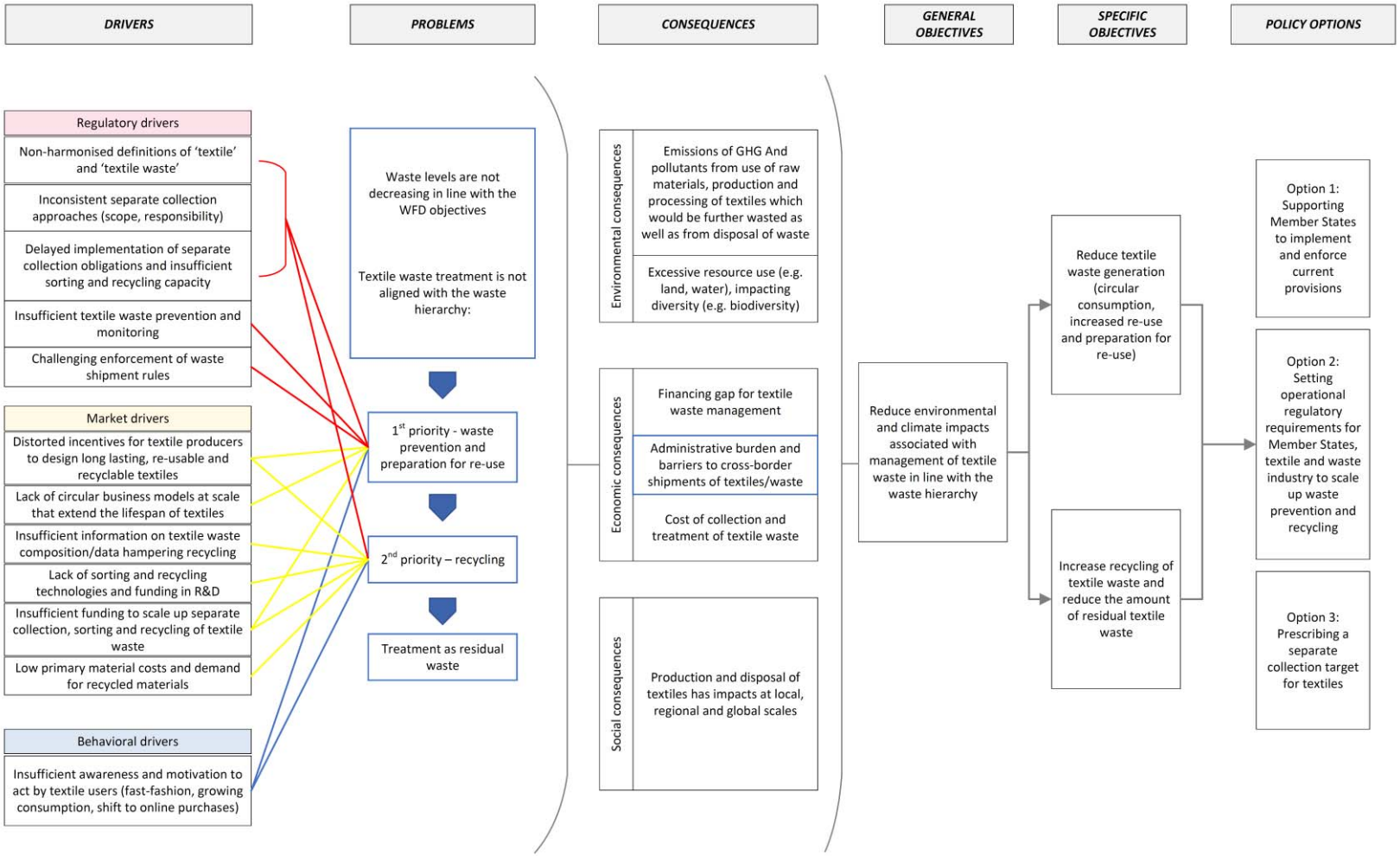
The specific objectives address two distinct problems: **volume of textiles waste is not decreasing in line with the European Green Deal ambitions and textiles waste is not being treated in line with the waste hierarchy**. The first step of the waste hierarchy is about preventing waste generation. Prolonging the useful lifetime of textiles through increased re-use and increased durability of the products brings the highest environmental savings and is therefore a priority. Once textile waste is generated, it should be treated as high up in the waste hierarchy as possible, prioritising re-use, preparation for re-use and recycling, to alleviate the impact of the textiles sector on the environment in terms of reducing primary resources use by encouraging the use of secondary materials.

This is consistent with the Textiles Strategy's objective to "create a greener, more competitive sector that is more resistant to global shocks". Textile products placed on the

market should be durable, re-pairable and recyclable, to a great extent made of recycled fibres, free of hazardous substances, produced in respect of social rights and limit environment harm to the extent possible.

Figure 3 - Problem tree and intervention logic for textiles

Problem tree and intervention Logic



2.5. What are the available policy measures and options?

2.5.1. What is the baseline from which options are assessed?

The baseline scenario constitutes the benchmark against which other options will be compared. It includes all relevant EU and national policies in force and all relevant Commission legislative proposals even if not yet adopted by co-legislators as well as specific policy options set by the EU Circular Economy Action Plan and, more generally, by the European Green Deal. The baseline considers the following aspects as summarised in Sections 1.1 and 1.2, which are further detailed in Annexes 5 and 6:

- the expected and relevant socio-economic developments
- the implementation of the '2018 waste package', including the separate collection obligation as of 1 January 2025
- efforts at Member State level to prevent textile waste
- relevant Commission proposals impacting the textile value chain

The baseline assumes that no further legislative action will be taken to target the textile value chain. The baseline is described in Section 2.2.3. The forward-looking trends for textiles waste up to 2035 are predicted in terms of waste generation, collection, sorting, and treatment flows (see Figure 2).

2.5.2. Description of the policy options and measures

There are three policy options in addition to the baseline, addressing the specific problem drivers set out above. These were discussed in several targeted stakeholder consultations and an expert group meeting with Member States. **Each option addresses all the problem drivers and objectives to reduce waste generation and ensure treatment of textile waste in line with the waste hierarchy**. The summary below provides an overview of the considered options and measures, and their main characteristics, including a specification of the drivers that each measure aims to address (see Annex 10 for details).

Baseline – Implementation of the current provisions

The baseline or reference scenario takes into account the ongoing implementation of the current legislation as well as a realistic expectation of impacts of policy instruments currently subject to ordinary legislative procedure and relevant to the textile value chain (see Annex 7 for details).

Option 1 – Supports Member States in implementing and enforcing current provisions through more harmonised application of definitions, approaches to separate collection and attribution of responsibility for waste management by adopting non-binding guidance, recommendations and exercise of existing Commission mandates for secondary legislation, improving current stakeholder platforms for guidance and exchange of best practices. This option addresses all problem drivers and both specific objectives albeit with a likely reduced impact due to the nature of the measures being limited to non-binding instruments. Option 1 entails the following measures:

1.1 Clarifying definitions in relation to textiles and textile waste through a non-binding Commission guidance document:

- Defining textiles**:** Clarification of the scope of separate collection obligation by reference to CN codes from the Combined Nomenclature Regulation targeted at customs codes.

- Defining textile waste**:** All separately collected textiles are waste until they undergo a sorting for re-use and/or other processing for recycling.

1.2 **Adopting an implementing act under Article 9(7) of the WFD laying down EU-wide waste prevention indicators:** Set measurable textile waste prevention indicators for more consistent use by Member States to guide waste prevention measure setting and monitor the performance and effectiveness of national waste prevention programmes and measures on textiles.

1.3 **Providing guidance and support to Member States on textile waste management:** Issuing Commission non-binding guidance on best practices in textile waste management addressing identified problems due to non-harmonised application of definitions, reporting rules; issue a Commission Recommendation inviting Member States to apply EPR for textiles to ensure funding for the management of textile waste and its infrastructure and define its key features (as proposed in measure 2.9) to facilitate harmonised application and reduce regulatory fragmentation, administrative burden on the industry; provide sustainable product design signals to the producers; and further develop existing platforms for exchange of practices, policies and projects on circular textile value chain.

Option 2 – Sets additional binding regulatory requirements to improve the waste management performance in line with the waste hierarchy through a targeted amendment of the WFD. The purpose of the amendments is to create new operational obligations on Member States, producers of textiles and waste management operators. They would clarify and harmonise definitions at EU level, clarify the scope of the existing reporting obligations to improve the robustness of data, clarify the scope of the separate collection obligations, and introduce new operational obligations for waste operators to ensure sorting for re-use and recycling. The flagship measure of this option is introducing a mandate for Member States to set up national EPR schemes for textiles and harmonise its scope, objectives and key organisational and operational features. This option addresses all problem drivers and both specific objectives. Option 2 entails the following measures:

2.5 **Setting sorting obligations for separately collected textiles:** Ensure that all separately collected textiles are subject to a sorting operation with the objective of identifying fractions suitable for re-use and preparation for re-use, as a priority, as well as fractions suitable for recycling. This measure also clarifies that separately collected used textiles are considered waste until a sorting operation is completed (this entails Measure 1.1. in a legally binding form).

2.6 **Adopting end-of-waste criteria:** This measure comprises the adoption by the Commission of an implementing act setting harmonised EU end-of-waste criteria that determine the recovery operation input material requirements, recovery operation requirements and output quality criteria for re-useable textiles and secondary raw materials from recycled textile waste. The criteria, once adopted, are binding to Member States and the economic operators and form the basis for developing an EU secondary raw material market for recycled textiles and high-quality harmonised sorting outputs of re-useable textiles for global and EU re-use markets. This measure builds on the obligation for a sorting stage to follow separate collection set out in Measure 2.5. The mandate for the Commission to adopt this measure is already established in Article 6(2) of the WFD.

2.8 **Setting requirements for shipments of textiles for re-use:** This measure sets minimum requirements for distinguishing shipments of re-useable textiles from

shipments of waste textiles. It facilitates the enforcement of the EU waste shipment rules and complements the Waste Shipments Regulation which does not regulate shipments of non-waste.

2.9 **Mandating the use of national EPR schemes for textiles:** This measure implements the polluter pays principle by transferring the obligation to secure the necessary funding for and the management of used and waste textiles according to the waste hierarchy from competent authorities to producers. It would assign the responsibility for the financing and or also operational management of used and waste textiles to the producers of textiles and their representatives, i.e. producer responsibility organisations which would carry out or procure the fulfilment of the specific waste management activities based on the fees collected from producers based on the amount of textiles each producer places on the market.

The measure would require Member States to establish an EPR scheme for textiles by mandating producers of textiles, i.e. those who place textile products for the first time on the market of the Member States, to finance and or organise specific textile waste management operations. The measure would harmonise all the key features of the EPR scheme, namely, the scope, objectives and organisational and operational features of the EPR scheme setting obligations on the competent authorities, producers and economic operators engaged in waste management. This is attained by introducing legally binding requirements in the WFD for Member States and economic operators. Detailed description of all the EPR features to be regulated is provided in Annex 10 and follows the general minimum requirements for all EPR schemes as set out in Article 8a of the WFD.

More specifically, the WFD would set a common scope for the EPR (which textiles and therefore producers are covered), objectives of the EPR (prioritisation of prevention and recycling and the obligation to meet the quantitative objective set out in Measure 3.6), operational obligations of the producers (which waste management and other activities they need to finance, including separate collection and the minimum requirements for the separate collection network, sorting for re-use and recycling, recycling and disposal), organisational features of the EPR scheme to run the EPR scheme and facilitate monitoring of its performance and enforcement (mandate to use producer responsibility organisations for the collective implementation of EPR obligations, harmonise EPR fee modulation criteria and align it with the detailed sustainability criteria for textiles to be set out in the framework of the ESPR and reporting frequency). The measure also requires Member States to establish a producer register for the purposes of ensuring enforcement and monitoring of EPR obligations (it will register all producers placing products on the Member State markets and subject to the EPR) with the WFD setting out harmonised requirements on the information to be submitted to the register.

As is the case for other EU mandated EPR schemes (e.g. legislation on electric and electronic equipment, packaging and batteries), the WFD will envisage a mandate to the Commission to adopt implementing acts to further harmonise fee modulation criteria to reinforce harmonised sustainable product design signals to the producers and reduce regulatory fragmentation and administrative burden on the industry.

2.14 **Improving reporting obligations for textiles:** This measure clarifies the scope of existing requirements on textile waste that the Member States have to report to the Commission under the WFD to improve the knowledge base at EU level on textile

and textile waste data flows and enable proper monitoring of the economic and environmental impacts of textiles. It introduces additional reporting requirements (currently indicated as voluntary under the WFD) that are strictly required for the enforcement of measures 2.9 and 3.6 and future proofing of the data flows in view of possible future performance target setting, where assessed as feasible and necessary. The realisation of this measure would also entail the adoption of an implementing act to revise the existing Commission Implementing Decision (EU) 2019/1004 setting out the reporting format on the reporting of municipal textile waste.

Option 3 – Prescribing waste management performance targets at EU level. This option entails an amendment to the WFD establishing binding waste management performance targets operationalising the waste hierarchy for the Member States and economic operators. Harmonisation of scopes and definitions would be integral to the definition of the target in the WFD and subsequent implementing acts defining more detailed rules on the calculation methodology for each of the target. This option addresses both specific objectives and all problem drivers, albeit it would not bring about a level of harmonisation as provided by Option 2 since it leaves the decisions on the means to attain the performance levels to the Member States.

Since the current data on textile waste generation is not sufficiently robust, which is partly due to the fragmented understanding of whether collected textiles are waste and the scope of the textiles covered by Member State implementation, Annex 11 explains the feasibility of the mechanism by which targets could be set in the future and the impacts of that process (and not the actual levels of targets). In relation to setting a target for collection (Measure 3.6.), a more detailed assessment based on an interim medium-ambition target is presented. Option 3 entails the following measures:

3.1 **Setting an EU textile waste reduction target:** The attainment of the target would reduce the amount of textile waste generated, facilitate coherence in measures and policies between the different Member States and to harmonise industry effort towards reaching the target.

3.4 **Setting a preparation for reuse target for textiles:** The attainment of the target would improve the reuse of textiles for Member States and reduce the generation of waste. This covers operations like checking, cleaning, or repairing, recovery operations, by which textile products that have become waste are prepared so that they can be reused without any other pre-processing.

3.5 **Setting a re-use target for textiles:** The attainment of the target would increase the amount of textiles re-used therefore reducing waste generation. It would mobilise competent authorities and economic operators activities, including planning and investment in sorting infrastructure.

3.6 **Setting a 50% collection target for textiles:** The attainment of the target might improve separate collection rate for textiles thereby increasing re-use rates, recycling rates and decreasing disposal rates.

3.7 **Setting a target for textiles found in residual waste:** The attainment of the target would improve separate collection system for textiles if the Member States found excessive textiles contained in the mixed household waste.

3.8 **Setting a recycling target for textiles:** The attainment of the target would improve the recycling capacity of Member States by setting a realistic recycling target that takes into account likely changes in recycling capacity and technologies. It would

mobilise competent authorities and economic operators activities, including planning and investment in sorting and recycling infrastructure.

2.5.3. Discarded measures

Other measures considered were discarded mainly because they are not proportional or coherent with other EU policies. More specifically, some of the measures, such as labelling requirements for textiles or taxation related economic instruments were considered incoherent with other EU policies which specifically regulate the matters. Other measures such as the establishment of minimum requirements on separate collection for textile reuse were identified as disproportionally limiting the scope for national decision-making.

2.6. What are the impacts of the considered policy measures and options?

Table 2 depicts the impacts of the considered measures that are included in each option. For each measure, the description of the impacts is provided as well as the overall balance/direction of impact is indicated as +, - and +/- to indicate these impacts (see Annex 11 for details)[74]. This initiative has been flagged as 'relevant for SMEs' in the SME Filter and the ISSG agreed with this assessment.

The impacts on competitiveness have been assessed quantitatively, where possible, considering impacts on different types of competitiveness[75]. Price competitiveness aims to reflect the relative impacts of prices companies or company groups are able to set within a market. Dynamic competitiveness refers to the impacts on research and innovation that would enable to maintain or improve the firms' competitiveness stance over time. Strategic competitiveness refers to the firms' ability to partially meet their raw material or product demand through re-used or recycled textiles within the EU. As shown in Table 2, the impacts on competitiveness are either positive or neutral.

2.7. How do the options compare?

Table 3 sets out the overall assessment of each option and then draws conclusion in terms of how the policy options compare based on the likely impacts of the measures they contained. This comparison is based on how the options contribute to the two main objectives, on the balance between economic, environmental and social impacts, and on the total costs and benefits where these could be calculated.

Option 1 measures would effectively contribute to both intended objectives and the economic, social and environmental impacts would generally be positive. However, all measures under Option 1 except for clarifying definitions (measure 1.1) are likely to address the objectives to a limited extent. Option 1 is also coherent with existing and planned EU policy initiatives. The costs of measures under Option 1 are generally limited to administrative costs for public authorities.

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[74] Please note that a + for the 'costs' column indicates a reduction in costs, while a – for the 'costs' column indicates a increase in costs.

[75] For an overview of the channels through which the circular economy impacts competitiveness, please see Flachenecker, F. (2018) The causal impact of material productivity on macroeconomic competitiveness in the EU. *Environmental Economics and Policy Studies* 20, 17–46. https://doi.org/10.1007/s10018-016-0180-3 and Flachenecker, F., Kornejew, M. (2019) The causal impact of material productivity on microeconomic competitiveness and environmental performance in the EU. *Environmental Economics and Policy Studies* 21, 87–122. https://doi.org/10.1007/s10018-018-0223-z

Option 2 measures would be more effective that Option 1 measures in achieving both intended objectives. Option 2 measures carry higher economic costs than Option 1, while they generate far higher economic, social and environmental benefits. Option 2 is coherent with existing and planned EU policy initiatives, while measure 2.9 specifically ensures coherence with the EU Strategy for Sustainable and Circular Textiles that calls for the introduction of harmonised measures for EPR for textiles.

The effectiveness of Option 3 measures would depend on their implementation and enforcement across Member States. The flexibility for Member States to decide which measures to implement in order to achieve the target would ensure cost-efficiency. Option 3 would be consistent with existing waste targets across the EU environmental legislation.

Table 2 – Impacts of considered policy measures

Policy option and measure	Costs	Benefits	Competitiveness impacts	Net impacts
Option 1 - Supporting Member States to implement and enforce current WFD provisions				
Measure 1.1 – Clarifying definitions in relation to textiles and textile waste	+	+	Price: +/- depending on current performance Dynamic: +/- depending on R&I being targeted Strategic: + higher re-use/recycling	Net positive
Measure 1.2 - Adopting EU wide waste prevention indicators for textiles	+	+	Price: NA Dynamic: + incentivise R&I in re-use/recycling Strategic: + higher re-use/recycling	Net positive but limited
Measure 1.3 – Providing Member States with guidance and support in dialogue on the management of textile waste between actors involved	+	+	Price: +/- depending on current performance Dynamic: + sharing best practice Strategic: + higher re-use/recycling	Net positive but limited
Option 2 – Proposing additional measures to align waste management to the waste hierarchy				
Measure 2.5 – Setting sorting obligations for separately collected textiles/textiles waste	-	+	Price: +/- depending on current performance Dynamic: + incentivise R&I in re-use/recycling Strategic: + higher re-use/recycling	Net positive
Measure 2.6 – Adopting end of waste criteria	-	+	Price: NA Dynamic: + incentivise R&I in re-use/recycling Strategic: + higher re-use/recycling	Net positive
Measure 2.8 – Setting requirements for the shipments of textiles	-	+	Price: +/- depending on current performance Dynamic: NA Strategic: NA	Net positive
Measure 2.9 – Mandating the use of EPR	+/-	+	Price: +/- depending on current performance Dynamic: + incentivise R&I in re-use/recycling Strategic: + higher re-use/recycling	Net positive
Measure 2.14 – Setting reporting obligations for textiles	-	+	Price: NA Dynamic: NA Strategic: NA	Net positive
Option 3 – Prescribing targets and restrictions				
Measure 3.1 – Setting an EU textile reduction target	+/-	+	Price: +/- depending on implementation Dynamic: + incentivise R&I in re-use/recycling Strategic: + higher re-use/recycling	Likely net positive
Measure 3.4 – Setting a preparation for reuse target for textiles	+/-	+	Price: +/- depending on implementation	Likely net positive

			Dynamic: + incentivise R&I in re-use/recycling Strategic: + higher re-use/recycling	
Measure 3.5 - Setting a reuse target for textiles	+/-	+	Price: +/- depending on implementation Dynamic: + incentivise R&I in re-use/recycling Strategic: + higher re-use/recycling	Likely net positive
Measure 3.6 - Setting a separate collection target for textiles waste	+/-	+	Price: +/- depending on implementation Dynamic: + incentivise R&I in re-use/recycling Strategic: + higher re-use/recycling	Likely net positive
Measure 3.8 – Setting a recycling target for textiles	+/-	+	Price: +/- depending on implementation Dynamic: + incentivise R&I in re-use/recycling Strategic: + higher re-use/recycling	Likely net positive

Table 3 – Comparison of options

Policy option and measure	Description of impact	Overall balance with best alternative
Option 1 – Supporting MS in implementing and enforcing current provisions	**Economic costs** (for public authorities)**:** €135 000 per guidance developed + EC staff. Measure 1.1 sub-option 1 alternative 2 adds collection costs of €660 million per year **Economic benefits** (for public authorities)**:** Reduced administrative burden of €250 000 per year for measure 1.1, measure 1.1 sub-option 2 alternative 2 offers an administrative cost reduction of €200 per year as waste permits are no longer needed **Environmental benefits** (for waste management enterprises)**:** Reducing waste as a result of improved data on and support for waste prevention, as well as greater reuse and recycling lead to reduced environmental externalities **Social benefits** (for waste management enterprises)**:** Potential increases in employment in the reuse and recycling sector as a result of the measures foreseen	**Costs**: €135 000 per guidance + EC staff **Benefits**: €250 000 per year **Overall effectiveness, efficiency and coherence**: positive but limited except for measure 1.1
Option 2 - Additional regulatory requirements (assessed for considered measures)	**Economic costs** (for producers and consumers): €913 million per year for sorting obligations, €7.79 million per year for producers to report for the purpose of EPR, €750 000 per year for EU enterprises to comply with EU reporting obligations **Economic costs** (for public authorities): register development costs of €2-12.3 million across Member States and maintenance costs of €11 200 and 69 000 per Member State per year, €4.04 million costs of operating PRO registers and inspections, €208 per competent authority and €78 per exporter annualised per inspection, €26.5 million landfill tax loss for Member States due to textiles diverted from landfills **Economic benefits** (for producers, consumers and waste management enterprises): EPR of €3.5-4.5 billion annual overall returns on recycling investment (including the benefits of other measures of Option 2) **Economic benefits** (for waste management enterprises): €534 million per year of re-use value and €117 million per year of recycling value from additional sorting **Environmental benefits**: €16 million from GHG emission reduction (assuming a social cost of carbon of €100 per tCO_2e) as well as reduction in release of pollutants to air, water and land that would otherwise result from inadequate waste management **Social benefits** (for consumers and waste management enterprises): 8 740 jobs created and social impacts of EU waste in third countries mitigated (no net impact assessment; see Annex 4 for details and underlying assumptions)	**Costs**: €963 million per year **Benefits**: €651 million per year of re-usable and recyclable materials, and €3.5-4.5 billion annual overall returns from EPR investments, environmental benefits (including €16 million or 160 000 tCO2e in GHG savings), and 8 740 jobs created **Overall effectiveness, efficiency and coherence**: positive and higher compared to Option 1 and Option 3, depending on the effectiveness of target implementation

Option 3 – Targets (assessed for considered measures)	**Economic costs** (for public authorities and waste management enterprises): €39.2 million per year for additional textile collection, sorting and treatment to meet a 50% collection target. Lack of robust data makes target setting for textile waste management premature for most targets **Economic benefits** (for producers and waste management enterprises): €28 million per year of combined reuse and recycling. **Environmental benefits**: Additional GHG emission reduction	**Costs**: €39 million per year (covered by the EPR measure 2.9) **Benefits**: €28 million per year of reusable and recyclable textiles for the EU re-use and recycling market, and additional GHG emission reduction **Overall effectiveness, efficiency and coherence**: effectiveness depends on targets being met, ensures flexibility for Member States to find cost efficient instruments to achieve target, coherence with existing waste targets

2.8. Preferred option

2.8.1. Preferred option for textiles

Based on Table 2 and the assessments of how the options contribute to the two main objectives, on the balance between economic, environmental and social impacts, and on the total costs and benefits where these could be calculated, the preferred option is Option 2. However, the setting of a textiles waste collection target (measure 3.6) might be additionally considered to potentially complement the measures in Option 2. Measure 3.6 could therefore also be considered part of the preferred option, but it has administrative implications, the detailed analysis indicates data challenges in setting a target and the established 2025 separate collection obligation is likely to have a similar effect. Other textile waste management targets cannot be set at this stage due to the lack of complete and robust data. The expected impacts of the preferred option (option 2 and possibly measure 3.6) are described below.

- The EPR would claim fees from producers/importers putting textiles on the EU market (but the fees might partially be passed on consumers). The EPR fees are expected to account for approximately 0.6% of the total cost of the product (or roughly €0.12 per t-shirt, under conservative assumptions). At the same time, it would ensure a better recovery of the value of generated waste in terms of re-use and recycling, including support to the development of closed loop recycling in the EU (measures 2.5, 2.6, 2.8, 2.9 and 3.6). The recovery of value is estimated to recover 58% of the costs concerned (measure 2.5).
- Environmental externalities are expected to decrease with greater re-use and recycling in the EU (measures 2.5, 2.6, 2.9 and 3.6), and in particular in third countries (measures 2.5, 2.6 and 2.8). This includes savings of €16 million through reduced GHG emission.
- The social impacts of inadequate textile waste management in the EU (measures 2.5, 2.6, 2.8, 2.9 and 3.6) and in third countries (measures 2.5, 2.6 and 2.8) are expected to be mitigated. 8 740 jobs would be created in the waste management sector, including textile recycling (measures 2.5, 2.6, 2.9 and 3.6), and provide support to social enterprises in managing used textiles (measure 2.9).
- The textiles sector is dominated by SMEs. Microenterprises cover around 88% of the sector. The preferred option is specifically tailored to minimise the financial and administrative impacts on microenterprises, most notably by excluding all microenterprises from the EPR. All remaining SMEs (i.e. SMEs that are not microenterprises) would still be covered by the EPR. At the same time, the support to re-use and recycling would support also those SMEs covered by the EPR (i.e. those that are not microenterprises) compared to the status quo by ensuring more funding is available, and a more stable feedstock of re-usable and recyclable textiles are available in the market.
- Greater clarity in relation to the scope of textiles subject to the provisions of the WFD (measure 1.1 taken up in legally binding form in the measures in option 2) as well as broader and better information on the flows of those textiles and on the results of efforts by Member States to address used textiles and textile wastes (measure 2.14) would reduce administrative costs, facilitate investments in strategic national and regional hubs for textiles, and limit additional burdens only to where they are most relevant (measures 2.9 and 2.14).

2.8.2. REFIT (simplification and improved efficiency)

The initiative aims to address the regulatory barriers identified by stakeholders, namely, the non-harmonised application of definition of textile waste, the scope of application of separate collection obligations and the linked diversity in the obligations to the industry that hamper the scaling up of the reuse and recycling sector. The measures and options considered aim to harmonise the application of the definition of waste and thus facilitate the re-use of textiles within the EU single market as well as at global re-use markets through providing greater legal certainty to the economic operators on the non-waste status of their shipments and to the competent authorities for the purposes of enforcement.

A harmonised approach to sorting obligations and the application of the EPR aim to reduce greatly the compliance costs of operators operating across several Member States, in view of several Member States planning the introduction of such schemes and engaging in export therefore also offering efficiency gains through economies of scale. It is also proposed to harmonise certain organisational features for the EPR schemes to improve the efficiencies in the operation of the schemes, compliance costs of the producers as well as facilitating enforcement processes, including through mandating membership to a producer responsibility organisation, harmonising reporting frequency and fee modulation requirements which are to be fully aligned with the harmonised product requirement measurement methodologies developed under ESPR.

2.8.3. Application of the one in one out approach

The administrative costs linked to the implementation, reporting and monitoring under the preferred option mainly Member States and are as follows[76]:

- EPR register development costs of €2-12.3 million across Member States and maintenance costs of €11 200 and 69 000 per Member State per year
- €4.04 million costs of operating PRO registers and inspections
- €208 per competent authority and €78 per exporter annualised per inspection

The preferred option would address the drivers linked to administrative costs for the enforcement authorities, and operators active in the shipment and treatment of textiles. Non-harmonised application of textile waste and non-waste status hamper activities leading to waste reduction as well as economies of scale required to scale-up the EU recycling sector. The preferred option also aims to reduce the administrative costs incurred by producers, consumers and waste management operators by increasing the environmental regulatory approaches, pre-empting the setting up of diverse EPR schemes or less efficient approaches. Therefore, overall positive net benefits can be expected.

2.9. How will actual impacts of the preferred option be monitored and evaluated?

Annex 14 details monitoring and evaluation tools for this initiative. The impact of the preferred policy option in the attainment of the objectives to reduce textile waste and residual textile waste generation would be monitored through the indicators and targets set out in measure 3.6. and based on the improved data flows on textiles as a result of measure

[76] Acknowledging that not all costs could be quantified, including those textiles that are currently not separately collected due to a lack of data available, the cost of licensing textile waste collectors given the large heterogeneity across Member States, the total costs (and benefits) from the application of end-of-waste criteria for textiles since this depends on the scope of the measure.

2.14. The latter would also enable further performance targets to be set that is currently assessed as not feasible under option 3. Monitoring is based on annual data on textiles reported (measure 2.14 and see Annex 10 for details).

Implementation of the national textile waste prevention measures as part of the national waste prevention programmes is subject to periodic reviews by the European Environment Agency (as required by Article 30(2) of the WFD). The Agency publishes a report every two years containing a review of the progress made in the completing and implementing waste prevention programmes, including an assessment of the evolution of the prevention of waste generation for each Member States and for the EU as a whole[77].

[77] See footnote 59, p. 10.

3. FOOD WASTE

3.1. Facts, figures and context

3.1.1. What is food waste and what is the scope of the initiative?

The WFD defines 'food waste' as all food, as defined in the General Food Law[78], that has become waste. This definition, also used in this IA, considers food as a whole and applies across the food supply chain, from production up to and including consumption. Food includes inedible parts, where those are not separated from the edible parts when the food is produced. Further information on the definition and quantification of food waste are in Annex 6.

Considering this definition, it is not technically feasible to completely prevent food waste. First, consumers usually cannot consume or re-use inedible parts of food (e.g., bones) for other purposes. Secondly, certain food (or by-products of food production) must be discarded due to safety concerns. Thirdly, food waste prevention – whilst a key priority in the transition to sustainable food systems – cannot compromise food safety, animal or human health.

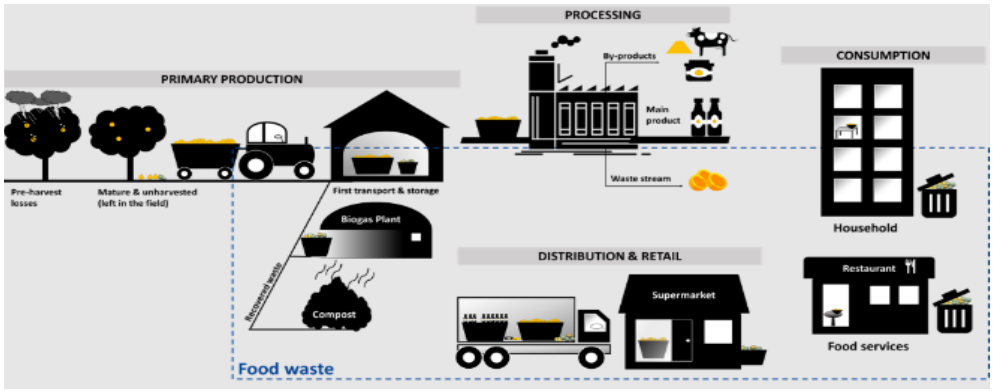
The EU's food waste definition does not include elements which were not food at the time these are discarded or removed from the food supply chain (e.g., losses occurring before harvest or slaughter). Neither does food waste include material which is not waste, such as surplus food that is donated or by-products from food production used for other purposes (e.g., animal feed or cosmetics).

Food waste arises at all stages of the food supply chain: (a) primary production; (b) processing and manufacturing; (c) retail and other distribution of food; (d) restaurants and food services; (e) households. Food waste arising at consumption includes waste generated both in- and out-of-home. Therefore, stages (d) and (e) are jointly addressed as "consumption" stage in this IA. Figure 4 shows the scope of the initiative.

Figure 4 – Boundaries of food waste as defined in the WFD (2018). Adapted from Sanchez Lopez et al. (2020) [79]

[78] Article 2 of Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety, *(OJ L 31, 1.2.2002, p.1)*.

[79] Sanchez Lopez, J., Caldeira, C., De Laurentiis, V., Sala, S., *Brief on food waste in the European Union*, Avraamides, M., European Commission, JRC121196, 2020



This initiative focusses on **preventing the generation of food waste**, in line with the waste hierarchy in order to ensure the highest value use of food. Moreover, far greater environmental and cost savings are gained by avoiding its generation[80]. Unlike other waste streams, food waste cannot be recycled into new food and recycling it into compost and/or biogas ensures only limited recovery of the resources spent on food production. Finally, the collection and treatment of food waste is already well regulated at EU level[81].

3.1.2. Overview of EU action to prevent food waste

Whilst the WFD was first adopted in 1975 and subsequently subject to several reviews - the most recent being in 2018- food waste prevention became a specific political priority at EU level, in 2015, reflecting EU commitments made in the context of the 2030 Sustainable Development Agenda. In this context, the EU and its Member States committed to achieving Sustainable Development Goal (SDG) Target 12.3 to halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses, by 2030.

The EU has implemented a dedicated **action plan** to reduce food loss and waste, including both regulatory and non-regulatory actions, initially as part of the 2015 Circular Economy Action Plan and, since 2020, under the EU's Farm to Fork Strategy. In doing so, the Commission aims not only to lay down clear obligations for Member States as regards reduction of food waste but also to create an enabling policy environment that supports Member States in taking effective action. Since 2015, the Commission has taken initiatives to clarify and harmonise relevant legislation (e.g., amendments to food hygiene rules to facilitate safe food donation practices) as well as to support the development and sharing of best practice and solutions to reduce food waste across the EU as set out below.

The WFD requires Member States to prepare specific **food waste prevention programmes** in line with the **waste hierarchy**. As part of the waste prevention programme, Article 9 of the WFD (as revised in 2018) obliges Member States to take measures to reduce food waste at each stage of the food supply chain and encourage food donation and other redistribution for human consumption, prioritising human use over animal feed and the reprocessing into non-food products. Member States are also called upon to provide incentives for the application of the waste hierarchy, such as facilitation of food donation (Article 4 and Annex IVa). **Guidance on the application of the waste**

[80] Slorach, Peter C., Jeswani Harish K., Cuéllar-Franca, Rosa, Azapagacic, Adisa, *Environmental and economic implications of recovering resources from food waste in a circular economy*, Science of The Total Environment, Volume 693, 25 November 2019, 1333516.
[81] See Annex 5 – Food Waste – section: *Downstream management of food waste*

hierarchy to food waste prevention[82] is already in place and laid down, not only at EU level, but through that of international organisations[83].

The WFD requires Member States to reduce food waste at each stage of the food supply chain, monitor food waste levels and report progress made. The Commission adopted, in 2019, a common food waste measurement methodology[84], to be utilised as a basis for EU-wide food waste monitoring.

Food waste prevention requires an integrated approach, involving multiple players from the public and private sectors. Established in 2016, the EU Platform on Food Losses and Food Waste (FLW) supports all actors in defining measures needed to prevent food waste, sharing best practice and evaluating progress made over time. The Platform has supported the development of EU guidelines to clarify relevant provisions in EU legislation and lift barriers to food donation[85] and the feed use of food[86] no longer intended for human consumption. It has also adopted its own deliverables (e.g., recommendations for action in food waste prevention) and has supported work undertaken at EU level to improve date marking[87] practices. The Commission is currently considering the most efficient ways to facilitate the understanding and use of date marking (i.e., 'best before' and 'use by' dates) aiming to prevent food waste without jeopardising food safety. The revision of marketing standards for fruit and vegetables, for which a Delegated Act is expected to be adopted in Q3 2023, aims to introduce certain derogations which may also contribute to the reduction of food waste.

The Commission is also undertaking work to **strengthen the evidence base** for food waste prevention interventions[88] in order to guide effective action, including those addressing the **hotspot of food waste generation at consumption**[89]. In collaboration with the European Health and Digital Executive Agency (HaDEA), the Commission provides **grants to support Member States and stakeholders**[90] in improving food waste measurement and implementation of actions to reduce food waste.

The Commission has supported **research and innovation** to address food waste prevention, including development of **blueprints for the establishment of national public-private partnerships** (e.g. Voluntary Agreements) to reduce food waste across the

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[82] Guidelines on the preparation of food waste prevention programmes (2008), Bio-waste prevention guidelines (2011); *Brief on food waste in the European Union* (see footnote 79, page 32); EU Platform on Food Losses and Food Waste, *Recommendations for action in food waste prevention* (2019)

[83] FAO, *Voluntary Code of Conduct for Food Loss and Waste Reduction* (2022). The Code presents the actions and measures that countries, national and sub-national authorities, food supply chain actors, the private sector, producer organizations, civil society organizations, academic and research institutions, and other relevant stakeholders should take or put in place in order to contribute to FLW reduction. It also presents guiding principles that should be followed in implementing these actions and measures.

[84] OJ L 248, 27.9.2019, p.77-85

[85] OJ C 361, 25.10.2017, p. 1–29

[86] OJ C 133, 16.4.2018, p. 2–18

[87] https://ec.europa.eu/food/safety/food_waste/eu_actions/date_marking_en

[88] European Commission, Joint Research Centre, Caldeira, C., Sala, S., De Laurentiis, V., *Assessment of food waste prevention actions. Development of an evaluation framework to assess the performance of food waste prevention actions,* Publications Office, 2019, https://data.europa.eu/doi/10.2760/9773

[89] The EU pilot project, European Consumer Food Waste Forum, will deliver a compendium of best practice in consumer food waste prevention by July 2023.

[90] Example: HaDEA 2022 call for proposals to help stakeholders take action on fighting food waste

food supply chain.[91] Calls for proposals under the EU Research and Innovation Framework Programme Horizon2020[92] and Horizon Europe[93] are offering new opportunities for research and innovation to address food loss and waste.

In order to support ongoing **sharing of resources, latest developments and good practices**, the Commission has established a **digital platform**, the EU Food Loss and Waste Prevention Hub, to provide a "one-stop-shop" for all stakeholders active in the area of food waste prevention. The RESTwithEU pilot project[94] showcases best practice digital tools to mitigate food waste in the restaurant industry.

3.1.3. Amounts of food waste at EU level

In Q3 2022, Eurostat published the first results of the EU-wide monitoring of food waste levels, measured according to a common methodology[95]. In 2020, total food waste reached nearly 59 Mt (131 kg per person per year). Roughly 10% of food supplied to retail, food services and households is estimated to be wasted.[96] Over half of food waste (53%) is generated by households (more than 31 Mt). The second biggest share (20%) is the processing and manufacturing sector (around 10 Mt). The remaining shares – representing altogether a quarter of the total food waste – originate from the primary production sector (11%; 6 Mt), restaurants and food services (9%; more than 5 Mt) and retail and other distribution of food sectors (7%; more than 4 Mt).

Figure 5 - Estimated food waste generation in the EU in 2020, Eurostat[97]

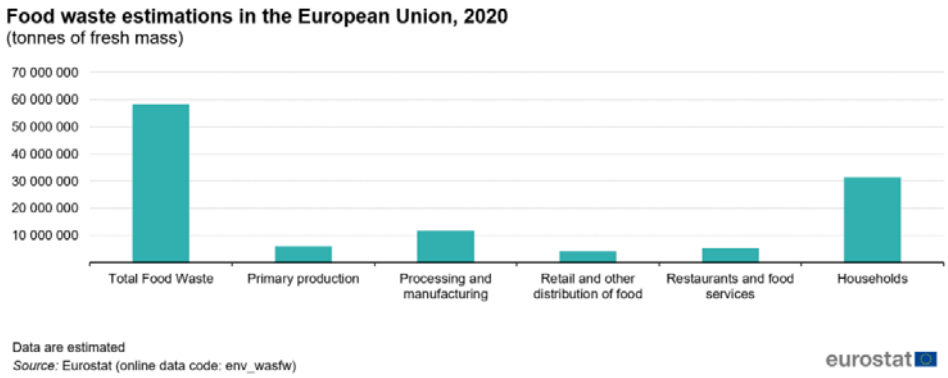
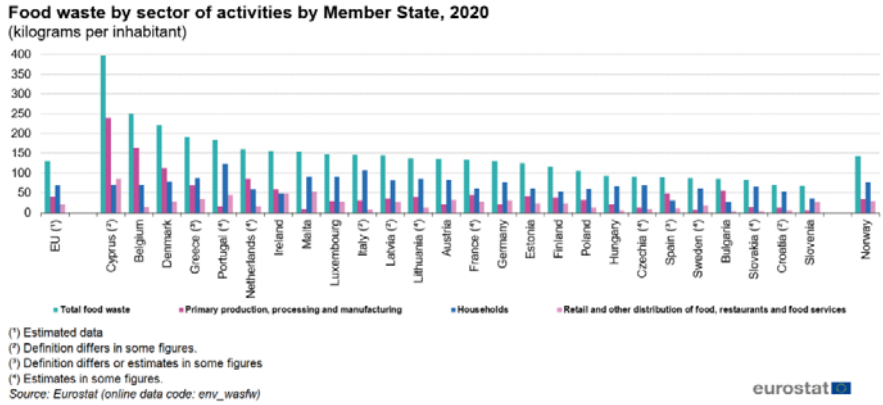


Figure 6 - Food waste by sector of activities by Member State, 2020, Eurostat [98]

[91] REFRESH, WRAP GLOBAL, *Building partnerships, driving change. A voluntary approach to cutting food waste*, 2019
[92] See projects CHORIZO and ToNoWaste
[93] See projects FOLOU and WASTELESS
[94] https://restwith.eu/
[95] See note 84, page 34
[96] Eurostat, *Food waste and food waste prevention estimates*, March 2023. Note that earlier estimations (October 2022) were 57 Mt, i.e., 127 kg/capita.
[97] See note 96
[98] Eurostat, *Food waste and food waste prevention by NACE Rev. 2 activity - tonnes of fresh mass*, March 2023 – the data for Romania are not yet available.



There is significant variation in the levels of food waste per capita. Figure 5 provides an overview of food waste levels by Member State (expressed as kg/inhabitant), presented in aggregated form: primary production and processing and manufacturing; households, retail and other distribution of food and restaurants and food services.

Several factors explain the differences in food waste amounts reported by Member States. These include, amongst others: the size of the manufacturing base; whether the country is a net food exporter or importer[99]; share of disposable income allocated to food; population flux (e.g., due to tourism, migration); cultural differences and food habits. In addition, as 2022 was the first reporting year, some differences may decrease as Member States gain experience in food waste monitoring over time.

General waste statistics, such as data on municipal waste (which include a large fraction of food waste) do not show any reduction between 2012 and 2020. Similarly, Eurostat estimates of food waste amounts, showed that the amounts had remained stable between 2012 and 2018 (i.e., between 66 and 69 Mt)[100]. Finally, the first results of the EU-wide monitoring of food waste, while not directly comparable to previous estimates[101], show slightly lower levels of food waste generation which however remain insufficient in the light of the ambition of halving food waste by 2030, as called for by SDG Target 12.3. More details can be found in Annex 6.

3.2. Problem Definition

3.2.1. What are the problems?

Despite the growing awareness of the negative impacts and consequences of food waste, political commitments made at EU and Member State levels and EU measures implemented since the 2015 CEAP, **food waste generation is not decreasing as required** to make significant progress towards SDG Target 12.3. In the EU, despite the existing legal obligations in the WFD and the supporting activities of the Commission described in section 3.1.2, **action taken to date in Member States is disparate and has not allowed a significant reduction of food waste levels**, as demonstrated by the relative stability of municipal waste levels since 2012 and Eurostat estimations. More specifically, the full potential for reducing food waste is not realised as **underlying behavioural and market**

[99] Food waste arising in processing and manufacturing is quantified where it originates i.e. exporting country.
[100] Eurostat, *Monitoring framework - Circular economy indicators*. Estimates are based on the relevant Waste Statistics categories that are expected to included food waste.
[101] FUSIONS EU Project, *Estimates of European food waste levels*, 2016

drivers of food waste generation are not adequately addressed in national strategies and roadmaps.

Key environmental, economic and social consequences

Food waste is one of the largest sources of inefficiency in the agri-food chain. In particular, it results in negative environmental and climate impacts, as reaffirmed in the biodiversity agreement under COP15 (Target 16), which hinder achieving ambitions laid down in the EGD.

Food has embedded **environmental consequences**[102] because of the energy, natural resources use and associated emissions generated throughout its life cycle. Food consumption is the main contributor to the environmental impacts[103] and biodiversity footprint[104] of EU consumption.

When food is discarded, all the **embedded** energy and resources and their environmental **consequences**, such as GHG emissions – that accumulate along the food chain – still materialise with no benefit for human nutrition. Food processed, transported and cooked that is then wasted at consumption – has a higher environmental impact than unprocessed food products lost at the farm. The 58.5 Mt of food waste generated in the EU in 2020[105] caused emissions of 252 Mt of CO_2 equivalents[106,107]. This corresponds to 16% of the total GHG impact resulting from the EU food system, calculated with a consumption-based approach[108]. Food waste also puts **unnecessary pressure** on limited natural resources. For example, the amount of water consumed to produce food that is ultimately wasted can be quantified as 342 bn m^3 water eq.[109], corresponding to 12% of the total impact of EU food production and consumption. Food waste is also responsible for 16% of impacts on soil as caused by land use activities[110], while the consequences on marine eutrophication are 15% of the total.[111,112]

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[102] Over 90% of respondents to the public consultation agreed or strongly agreed that reducing food waste will help reduce environmental impacts and mitigate climate change (Annex 2 – public consultation).
[103] Sanye Mengual, E. and Sala, S., 2023 Consumption Footprint and Domestic Footprint: Assessing the environmental impacts of EU consumption and production.
[104] Sanyé-Mengual, E., Biganzoli, F., Valente, A., Pfister, S., & Sala, S. (2023). What are the main environmental impacts and products contributing to the biodiversity footprint of EU consumption? A comparison of life cycle impact assessment methods and models.

[105] https://ec.europa.eu/eurostat/databrowser/view/env_wasfw/default/table?lang=en
[106] Calculated using the Consumption Footprint methodology, as presented in: European Commission, Joint Research Centre, Sanyé Mengual, E., Sala, S., *Consumption footprint and domestic footprint: assessing the environmental impacts of EU consumption and production: life cycle assessment to support the European Green Deal*, Publications Office of the European Union, 2023, https://data.europa.eu/doi/10.2760/218540.
[107] Sala, S., De Laurentiis, V., and Sanye Mengual, E., EU Food consumption and waste: environmental impacts from a supply chain perspective, European Commission, 2023, JRC129245.
[108] The methodology used for this estimation is presented in Section 2.2.1 of Annex 4.
[109] A m^3-world eq. represents a cubic meter consumed on average in the world. The average refers to a consumption-weighted average, and hence represents the locations where water is currently consumed.
[110] Assessed considering impacts on four soil properties: biotic production, erosion resistance, groundwater regeneration and mechanical filtration, as presented in: De Laurentiis, V., Secchi, M., Bos, U., Horn, R., Laurent, A. and Sala, S., Soil quality index: *Exploring options for a comprehensive assessment of land use impacts in LCA*, Journal of Cleaner Production, 215, pp.63-74, 2019.
[111] The Consumption Footprint covers the 16 impact categories of the Environmental Footprint (European Commission, 2021) including freshwater eutrophication which is caused mainly by phosphorous emissions.
[112] OJ L 471, 30.12.2021, p. 1–396.

As regards **economic consequences**, the 58.5 Mt of food waste have an associated market value estimated at 132 bn euros.[113] These costs include lost resources by food business operators at each stage of the food supply chain, but also unnecessary spending by households. In addition, the cost of collection and treatment of food waste is estimated at an additional 9.3 bn euros[114].

Wasting food has important **social consequences.** It leads to unnecessary spending of resources that could be otherwise allocated. The average share of food expenditure (agri-food and food services) in total household expenditure in the EU is around 19%[115]. Discarding food that is fit for human consumption – rather than redistributing that food to those in need, including through food donation – also represents a missed opportunity in the light of growing challenges to **food security**. Although, in Europe, food availability is ensured, food affordability is a concern for a growing number of EU citizens: 32.6 million people cannot afford a meal with meat, fish, chicken or vegetarian equivalent every second day.[116] Finally, for many consumers, wasting food has an important ethical dimension[117].

3.2.2. What are the problem drivers?

The main drivers and situations that generate food waste in the food value and consumption chain are widely documented[118] and relate to: **insufficient consumer food management**; **inefficiencies and trade-offs in the food supply chain**; and **lack of understanding and certainty regarding food safety standards**. Moreover, in the EU – except for a few front runners – the **lack of evidence-based, coordinated approaches in Member States** leads to food waste generation going largely unchecked. The failure of governments to effectively address the behavioural and market drivers of food waste through evidence-based food waste prevention strategies and programmes, involving multiple players, means that food waste is not decreasing in line with commitments agreed to as part of the global Sustainable Development Agenda.

The abovementioned drivers are reflected in the responses to the public consultation as regards challenges to achieving food waste reduction and who needs to act (see Annex 2,

[113] Estimated using the JRC food waste prevention calculator - https://eplca.jrc.ec.europa.eu/permalink/valeria/prevention_action_calculator.xlsm

[114] Manfredi, S., & Cristobal, J., *Towards more sustainable management of European food waste: Methodological approach and numerical application*. Waste Management and Research, 34(9), 957–968, 2016, https://doi.org/10.1177/0734242X16652965.

[115] European Commission, Directorate-General for Agriculture and Rural Development, *EU agricultural outlook for markets, income and environment 2022-2032*, Publications Office of the European Union, 2023, p. 43. https://data.europa.eu/doi/10.2762/29222. Note: very small variation (less than 1%), because of slightly different MAGNET baseline used.

[116] Eurostat, October 2022. *Living conditions in Europe - material deprivation and economic strain - Statistics Explained*

[117] The need to ensure access to food and solidarity in the food supply chain is also highlighted in the recommendations of the European citizens' panel on food waste.

[118] FAO, *The State of Food and Agriculture. Moving forward on food loss and waste reduction*, 2019; UNEP, *Food Waste Index Report 2021*; Champions 12.3, *Changing behaviour to help more people waste less food – a guide*, 2022; *Combating food waste: an opportunity for the EU to improve the resource-efficiency of the food supply chain* (see note 33, page 4)

synopsis report – public consultation) as well as in the recommendations made by EU citizens[119] to step up action to reduce food waste in the EU.

The EU food safety regulatory framework in general cannot be considered as a driver of food waste as its implementation seeks to ensure a safe, sustainable food system and protect human and animal health. On the contrary, by reducing the occurrence of food safety hazards in foods, EU food safety policy helps to prevent food waste. When food safety incidents arise (e.g., presence of Salmonella, dioxins…), quick action in accordance with Commission Decision (EU) 2019/300 will limit recalls and reduce food waste.

1. Insufficient consumer food management. At the **consumer level**, the drivers[120] and behaviours that lead to food waste are complex and often inter-related. These can occur during planning, shopping, storing, preparing and/or consuming stages.

Food waste reduction depends on consumers' motivation, opportunity and ability to act[121]. There may be **insufficient motivation to take action** due to a number of factors including lack of awareness about food waste; attitudes and/or level of concern about food waste and its related impacts; lack of self-awareness on the amount of food generated; food prices in relation to household incomes; lack of role models and other examples pointing to food waste prevention as a social norm[122]. **Lack of opportunity** such as time constraints affecting meal planning and preparation, not having access to technologies supporting food management (e.g., freezing) or to advice on how to store and re-use food safely can lead to food being wasted. **Lack of ability** (knowledge and skills) can also contribute to insufficient food management, leading to food waste.

One of the main reasons leading to avoidable food waste in households is food not being used in time including due to the misunderstanding of the meaning of date marking[123]. Moreover, the consumer **trend towards healthier diets**[124] and increased demand for fresher, chilled and convenience foods will result in a greater share of grocery products within the food categories where date marking issues are more likely to drive food waste[125]. Consumer **expectations regarding the appearance of food** (such as the size and shape of fruit and vegetables) can contribute to food waste upstream in the food supply chain just

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[119] European Citizens' Panel on Food waste, *Final recommendations*, February 2023. https://citizens.ec.europa.eu/food-waste-panel_en

[120] Attiq, S., Danish Habib, M., Kaur, P., Junaid Shahid Hasni, M., & Dhir, A., *Drivers of food waste reduction behaviour in the household context*, Food Quality and Preference, 94, 2021, doi:10.1016/j.foodqual.2021.104300; Canali et al. *Drivers of current food waste generation, threats of future increase and opportunities for reduction*, FUSIONS Project. ISBN: 978-94-6257-354-3, 2014.

[121] van Geffen, L., van Herpen, E., Sijtsema, S., van Trijp, H., 2020. *Food waste as the consequence of competing motivations, lack of opportunities, and insufficient abilities.* Resour. Conserv. Recycl. X 5, 100026. https://doi.org/10.1016/j.rcrx.2019.100026.

[122] Hebrok, M., Boks, C., 2017. *Household food waste: Drivers and potential intervention points for design – An extensive review*. J. Clean. Prod. 151, 380–392. https://doi.org/10.1016/j.jclepro.2017.03.069;

[123] Flash Eurobarometer 425 (2015): while 58% of Europeans state that they always check 'use by' and 'best before' labels when shopping and preparing meals, less than half understand the meaning of 'best before' (47%) or 'use by' (40%).

[124] Moz-Christofoletti, M.A.; Wollgast, J., Sugars, Salt, *Saturated Fat and Fibre Purchased through Packaged Food and Soft Drinks in Europe 2015–2018: Are We Making Progress?,* Nutrients 2021, 13, 2416.

[125] Bumbac, R., *The European food market – increased consumer preference towards convenience and healthy food*. Junior Scientific Researcher, Vol V, No. 2, pp. 53-61

as the **food environment** can also influence consumer food purchases and habits (e.g., availability of 'doggy bags' in restaurants to take home surplus food from meals)[126].

At the consumer level, the drivers and behaviours that lead to food waste are also impacted by market causes, for instance, the **price of food**. As increased food productivity has, over the years driven down the price of food, it may be perceived as having a relatively low value The **challenge however lies in how to ensure higher perceived value of food, without actually increasing its price,** notably in the context of recent inflation; hence this driver is not addressed. The growing interest in short supply chains (as reflected in the recommendations of the Citizens' panel) may also help combat food waste by better linking consumers with producers and building greater appreciation for food.

2. Inefficiencies and trade-offs in the food supply chain. In pursuing an economically efficient approach, actors in the food supply chain may not always prioritise efficient use of natural resources and the reduction of environmental impacts. For example, products of lower market value may not warrant investment in prevention measures, and operators may decide to compensate for waste by producing or buying in more[127].

Moreover, failures in food business operations (e.g., spillage, spoilage, break in the cold chain) as well as lack of cooperation between supply chain actors can lead to food waste[128]. Other drivers also include inefficiencies in the production, handling, storage, processing, packaging, distribution and marketing of food; the lack of measurement, diagnosis and corrective action to address food waste in business operations; buffers in food production systems in order to ensure meeting contractual agreements and/or food security; poor stock management; inaccurate forecasting of supply and demand as well as unfair trading practices (e.g., last minute order cancellations)[129].

Supply chain management systems can also affect food waste. The length of remaining shelf-life on a product delivered to the retailer is a key factor driven by the stock control function of date marks ('use by' and 'best before'). While ensuring sufficient available shelf-life at retail and consumption is important, the setting by retailers of strict Minimum Life On Receipt (MLOR) criteria may result in product returns and food waste[130].

3. Lack of understanding and certainty as regards the implementation of food safety standards may lead to situations where food that is still safe for human consumption is removed from the food supply chain.

One such example concerns the possible misinterpretation of date marking set out in EU food labelling rules[131] – requiring that most pre-packed foods display a date mark and

[126] REFRESH, *Policies against consumer food waste*, Background report contributing to "REFRESH Policy brief: reducing consumer food waste" (D3.4), 2019.
[127] *The State of Food and Agriculture. (*see note 118, page 38*)*
[128] *The State of Food and Agriculture.* (see note 118, page 38); *Food Waste Index Report 2021* (see note 114, page 38); *Changing behaviour to help more people waste less food – a guide* (see note 118, page 38); *Combating food waste: an opportunity for the EU to improve the resource-efficiency of the food supply chain* (see note 33, page 4)
[129] Ghosh, R., & Eriksson, M., *Food waste due to retail power in supply chains: Evidence from Sweden. Global food security*, Global Food Security, Volume 20, March 2019, pp. 1-8.
[130]European Commission, Directorate-General for Health and Food Safety, *Market study on date marking and other information provided on food labels and food waste prevention*: final report, Publications Office, 2018, https://data.europa.eu/doi/10.2875/808514.
[131] Regulation (EU) No 1169/2011 on Food Information to Consumers

accompanying wording that explains whether the date signals a threshold in the product's safety ("use by") or its quality ("best before"). It is estimated that up to 10% of food waste generated annually in the EU is linked to date marking[132].

With the exception of table eggs and poultry meat, EU legislation does not prescribe how date marking should be established. The choice of date mark and length of shelf-life – both of which can impact on food waste – are determined by food business operators. In doing so, food business operators are required to ensure food safety, and tend to act cautiously to take account of differences in storage conditions within the food supply chain and households. Concern about consumer perceptions of products (e.g., freshness, quality) can also prevent firms from exploiting the potential for extension of shelf-life provided by improved storage technology.

The marketing of foods beyond their date of minimum durability (i.e., 'best before') is allowed under EU rules, provided that the foods concerned are still safe and their presentation is not misleading. In practice, both misunderstanding of the meaning of 'best before' and, in some Member States, measures taken to restrict placing on the market of food past the 'best before' date can also result in barriers to food donation[133].

Traceability requirements for food safety purposes have also been raised as a potential cause of food waste, mainly by food business operators at retail level which consider these as an additional administrative burden and thereby an obstacle for donation of surplus food[134]. However, food safety has to be ensured throughout the food supply chain, including food donation. It is therefore crucial to ensure full traceability to prevent and/or contain a possible food safety incident.

4. The **lack of evidence-based, coordinated approaches in Member States** – despite the existing obligations in the WFD – means that the systemic causes of food waste are not adequately addressed and that food waste is not decreasing at the pace and scale required to meet SDG Target 12.3.

Reducing food waste, and in particular that arising at consumption, requires an integrated, systemic approach, involving multiple partners from the public and private sectors, with coordinated actions tailored to address specific hotspots as well as attitudes and behaviours that lead to food waste.

The Voluntary Code of Conduct for Food Loss and Waste (FLW) Reduction[135], developed by Food and Agriculture Organization (FAO), calls for **setting up an adequate institutional, policy and regulatory framework** in order to facilitate the coordination of actors, enable investments and support and incentivise both improvement of practices and adoption of good practices. In the EU, **national authorities in Member States are best placed to design effective national food waste prevention strategies and programmes**

[132] Market study on date marking and other information provided on food labels and food waste prevention: final report (see note 130)
[133] European Commission, Directorate-General for Health and Food Safety, *Food redistribution in the EU : mapping and analysis of existing regulatory and policy measures impacting food redistribution from EU Member States*, Publications Office, 2020, https://data.europa.eu/doi/10.2875/406299
[134] The issue of traceability has been raised by the EU Fit For Future Platform in an opinion adopted in 2022. The Platform suggests that the Commission explores the possible benefits of updating the EU Guidelines on Food Donation.
[135] See note 83, page 33.

that address relevant behavioural and market drivers, supported by an appropriate evidence base.

In addition, the United Nations Environment Programme (UNEP) calls on governments to follow the **"Target-Measure-Act"** evidence-based approach[136] to achieve rapid and concrete results regarding food waste prevention. Targets set the level of ambition and can help guide effective action based on food waste diagnostics (that is, carrying out a baseline assessment of food waste levels and "hotspots" in order to identify causes of food waste generation, underlying drivers and define corresponding solutions to address these).

In particular, countries which have achieved significant reduction of consumer food waste associate both **public-private partnerships and collaboration between government and actors in the food supply chain**, committed to a common roadmap for food waste reduction at national level, with a **consumer behaviour change campaign**.

In order to assess the situation in the EU, an analysis[137] was carried out of the measures taken in the Member States, based on Member States' contributions to various EU-level data collection initiatives and web sites[138]. While Member States have committed to reaching SDG Target 12.3, overall, **action taken so far at national level is insufficient and not at the scale required[139].** All Member States have some actions in place to prevent food waste; however, most Member States have not yet adopted a specific target on food waste reduction nor a roadmap to drive concrete action at national level - relying instead on their overall commitment to SDG Target 12.3. Thus, the level of ambition, the degree to which measures have been implemented, and results obtained vary considerably (see further details in Annex 7):

- **Lack of overall approach to guide effective action** (food waste diagnosis, targeted activities to key hotspots, evaluation): Only 3 Member States[140] have demonstrated this approach.
- **Lack of overarching strategy and roadmap for achieving agreed targets:** Only 12 Member States[141] have strategies in place, with wider scope than measures in the specific food waste prevention programmes foreseen in the WFD; however, with limited or partial evidence of monitoring and evaluation. Another 11 Member States[142] report on actions undertaken at national level; however, these appear to be still at an early stage in their development and/or are limited in duration, scale or scope (e.g., voluntary agreements, redistribution and awareness campaigns). Monitoring and

[136] *Food Waste Index Report 2021* (see note 118, page 38)
[137] The assessment was based on: Member States' contributions to the EU Food Loss and Waste Prevention Hub; targeted surveys to members of the EU Platform on FLW; Member States' contributions to a 2020 progress assessment on the implementation of 2016 Council Conclusions on Food Losses and Food Waste; findings from a review of Member States' Country Profiles by the European Environment Agency (EEA).
[138] This assessment is based on: De Laurentiis, V, Mancini, L, Casonato, C, Boysen-Urban, K, De Jong, B, M'Barek, R, Sanyé Mengual, E, Sala, S. *Setting the scene for an EU initiative on food waste reduction targets*. Publication Office of the European Union, Luxembourg, 2023, doi: 10.2760/13859, JRC133967
[139] The Champions 12.3 high-level coalition also reported that global progress by governments and companies on achieving SDG Target 12.3 is slower than needed. See: SDG Target 12.3 on Food Loss and Waste: 2022 Progress Report | Champions 12.3 (champions123.org)
[140] The Netherlands, France and Germany.
[141] The Netherlands, France, Germany, Austria, Belgium (particularly Flanders and Brussels capital), Croatia, Finland, Ireland, Italy, Portugal, Spain and Sweden.
[142] Member States with low-to-mid level actions: Bulgaria, Czechia, Denmark, Estonia, Greece, Hungary, Latvia, Lithuania, Luxembourg, Slovakia and Slovenia.

evaluation are either not defined, not implemented or not reported. The remaining four Member States[143] appear not to have strategies in place.

- **Lack of clear accountability and governance, engaging all players (from both public and private sectors) to ensure effective coordination of action:** Generally, government sponsor is not clearly identified due to shared agenda (agri/food/environment). The majority of Member States (23)[144] have public-private partnerships or collaborative fora with commitments or actions in place, however, coordination of efforts appears to be not well documented nor visible. There is also limited evidence of reporting on progress, suggesting low priority of the food waste agenda in national policymaking.
- **Efforts do not adequately target both improving supply chain efficiency and supporting consumer behavioural change:** 11 Member States[145] follow a dual approach with actions to improve supply chain efficiency (e.g., voluntary agreements or stakeholder dialogue fora) and measures fostering behavioural change. Although all Member States have some actions targeting consumers, these mainly focus on awareness raising rather than behavioural change.

A few Member States can be considered front runners in their efforts to set up evidence-based approaches:

The Food Waste Agenda in The Netherlands (non-regulatory approach)

- **Overall strategy and roadmap:** Target in line with SDG 12.3 (2015 to 2030). 30% reduction in household food waste (2010-2022). A slight decrease has been reported in total quantities of food waste generated, but data for supply chain level food waste is highly uncertain.
- **Food waste diagnosis and evidence-based approach:** annual monitoring and publication of food waste levels since 2012.
- **Governance:** Food Waste Free United Foundation (2018) established to shape the Dutch food waste prevention **agenda**. The **Government** facilitates and supports food waste actions and regularly reports to the parliament on the implementation of the FW agenda.
- **Supply Chain Engagement:**
  - **Voluntary agreement (2018),** coordinated by independent body (Foundation) consisting of a multi-stakeholder platform catalysing food waste prevention initiatives across the supply chain, in collaboration with government and education institutions, as well as food business operators and financial organizations (*cost of 208.000 EUR/year*).
  - **online food redistribution platform**
  - Support for food business operators for **food waste prevention solutions** (*200.000 EUR/year*).
- **Consumer behaviour:**
  - **Annual consumer campaigns** "United Against Food Waste" to reduce household food waste (2019-2022), supported by government (7 million euros).
  - Other consumer **awareness and behaviour interventions** (week against food waste, date marking campaign (2020) and actions in schools).

The French Food Waste Pacts (regulatory approach coupled with stakeholder engagement)

[143] Cyprus, Malta, Poland and Romania.
[144] All Member States excluding Cyprus, Estonia, Lithuania, Malta.
[145] Belgium, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Luxembourg, The Netherlands, Sweden

- **Overall strategy and roadmaps/routes towards impact: Target** set by the French government and adopted by law aims for 50% reduction before 2025 for retail and collective catering sectors, and by 2030 for other sectors (baseline 2015). Two pacts (2013, 2017).
- **Governance:** Involving **five ministries and 58 stakeholders** (6 working groups). **Regional networks** with annual calls for proposals to support territorial food/food waste reduction projects.
- **Food waste diagnosis and evidence-based approach** addressing **supply chain engagement:**
  - **Food redistribution**: obligation for **retailers** (>400m2 surface area) to establish partnerships with charities to ensure redistribution of surplus food as practices to destroy edible foods became prohibited (Garot Law, 2016).
  - Mandatory measures extended to **collective catering** and the **food and drink industry** (2019) and **wholesalers** (2020).
  - **Action plans against food waste** are mandatory for the abovementioned sectors (including **diagnosis** supported by French environment Agency, ADEME).
  - Pilot project on fruit and vegetables to support producers in the diagnosis and implementation of tools to reduce food losses and waste (ADEME, 2021).
  - **Evaluation** of the second pact, included an overview of actions reached so far (2021).
- **Consumer behaviour:**
  - **Education on food waste reduction for consumers in the school curricula** (Egalim law, 2018). Teacher trainings and educational materials.
  - **National pact** on date marking, co-signed by Agriculture and Environment ministries, initiated by *Too Good To Go*.
  - **National campaign to raise awareness** on the difference between 'best before' and 'use by' dates and creation of 'anti-food waste' aisles in retail stores.

Overall, the situation in the EU – based on the nature and level of activity – shows that only three Member States are well positioned to make significant progress in achieving SDG Target 12.3. The insufficient and uneven response of Member States in taking action, in line with EU and global commitments, is therefore a key regulatory issue which this initiative seeks to directly address.

The **visual problem tree** is presented as part of the intervention logic in Section 3.4.2.

3.2.3. How likely is the problem to persist?

Without further EU intervention, Member States will continue to adopt food waste prevention programmes that do not include a national target, that will lack monitoring and that will not be supported by adequate governance, with ineffective coordination of action. In addition, the initiatives taken by most Member States to date remain at an early stage of development or are on such a small scale that delivery of results at the level required to significantly reduce food waste generation in the EU by 2030 is unlikely. The few initiatives taken to date that show any quantifiable results at national level will not be sufficient to achieve EU and global commitments by 2030. It can be expected that the measures will generally remain insufficient to ensure progress at the pace required to achieve SDG Target 12.3, and that the underlying behavioural and market drivers of food waste generation will remain inadequately addressed in national strategies. As a result, it can be expected that action will remain disparate and that the potential for reducing food waste will not be realised.

A few individual cases, including experience gained outside the EU[146] do show, however, significant food waste reduction potential. Therefore, it could be argued that the current

[146] E.g., United Kingdom or The Netherlands – see Annex 7 for further information

activities – if they were to grow over time – would have some impact, even without any additional future intervention at EU level. However, taking into account the very short time horizon up to 2030, as well as the lack of robust data on the progress made over the last period (see section on Problem Definition above), it can be assumed that there will be no significant change in food waste reduction. Based on the analysis of the existing prevention policies, it is expected that general trend will be stable. Further details are provided in section 3.5.1 describing the baseline.

Since waste generation is linked to economic growth, it is likely that waste generation will increase along with the economic growth expected in the medium term.

It can therefore be concluded that food waste generation will not be decreasing as required to meet the global and EU commitments, with resulting environmental, economic and social consequences (including the contribution to food security).

3.3. Why should the EU act?

3.3.1. Legal basis and nature of the legal instrument

Article 192 of the Treaty on the Functioning of the European Union (TFEU) empowers the EU to act in the field of environmental policy to preserve, protect, and improve the quality of the environment and protect human health and contribute to the prudent and rational utilisation of natural resources; and promote measures at the international level to deal with regional or worldwide environmental problems. empowers the EU to act in the field of environmental policy to preserve, protect, and improve the quality of the environment and protect human health and contribute to the prudent and rational utilisation of natural resources; and promote measures at the international level to deal with regional or worldwide environmental problems.

The initiative would be realised through targeted amendments to the WFD which is based on Article 192 (1) TFEU and already regulates major aspects of food waste prevention (definition, obligations for Member States, planning, reporting) and management (e.g., separate collection). The amendment of the Directive would build on these existing requirements and waste prevention measures and will introduce binding objectives to be achieved by Member States and the timeframe for their achievement.

3.3.2. Subsidiarity: Necessity of EU action

Given the cross-border nature of the problems (e.g., environmental pressures and impacts related to food waste) and supply chains that underpin the Union food system, a harmonised transformational change as regards reduction of food waste can only be effectively achieved at EU level.

The decrease of food waste generation is insufficient across all EU Member States and the underlying drivers that generate food waste are the same across the EU.

Food waste generation has significant trans-boundary environmental and pollution effects including the production of significant GHG emissions within the EU. Food is traded widely within the EU internal market[147] and the Member State of food production is often

[147] In 2021, more than two thirds (68.8 %) of the EU's total trade in agricultural, fisheries and food and beverage products was between EU MS – *Key figures in the European food chain* - 2022 edition, (Statistical Office of the EU (2022))

different from the Member State of consumption. Food businesses that operate cross-border, for example larger food producers or major retail chains with activities in several Member States, need coherence and clarity on the level of ambition expected in order to plan investments and actions on food waste prevention.

A coordinated approach at EU level can bring reliability and continuity and thus support adoption of new business models by food business operators in order to accelerate food waste reduction across the food value chain. For example, a group of the world's largest food retailers and providers, including companies operating throughout the EU, have committed to working with their suppliers to halve food waste by 2030[148]. An assessment of the world's progress towards achieving SDG Target 12.3[149] shows that companies are taking action to address food loss and waste at a greater rate than countries. The setting of binding targets on Member States to further drive action by governments is expected to help accelerate reduction of food waste in the food supply chain.

Food has embedded environmental and climate consequences, because of the energy and resources used and associated emissions throughout its life cycle. Most of these environmental externalities are not internalised into food prices, thus obstructing the market mechanisms to provide the necessary incentives to minimise them. Therefore, reduction of food waste across the EU in a consistent manner is needed to ensure, in each Member State, prudent and rational utilisation of natural resources, reduction of negative impacts on climate, biodiversity and use of natural resources, with benefits extending beyond national borders. Importantly, by making the food system more efficient, food waste reduction also contributes to food security across the EU.

Despite political commitments made at international, EU and national levels, existing legal requirements in the WFD and supporting activities by the Commission, Member States' responses to food waste have been uneven and are, overall, not sufficient to address the problems identified and the environmental, economic and social consequences for consumers, enterprises and society as a whole. The variation in efforts across Member States as regards reduction of food waste generation and different levels of expectations as to the contribution of food business operators indicates a need for reinforced and uniform legal measures at EU level to drive the progress at the pace required to achieve SDG Target 12.3.

While the EU legislator can define a common target for reduction of food waste for different stages of the food supply chain to ensure the EU achieves these objectives, each Member State will retain the same level of flexibility to develop the most effective policies and measures to reach the objectives, taking into account its national context and specificities, while being able to draw on the supportive actions led by the Commission as described in section 3.1.2. This is particularly the case for reducing food waste at consumption level: while EU-wide actions can help, they cannot easily take into account the complex, market- and culture-specific drivers of food waste generated by consumers in different Member States, nor the behavioural change levers. Such initiatives need to be tailored to address the specific situations in Member States, informed by food waste diagnostics and developed with local partners, such as local governments, education

[148] Champions 12.3 release: *World's leading food retailers and providers engage nearly 200 suppliers in cutting food loss and waste in half* (24 September, 2020)
[149] Champions 12.3, *SDG Target 12.3 on Food Loss and Waste: 2022 Progress Report* (September 2022)

institutions, retailers, NGOs and food producers. Member States themselves are best placed to take forward such targeted efforts including information and behavioural change campaigns tailored to their citizens' needs and taking into account policy frameworks and governance models. Furthermore, initiatives targeting supply chain efficiency also need to be addressed at national levels[150] where governments may define the specific objectives and actions required, in cooperation with food business associations, as part of national food waste prevention strategies and roadmaps established to reach national targets.

The intended amendment of the WFD therefore seeks to directly address the regulatory drivers identified in this impact assessment and to incentivise Member States to take action addressing the behavioural and market drivers of food waste generation.

3.3.3. Subsidiarity: Added value of EU action

EU action on food waste reduction brings added value as it is more effective and efficient than individual actions by Member States taken in isolation. An EU regulatory framework ensures coherence notably through the setting of common objectives as regards the reduction and monitoring of food waste, avoiding a fragmented approach by addressing the drivers of food waste in a coordinated manner and giving certainty to operators.

Setting food waste reduction targets is expected to confer clear accountability to Member States for driving more ambitious action at national level, in line with their and the EU's commitment to achieve global targets. In order to achieve results in the short term, and to give food business operators, consumers and public authorities the necessary perspective for the longer term, quantified targets for reduction of food waste generation, to be achieved by Member States by 2030, should be set. Such targets are expected to reinforce efforts to identify and scale-up effective strategies/initiatives both within and across Member States, in particular by:

- streamlining the contribution of food business operators, notably in the context of cross-border supply chains, avoiding shifting waste from one stage of the food supply chain to another and ensuring systemic reduction across the food value chain;
- helping to ensure that drivers (market and behavioural) are addressed consistently/simultaneously by all Member States, in line with actions taken by the – so far few – front-runners as less advanced Member States can benefit from the experience of others;
- accelerating the development of effective national food waste prevention strategies by spreading good practices and synergies from similar approaches being developed in different Member States and by further leveraging the EU knowledge base regarding environmental impact of food waste generation, prevention and management.

Member States' achievement of food waste reduction targets will be facilitated by EU level supporting measures that can both supplement and reinforce action at national level (see section 3.5.2 for further details). Such EU-level action will support Member States through the provision of relevant guidance and tools to reduce food waste while allowing flexibility

[150] For instance, in Germany, a Voluntary Agreement on the reduction of food waste in the away-from-home catering sector has been established between the Federal Ministry of Food and Agriculture (BMEL) and business associations of the catering and hotel sector. As part of the Voluntary Agreement (VA), business associations have agreed on reduction targets and measures to reduce food waste. The VA was developed in a dialogue forum for the sector, supported by the BMEL.

in the approach to be taken. Nonetheless, the obligations already laid down in the WFD (see section 3.1.2) will ensure coherent implementation of food waste prevention initiatives by Member States, in line with the waste hierarchy. Moreover, the proposed setting of targets for specific stages of the food supply chain provides Member States with a common approach in reducing food waste and priorities for action.

By acting at EU level, in combination with actions taken at Member State level, barriers to the implementation of food waste prevention can be identified and assessed as they arise, including the possible need for further intervention. For example, amendments to food hygiene legislation, adopted in 2021 in order to lay down certain requirements to promote and facilitate food donation whilst guaranteeing its safety for consumers, reflected issues raised by Member States and food business operators in context of the prior elaboration of EU food donation guidelines (adopted in 2017).

3.4. Objectives: What is to be achieved?

3.4.1. General objective

The general objective of this revision is to reduce the environmental and climate impacts of food systems associated with food waste generation. Preventing food waste would also contribute to food security. More specifically, by increasing the efficiency of food systems and supporting consumer behavioural change to avoid unnecessary discarding of food, it would be possible to feed a greater number of people with the same food production. Reducing food loss and waste can therefore contribute to meet the expected growing demand for food whilst ensuring that our food system operates within planetary boundaries.

The links between the problems, general objectives and specific objectives are presented in the intervention logic in Annex 7.

3.4.2. Specific objectives

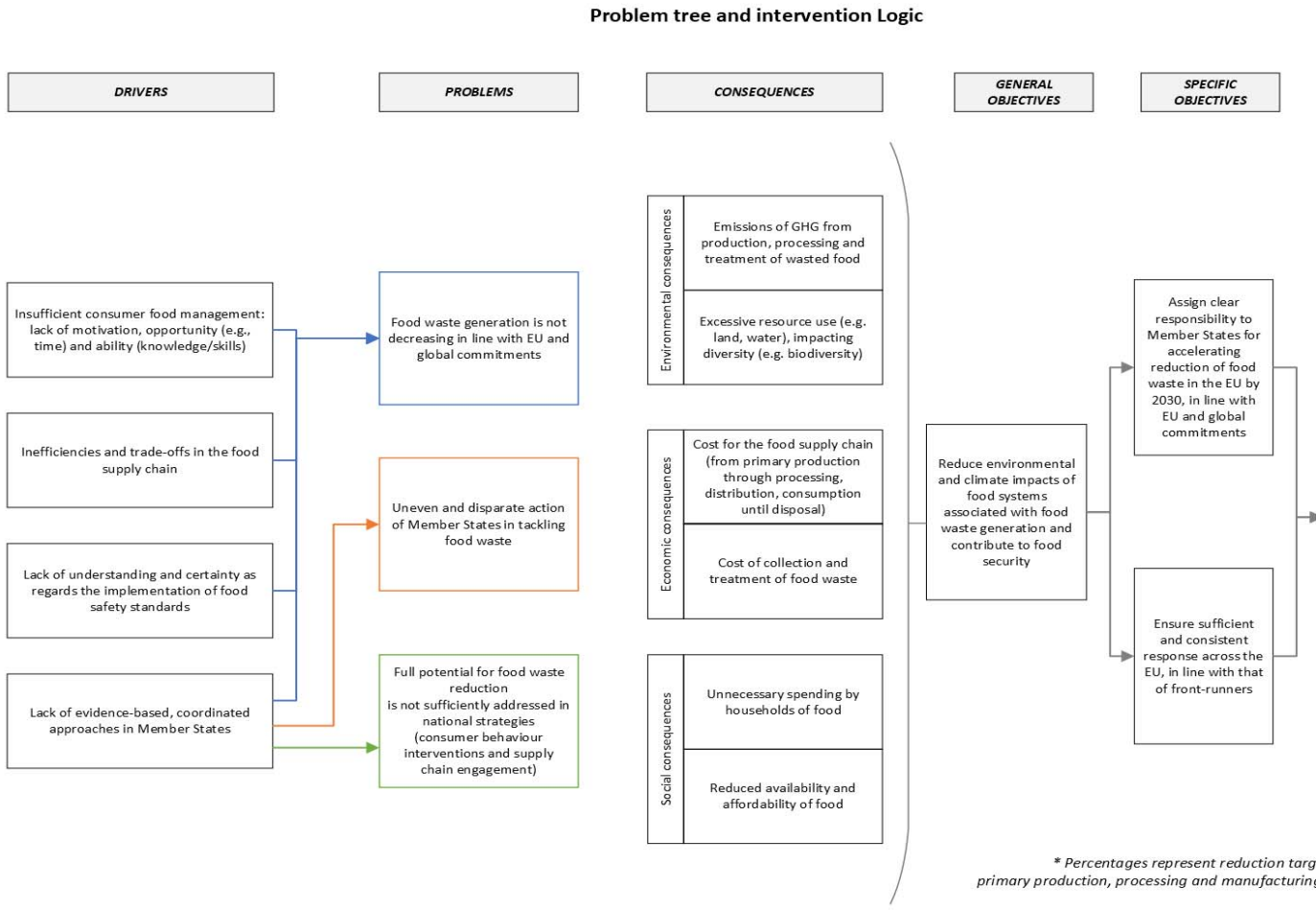
The first specific objective of the initiative is to **assign clear responsibility to Member States for accelerating reduction of food waste** along the food supply chain and in households, **in their respective territories**, and thus make a solid contribution towards achieving SDG Target 12.3.

As second specific objective, the initiative also seeks to **ensure sufficient and consistent response by all Member States to reduce food waste**, in line with that of front-runners. This should lead each Member State to take ambitious action – deploying the most effective measures, tailored to its specific national situation – and aiming to support consumer behavioural change as well as strengthen coordination of actions between actors across the whole food value chain as well as with other relevant actors (e.g., academia, NGOs, financial institutions…).

In order to facilitate systemic action, Member States will need to **ensure an enabling institutional, policy and regulatory framework** that can adapt to evolving needs of key players. Findings from the public consultation showed strong agreement of respondents with the effectiveness of taking such food waste prevention measures, with the vast

majority agreeing with the setting of EU-level legally binding food waste reduction targets (74% - 488 replies)[151].

Figure 7: Problem tree and intervention logic for food waste



[151] Further details are presented in Annex 2 – public consultation.

3.5. What are the available policy measures and options?

3.5.1. What is the baseline from which options are assessed?

The baseline is a "no policy change" scenario, with the current WFD remaining in force. Although Member States will continue to define and implement food waste prevention measures and the Commission will continue to lead supporting activities as described in section 3.1.2, it is expected that action across the EU will remain uneven and disparate and will not sufficiently leverage the full potential of food waste reduction, as the behavioural and market drivers will likely not be adequately addressed under this scenario. Thus, food waste levels are not expected to decrease in line with the EU and global commitments.

The baseline assumes that no further legislative action will be taken at EU level to target directly the reduction of food waste. While it reflects relevant EU and national policies in force (such as related climate or agriculture policies), it does not include Commission proposals (i.e., policies not yet adopted by co-legislators) foreseen by the relevant EU strategies and, more generally by the EGD (see Annex 10, section 2.1 *Baseline* - for further details).

The baseline considers a series of variables which influence the evolution of food waste projections up to 2030, including the GDP and population growth, which are the main factors[152], as well as developments in agri-food production and services. On this basis, food waste levels are expected to remain constant between 2020 and 2030, with only 0.1% change (from 56.98 Mt in 2020 to 57.04 Mt in 2030, see also Figure 8)[153]. However, the expected changes in food waste generation vary between Member States. While countries with increasing population and a well-performing economy and agrifood sectors are expected to show an increase in food waste generation, some Central and Eastern European countries are expected to experience a strong demographic decline resulting in a reduction of food waste, in spite of comparatively high economic growth rates. Baseline (and further assessment of impacts) is based on the estimates of October 2022[154].

The detailed description of the baseline as well as the situation of different Member States (including key drivers) is presented in Annex 10, section 2.1 *Baseline*.

Some of the assumptions regarding factors such as economic growth, demography, or energy are based on 2021 data. Therefore, they already include impacts from the COVID pandemic. However, food-price inflation, energy crisis and other recent developments exacerbated by the Russian invasion of Ukraine, are not taken into account. Inflationary pressures are expected to fall in the **short- term**; however, uncertainty remains as to their influence and evolution over the ten-year span.

Separate collection of bio-waste is already considered in the projection on food waste amounts. On its own, separate collection does not impact the amounts of food waste generated. However, separate collection obligations for bio-waste have already been

[152] European Commission, Joint Research Center, *Global Energy and Climate Outlook: Advancing towards climate neutrality*, Dataset, 2021, https://data.jrc.ec.europa.eu/dataset/067e2ab2-d086-4f19-972e-5c46473f5efb

[153] The projection is based on projected growth of municipal waste amounts - 8.3% at the EU level (calculated using a regression on GDP and population) and then implemented to the MAGNET model using a top-down approach.

[154] The updated estimations from March 2023 are slightly higher (58.5 Mt vs previous 57 Mt) became available only after completion of the modelling exercise; however, as all options are compared to the same baseline, impact on the results would be minimal.

gradually implemented by Member States over several years, and no significant changes in the amounts of food waste have been observed as a consequence. Therefore, entry into force of the legal obligation from 2024 is not expected to have any significant impact on generation of food waste.

Regarding technological change, production technology development in terms of agricultural and forestry technology development, and feed efficiency are considered in the baseline. However, technological developments that are aimed at reducing food waste are not considered as little data are available about the concrete impacts of new digital and smart technologies (such as food-sharing smart phone applications) on food waste reduction.

3.5.2. Description of the food waste policy options

Pre-selection of options

While the legal obligation in the WFD specifically calls for the setting of food waste reduction target[155], in the preparation of this impact assessment other measures at EU level that could help address the problem drivers have also been considered.

Public authorities such as Member States or the European Commission cannot themselves directly reduce food loss and waste, but they are indispensable in providing overall strategic direction as well as supporting and coordinating action from multiple players in the public and private sectors to reduce food waste.

As presented in section 3.1.2 (*Overview of EU action to prevent food waste*), the European Commission has already implemented measures (regulatory and non-regulatory) to support Member States in taking action in many of these areas and monitor the EU's progress. In order to facilitate synergies between EU- and Member State-level action, the Commission intends to require Member States to formally designate a competent authority for food waste prevention within existing government services. As this entails no additional costs, it has not been assessed in the IA.

The potential further actions which could be considered by the Commission include items listed hereunder.

a) Supporting consumer behavioural change

Evidence suggests that changing consumer behaviour as regards food waste cannot rely on simple awareness raising but requires a mix of different interventions targeted to address specific behaviours and population groups[156]. In order to curb consumer food waste, joined-up action involving multiple players is needed, drawing on consumer insights derived from research carried out in Member States. Findings and learning related to

[155] Article 9.6 of the WFD: "*By 31 December 2023, the Commission shall examine the data on food waste provided by Member States in accordance with Article 37(3) with a view to considering the feasibility of establishing a Union-wide food waste reduction target to be met by 2030 on the basis of the data reported by Member States in accordance with the common methodology established pursuant to paragraph 8 of this Article. To that end, the Commission shall submit a report to the European Parliament and to the Council, accompanied, if appropriate, by a legislative proposal.*"

[156] Champions 12.3, *Changing behaviour to help more people waste less food – a guide*, 2022; Cristobal Garcia, J., Pierri, E., Antonopoulos, I., Bruns, H., Foster, G. and Gaudillat, P., Separate collection of municipal waste: citizens' involvement and behavioural aspects, EUR 31310 EN, Publications Office of the European Union, Luxembourg, 2022, ISBN 978-92-76-59008-8, doi:10.2760/665482, JRC131042.

consumers' own motivation and intentions to reduce food waste, opportunity factors (e.g., available time and financial resources), and consumers' abilities (knowledge and skills related to food management) are important elements to help inform behavioural change interventions and information campaigns.

To make behavioural interventions aiming to reduce consumer food waste more effective (and efficient), it is important to understand the contexts in which food waste occurs, and the people and groups that create food waste. Some groups waste more than others and some will be more influenced to change their behaviour than others. Obtaining such knowledge is an essential foundation for the design of both interventions and messaging, ensuring that these are as effective as possible.

In designing such interventions, a top-down, "one size fits all" approach will not address the underlying behavioural drivers of food waste[157]. As regards nudges, the best choice depends on the specific situation at hand and requires in-depth knowledge of the target group and context. For instance, nudges that make food waste avoidance easier and more convenient will primarily work for those who consider reducing food waste as effortful or nudges to avoid food waste during meal preparation will not address decisions made when food shopping (e.g., overbuying) which may later lead to food waste.

Whether or not nudges (or other behavioural interventions) are effective in reducing food waste depends to a large degree on the target group, the context in which they are implemented (e.g., city, region, country), the engagement of other players (e.g., food business operators), and the overall policy context. Importantly, their effectiveness relies on empirical evidence, which usually stems from rigorous experimental testing, often done in laboratories. Scaling up from the laboratory to a local, regional or country-wide initiative, although challenging[158], can be accomplished best by actors with sufficiently detailed knowledge. Moreover, the design of experiments may need to be adapted based on results and learning gleaned, requiring ongoing monitoring and updating.

Whilst such efforts may be supported and enhanced through actions undertaken at EU level – through EU-funded research[159] and sharing of best practice and learning from actions undertaken on-the-ground – interventions to support consumer behavioural change can only be undertaken in and by Member States. The integration of consumer behavioural change initiatives in the context of national food waste prevention programmes ensures their alignment with objectives defined at national level, supported by an appropriate evidence base and engaging multiple players in a joined-up approach, in particular: policy makers, food businesses, non-food businesses (e.g., technology providers), non-governmental organisations (consumer, environmental…) and educators/other influencers (including social media).

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[157] Bruns, H. and Nohlen, H., Segmenting consumers and tailoring behavioural interventions to reduce consumer food waste, EUR 31547 EN, Publications Office of the European Union, Luxembourg, 2023, ISBN 978-92-68-04228-1, doi:10.2760/541400, JRC134011.

[158] Al-Ubaydli, O., List, J. A., & Suskind, D. L. (2017). What Can We Learn from Experiments? *American Economic Review: Papers & Proceedings*, *107*(5), 282–286. https://doi.org/10.1257/aer.p20171115

[159] For instance, EU-funded project CHORIZO aims to improve the understanding of how social norms influence behaviour and food waste generation and use this knowledge to improve the effectiveness of decision-making and engagement of food chain actors towards zero food waste.

b) Consumer education

In its recommendations[160] on actions needed to step up food waste prevention, the EU citizens' panel highlighted the importance of education. Education is a competence of Member States which are also best placed to take forward both the integration of food and food waste prevention in school curricula as well as carrying out targeted campaigns addressing relevant behavioural drivers and tailored to their citizens' information needs. The Commission supports such actions by facilitating sharing of best practice and learning in consumer education through a variety of tools[161] (see section c).

c) **Clarification and/or amendment of EU legislation** in order to facilitate prevention of food waste, in line with the waste hierarchy

As regards clarification and/or amendment of EU legislation to support food waste prevention, a major effort has already been delivered in particular in the area of food donation and the use of food for feed purposes but also in the area of measurement and reporting of food waste levels by Member States[162]. As further needs arise, it is expected that these will be addressed, on an ongoing basis, notably through the work of the EU Platform on FLW and Member States' cooperation with Eurostat. For example, the EU Platform on FLW is currently carrying out a new assessment of barriers and opportunities to further facilitate redistribution of surplus food. Based on findings, the Commission may update the EU food donation guidelines to integrate possible new issues identified. For these reasons, this action can be considered as already implemented, with tools in place for its delivery, and potential for its further strengthening will be considered based on findings of the EU FLW Platform's assessment.

d) **Reinforcing dissemination and transfer of learning and best practices**

Dissemination and encouraging transfer of learning and best practices, including assessment of the effectiveness of food waste prevention initiatives, are already carried out on an ongoing basis by means of the EU Platform on FLW and the digital EU Food Loss and Waste Prevention Hub. In the digital pathway tool, that the RESTwithEU pilot project[163] will provide in Q3 2023 restaurants are guided to digital tools that help to mitigate food waste along the supply chain. The new EU pilot project 'European Consumer Food Waste Forum'[164], will also deliver in June 2023 solutions and tools to help all actors (including regulatory authorities) in implementing effective actions to **reduce consumer food waste**.

According to the assessment of progress made in implementing the Council conclusions on food losses and food waste, under the German Presidency of the Council of the European Union[165], Member States have benefited from the exchange of information and

[160] European Citizens' Panel on Food waste, *Final recommendations*, February 2023. Recommendation n°18.
[161] See for example: European Commission, Leaflet: *How to reduce food waste in your daily life*, 2020 available in all official languages of the EU.
[162] See note 96, page 35
[163] https://restwith.eu/
[164] European Commission, EU Project: *European Consumer Food Waste Forum*, October 2021 - July 2023.
[165] Food losses and food waste: assessment of progress made in implementing the Council conclusions adopted on 28 June 2016, November 2020. (see note 30, page 3)https://data.consilium.europa.eu/doc/document/ST-11665-2020-INIT/en/pdf

experience made possible by the Platform, which have often inspired further action at national level.

While increasing resources applied to 'best practice' sharing could further support effective food waste prevention, dissemination of best practices cannot – in and of itself – mobilise Member States and build capacity at national level to implement ambitious food waste prevention strategies and actions. Based on the experience with uptake of identified best practices today, this would not be sufficient to accelerate progress in all Member States to take decisive actions for achieving SDG Target 12.3.

e) Legislative measures requiring specific actions of food business operators in particular at retail– such as obligations related to food donation or banning the destruction of edible food.

As part of their waste prevention programmes, Article 9 of the WFD (as revised in 2018) obliges Member States to take measures to reduce food waste at each stage of the food supply chain and encourage food donation and other redistribution for human consumption, prioritising human use over animal feed and the reprocessing into non-food products. Member States are also called upon to provide incentives for the application of the waste hierarchy, such as facilitation of food donation (Article 4 and Annex IVa).

While most Member States promote food donation through voluntary measures (e.g., food redistribution guidelines, stakeholder fora, digital tools and platforms) often coupled with fiscal incentives, others have laid down specific measures laying down obligations related to food donation (e.g., France, Czech Republic, Hungary, Poland). However, such measures need to be precisely adapted to national conditions due to differences in the structure and functioning of the markets, cooperation amongst actors in the food supply chain, national legislative frameworks, policy culture (e.g., regulatory vs non-regulatory approach) etc. The current measures laid down in the WFD provide the appropriate framework for implementation of national measures tailored to the specific situation in Member States.

f) **Setting targets** on Member States

While EU policy and supportive measures already seek to mobilise action by Member States to prevent food waste in their territories, existing waste prevention measures cannot ensure sufficient results within the fixed timeframe set by the SDG Target 12.3. Achieving significant reduction of food waste in the EU by 2030 would require all Member States to establish comprehensive and ambitious national food waste prevention strategies and ensure their effective implementation as for far done only be a few countries.

In order to achieve this, more compelling action, set out in legislation and laying down clear objectives for Member States, seems required at EU level. Such EU targets could either be defined as national objectives or binding targets to be achieved by Member States. In line with the subsidiarity principle, targets would allow Member States to develop their own mix of policy measures including voluntary or legally binding measures or a combination of both, depending on their national specificities.

Therefore, following this pre-screening, the abovementioned legislative and non-legislative options (a-e) have not been analysed further in the IA. The analysis of policy

options to reduce food waste have focused on different approaches and levels for the setting of food waste reduction targets (f).

EU measures to support Member States in reaching targets

- **Operations of the EU Platform on FLW and its five dedicated sub-groups** (action and implementation; consumer food waste prevention; date marking and food waste prevention; food donation; and food loss and waste monitoring). This multi-stakeholder forum brings together international organisations, Member States and actors in the food value chain including consumer and other NGOs to support all players in defining measures to prevent food waste, sharing best practice and evaluating progress made over time. The Platform is currently preparing a case study report on the implementation of **Voluntary Agreements** (public-private partnerships) to share results and learning of Member States and other actors. Furthermore, the Platform is carrying out new data collection on **barriers and opportunities on food redistribution practises** across the EU.
- **Supporting consumer behavioural change efforts**, notably through the dedicated Platform subgroup on consumer food waste prevention and the deliverables of the European Consumer Food Waste Forum, and further dissemination of its solutions and tools tailored to meet the needs of specific target groups (e.g., policymakers, food business operators).
- **Facilitating consumer understanding and use of date marking:** the Commission is currently exploring the most efficient ways of doing so, without jeopardising food safety.
- **Sharing best practice, resources and learning from food waste prevention to accelerate progress** through the EU Platform on FLW and the EU Food Loss and Waste Prevention Hub.
- **Clarify and/or amend EU legislation as needed to facilitate food waste prevention in line with the EU waste hierarchy.** Ongoing assessment of the policy environment at Member State and EU levels and consideration of any additional EU-level actions needed (e.g., possible updating of EU food donation guidelines).
- **Strengthen the evidence base for food waste prevention interventions** through ongoing assessment and continued development of the evaluation framework for food waste prevention initiatives, in cooperation with the Joint Research Centre. Research and innovation support for food waste prevention will continue both through ongoing EU-funded research projects and further calls for proposals under Horizon Europe[1] and other funding instruments (LIFE, InterReg Europe).
- **Grants to support Member States and stakeholders** in improving food waste measurement and implementation of actions to reduce food waste, in collaboration with HaDEA. Such grants are awarded, on an annual basis, under the Single Market Programme.
- **Biennial assessment of the progress of food waste** prevention in Member States by the European Environment Agency taking into consideration, amongst others, data reported to Eurostat, and Member States' food waste prevention programmes**.**

3.5.3. Setting a food waste reduction target

Taking into account the existing legal requirements in the WFD, the supportive measures at EU-level implemented and the results achieved so far, the setting of EU-wide food waste reduction targets is a necessary next step. By setting targets, the Commission aims to **catalyse the development and implementation of national food waste prevention strategies** of sufficient breadth and scale to adequately address the behavioural and market drivers of food waste at national and local levels.

Setting targets in EU waste legislation is a policy instrument which requires Member States to take action whilst however giving full flexibility as to the selection of measures required. Member States may choose the policy instruments that would be the most effective and efficient according to the specific situation in their respective territories.

Introducing targets for food waste sets a **clear objective** and ensures that food waste prevention becomes a long-term political priority. They provide **legal certainty** as well as a common direction for all players and a coherent vision for society overall.

Such a policy approach is necessary given the multi-faceted nature of food waste caused by different drivers and requiring multiple players to take action simultaneously[166] as set out in Section 3.2.2. (See specific examples of Member States actions in Annexes 7 and 10).

Research indicates that targets can be very effective motivators and can drive action when they are set at the right level (i.e., that the required strategic levers are available and that policymakers can achieve the right balance between motivating action and what is actually possible to achieve).[167,168] In particular, this instrument has been used in waste legislation since the mid-1990s. Examples include the target for waste recycling[169], targets on limiting on landfilling of biodegradable municipal waste and targets on recovery and recycling of packaging waste[170].

These targets have been an effective policy tool in the area of waste management. While several infringement procedures were initiated by the Commission due to the targets' not being achieved by the deadlines foreseen, no Member State has ultimately been fined as all of them eventually achieved the prescribed target. Finally, food waste reduction targets are a policy tool advocated by the European Parliament since 2012[171]. The proposal to revise the WFD in 2014[172] set aspirational targets for Member States to reduce food waste by 30% by 2025. The Commission later withdrew the proposal[173] and adopted a new one, in 2015, without targets. During negotiation of the new proposal[174], the Parliament requested again to set targets. As a result, due to lack of data at that time, when the co-legislators amended the Directive in 2018, the Commission was mandated to assess, by the end of 2023, the feasibility of setting EU-wide targets accompanied, if appropriate, by a legislative proposal.[175]

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[166] Stakeholders expressed strong support for the setting of EU-level food waste reduction targets in IAA, public consultation and meetings of the EU Platform on FLW as well as the measures which need to be implemented by multiple players in order to achieve food waste reduction (see Annex 2 – synopsis report).

[167] *Targets for a circular economy* - Piero Morseletto https://www.sciencedirect.com/science/article/pii/S0921344919304598

[168] https://www.eea.europa.eu/publications/diverting-waste-from-landfill-effectiveness-of-waste-management-policies-in-the-european-union

[169] Article 11 of the WFD

[170] OJ L 365, 31.12.1994, p. 10–23 – Art 6

[171] OJ C 227E, 6.8.2013, p. 25–32 (European Parliament resolution of 19 January 2012 on avoiding food wastage)

[172] COM/2014/0397 final - 2014/0201 (COD)

[173] This was part of a broader withdrawal of pending legislative proposals carried out on adoption of the 2015 Work Programme. Withdrawal of Commission proposals: OJ C 80, 7.3.2015, p. 17–23

[174] COM/2015/0595 final - 2015/0275 (COD)

[175] Article 9.6 of the WFD: "*By 31 December 2023, the Commission shall examine the data on food waste provided by Member States in accordance with Article 37(3) with a view to considering the feasibility of establishing a Union-wide food waste reduction target to be met by 2030 on the basis of the data reported by Member States in accordance with the common methodology established pursuant to paragraph 8 of this Article. To that end, the Commission shall submit a report to the European Parliament and to the Council, accompanied, if appropriate, by a legislative proposal.*"[176] Inception Impact Assessment, Proposal for a revision of Directive 2008/98/EC on waste – part on food waste reduction target. See Annex 2 for details on

The policy options described below have been included in the Inception Impact Assessment[176] (IIA) and stakeholders were consulted on these including the EU Platform on Food Losses and Food Waste. Stakeholder feedback showed broad support for the setting of EU-level food waste reduction targets, with even higher endorsement expressed in the public consultation by public authorities (see Annex 2- synopsis report).

3.5.4. Development of the policy options

Setting the format of the targets

Following input received from stakeholders[177], the Commission has further analysed modalities for setting the binding targets. The analysis covered the following choices:

- Scope – i.e., which stages of the food supply chain should be addressed
- Expression – i.e., the way targets are to be expressed and measured
- The way the targets are set for Member States.

Concerning the **scope**, the question considered was whether targets should be limited to the hotspot for food waste generation (i.e., consumption, including retail due to its impact on the former) or rather address the whole food supply chain (post-farm gate to the final consumer). While SDG Target 12.3, calls for "halving *per capita* global food waste at the retail and consumer levels," it also requires "reducing food losses along the production and supply chains, including post-harvest losses".

There was consensus among stakeholders that retail and consumption (food services and households) represent important food waste generation hotspots and need to be targeted. [178] However, there were differing views as to whether the targets should also cover two earlier stages (i.e., primary production and processing and manufacturing) in order to drive food waste reduction upstream, in line with the global target. Food waste in primary production is often considered a "side effect" of inefficiencies in the overall functioning of the food supply chain or other factors beyond the control of producers (e.g., weather, international trade restrictions). The potential for further reduction of food waste in food processing and manufacturing was regarded by some as more limited given the inherent economic incentive for operators to reduce food waste. Notwithstanding, most stakeholders providing feedback to the IIA affirmed that food waste reduction targets should cover the whole food supply chain.

In the light of these considerations, it was decided to test options covering the **whole food supply chain**. However, since reducing food waste at production and consumption requires different approaches and measures and targets different stakeholder groups, differentiated targets would need to be proposed to address these stages separately.

It is important to note that, for setting the targets, the **retail** (food distribution) **and consumption** (food services and households) stages are considered together. Despite retail's more limited contribution to food waste generation in the EU, setting a common

stakeholder responses to the setting of EU-level targets during IAA, public consultation and by the EU Platform on FLW.

[176] Inception Impact Assessment, Proposal for a revision of Directive 2008/98/EC on waste – part on food waste reduction target. See Annex 2 for details on stakeholder responses to the setting of EU-level targets during IAA, public consultation and by the EU Platform on FLW.

[177] see in particular Annex 2, section 1, Inception Impact Assessment

[178] see Annex 2, section 1, Inception Impact Assessment

target reflects the influence of retail practices on consumption (e.g., portion sizes, consumer information on shelf-life and storage, offers and promotions) and possible related impact on food waste. Moreover, setting a joint target for these sectors (combining retail, food services and households) will allow Member States flexibility to reduce waste more in one sector than another, depending on their specific circumstances. Setting separate targets for each of these stages would add unnecessary complexity and make measurement less robust[179].

Concerning how food waste reduction targets should be formulated**,** the inception IA proposed that targets could be **expressed** either as:

- the *percentage* reduction of food waste from the baseline year (2020) amount to that in the target year (2030), or
- absolute amounts, i.e., in kilograms *per capita* per year to be achieved by 2030 (per country).

In the feedback, stakeholders gave roughly equal support to both variants, with a slight preference for targets expressed as a *percentage*. Expressing targets as percentage reduction has the following advantages: consistency with the formulation of other waste targets; for food processing and manufacturing, targets should refer to volume of production and cannot be effectively expressed in absolute amounts; ensures a differentiated approach by Member States (countries with high amounts of food waste need to make proportionally higher efforts, but no one is exempted from taking any action at all). Finally, targets expressed as a percentage reduction are less likely to be affected by reporting errors/inaccuracies and modification of the measurement methodology.

Targets should therefore be expressed as a percentage reduction from the baseline year (2020, or earlier if credible data are available) to the target year (2030).

Three possibilities were examined for the way in which targets should be **set**:

- the same target level for all Member States;
- target level differentiated by Member State;
- a collective target set at EU level – based on contributions from individual Member States.

Stakeholders providing feedback to the IIA most often chose the collective EU target as a preferred approach followed by the same target for all Member States, with targets differentiated by Member State receiving the least support. Interestingly from the few Member State authorities that provided feedback, all selected setting the same target level.[180]

Although setting a collective EU target could help incentivise action across the EU to reach a common target whilst taking account of Member States' different national situations, it carries significant risks. Unlike the targets established in the context of the climate effort-

[179] One of the challenges with measurement and reporting of food waste is the between waste arising from households and that generated by the food services and retail sectors – as waste from these sources are often collected together as municipal waste.
[180] See Annex 2, section *Inception impact assessment and call for evidence for an impact assessment*

sharing mechanism[181], the lack of a robust data series on food waste levels (in fact, so far Member States have only reported once according to a common methodology) would not allow an evidence-based differentiation of targets by Member States. Finally, the process of agreeing contributions to a shared, collective target is rather long, which would challenge the possibility of achieving any agreed target by 2030.

While such an approach can possibly be implemented in the future on the basis of time series data, it was considered unfeasible for this exercise. However, expressing the reduction target as a percentage already addresses, to some extent, differences between Member States. Further analysis therefore focused on assessing impacts from **setting the same target levels for all Member States**. Moreover, this approach is also consistent with commitments made by all Member States individually to achieve SDG Target 12.3 in 2015.

In order to take into account the different status as regards Member States' implementation of food waste prevention, a derogation from the 2020 baseline year (i.e. an earlier baseline) could however be envisaged for those which can provide evidence of action taken prior to that date, with monitoring confirming the progress made.[182] Due to lack of clear national monitoring and limited published data available, any earlier progress achieved by Member States (see Annex 7) could not be considered as part of the baseline for this IA.

Moreover, intermediate targets are not proposed given the short timeframe between the expected adoption of the Directive and 2030; progress of Member States will be monitored through the Early warning report[183] (Article 11b, WFD).

The detailed analysis that led to this approach is presented in Annex 10.

Voluntary vs legally binding targets

As the Inception IA focussed on the Commission's commitment to propose legally binding targets, voluntary targets were not part of stakeholders' consultations.

Voluntary targets might be more easily accepted by Member States as they are more flexible, while helping to some extent to raise awareness regarding the need to take action. They are therefore likely to fulfil the first specific objective of the initiative, that is, to assign clear responsibility for reduction of food waste to Member States. However, their disadvantage is that they cannot be enforced and therefore their effects are weaker and less predictable.

This impact assessment considers both scenarios of setting legally binding and voluntary targets.

Selecting policy options for setting food waste reduction targets

[181]https://climate.ec.europa.eu/eu-action/effort-sharing-member-states-emission-targets/effort-sharing-2021-2030-targets-and-flexibilities_en

[182] The derogation requested by Member States could be granted in accordance with a procedure similar to Art 10.3 of WFD. The Member State in question will need to notify the Commission and other Member States and provide required data.

[183] At least three years before the target's deadline, the Commission and EEA draw up, for each Member State, a report on progress towards the targets. For Member States at risk of not attaining the targets, it should include appropriate recommendations and examples of relevant best practices.

The levels selected for the mandatory targets for this IA cover the full spectrum of targets outlined in the IIA (15-50% reduction) with the voluntary target based on SDG Target 12.3. The rationale for proposing these levels is explained in Annex 10.

Option 1 is based on the minimum targets examined in 2014.

- Target for primary production – not applicable,
- Target for processing and manufacturing – 10%,
- Target for retail and consumption stages – 15%

Option 2 is a more ambitious variant with the maximum target examined in 2014 for retail and consumption.

- Target for primary production – not applicable,
- Target for processing and manufacturing – 10%,
- Target for retail and consumption stages – 30%

Option 3 reflects the targets set referred to in SDG Target 12.3 and additional commitment made by the "Food is never waste" Coalition[184].

- Target for primary production – 10%,
- Target for processing and manufacturing – 25%,
- Target for retail and consumption stages – 50%

Option 4 reflects setting a voluntary target at the level of the SDG 12.3 commitment regarding the retail and consumption stages (i.e., 50% reduction) with no numerical commitment assumed for earlier stages. This option would not be subject to enforcement mechanisms other than annual reporting of food waste levels.

The targets are expressed as a percentage change between 2020 (baseline) and 2030. For processing and manufacturing, these refer to the reduction in absolute amounts of food waste, whilst for retail and consumption, targets should refer to a percentage change in food waste levels per capita, to take into account population changes.

3.5.5. Discarded measures

During the stakeholders' consultations (IIA and public consultations[185], EU Platform on Food Losses and Food Waste), stakeholders suggested that additional measures on food waste prevention be considered. These were however discarded on the grounds that they were not proportional nor coherent with other EU legislation. A more detailed overview of the discarded measures (e.g., extending the scope of the WFD to cover on-farm food losses or relaxing feed safety rules) is provided in Annex 10.

[184] The 'Food is Never Waste' Coalition was launched by a group of partners at the UN Food Systems Summit, in 2021, to accelerate reduction of food loss and waste, toward achieving SDG 12.3. The Coalition seeks to halve food waste by 2030 and reduce food losses by at least 25%.
[185] In particular through position papers.

3.6. What are the impacts of policy options

3.6.1. Approach to analysis of the impacts[186]

As explained in sections 3.2.1 and 3.2.2, the reduction of food waste cannot be achieved by a few individual measures but rather results from the coordination of many actions carried out by multiple players. In the light of this complexity, and given lack of data on the environmental, economic and social impacts of specific food waste prevention measures, economic modelling was used to compare the options, that is, the **Modular Applied GeNeral Equilibrium Tool (MAGNET)**[187]. This global economy-wide equilibrium model belongs to the European Commission's Modelling Inventory (MIDAS[188]). As it depicts the interlinkages and rebound effects of all sectors, it is suitable for economy-wide simulation of the impacts of policy scenarios and has already been used for several food loss and waste-related assessments in high-level reports (EC[189]; FAO[190]; IFAD[191]) and supports the EU's Common Agricultural Policy, trade and other policy assessments.

The MAGNET model simulates the impact of achieving the food waste reduction targets in Member States but does not provide an analysis of concrete instruments by which Member States can implement waste reduction policies. In the model, for each policy option, it is assumed that target levels have been reached and food waste is reduced by a certain amount (Option 1, 2 or 3). Subsequently, the reduction of food waste, for instance at the consumer level, is expected to have the following market effects: first, consumers throw away less food, so they can buy less. As a result, overall food demand falls; consequently, market prices decline and, in return, provide incentives (households savings) which can be spent on different food or non-food goods and services.

The equilibrium model describes the situation after the targets are achieved (i.e., a new equilibrium is reached). If the given target is not met, the expected impacts (both positive and negative) should be proportionally reduced.

To reduce that uncertainty, the selection of food waste reduction levels to be achieved, has been done based on previous experiences from countries as well as political commitments. The uncertainty is therefore highest in areas of little or no previous experiences – in particular in the area of primary production. However, as this sector has very small impact compared to other sectors, the impact from this uncertainty on the results of the analysis is

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[186] This assessment is based on: De Jong B, Boysen-Urban K, De Laurentiis V, Philippidis G, Bartelings H, Mancini L, Biganzoli F, Sanyé Mengual E, Sala S, Lasarte-López J, Rokicki B, M'barek R. *Assessing the economic, social and environmental impacts of food waste reduction targets. A model-based analysis.* Publications Office of the European Union, Luxembourg, 2023, doi:10.2760/77251, JRC133971.

[187] Woltjer, G.B., Kuiper, M., 2014. The Magnet Model: Module Description. LEI Wageningen UR, The Hague, The Netherlands. https://edepot.wur.nl/310764.

[188] https://web.jrc.ec.europa.eu/policy-model-inventory/explore/models/model-magnet

[189] European Commission, Directorate-General for Agriculture and Rural Development, *EU agricultural outlook for markets and income 2018-2030;* European Commission, Joint Research Centre, Boysen-Urban, K., M'barek, R., Philippidis, G., et al., *Exploring changing food attitudes to respect planetary boundaries: a global, model-based analysis*, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2760/744504

[190] FAO, *The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction*, Rome, 2019

[191] IFAD, *Transforming food systems for rural prosperity. Rural Development Report 2021*.

considered to be insignificant. For more information on how the results of the MAGNET modelling should be interpreted in the light of feasibility, see section 3.7.

For Option 4, due to the voluntary nature of the target, no specific food waste reduction level could be assumed with certainty, and requires making assumptions about the level of uptake by Member States. It is expected that, on average, reduction level achieved will be higher than in the baseline scenario, but lower than in option 1 with mandatory food waste targets. This assumption is based on the fact that actions taken by Member States following their political commitments, since 2015, to the voluntary SDG Target 12.3, have not allowed the EU to make significant progress towards the global target of halving food waste by 2030. There is no reason to believe that including an obligation for Member States to set voluntary targets, in the WFD, would lead to significant improvement in this regard[192].

As regards Option 4, it is not possible to assign specific reduction level (but only a range of reduction), therefore the MAGNET model was not run for this option. As the impacts for Option 4 are expected to be in the range between the baseline and Option 1, Option 4 will be described by reference to impacts from these options.

Limitations of economic simulation models result from these being a conceptual framework representing the economy in a structured but schematic and simplified manner. By definition, they cannot reproduce reality in its full complexity and thus have shortcomings and limitations in their use, with underlying data and parameter choices affecting the uncertainties. In particular, food waste data published by Eurostat, while of good quality, so far are limited to 2020. This results in some uncertainty due to the lack of time series data, which would help assess the evolution of food waste amounts in Member States.

The empirical evidence as regards the response of food chain actors to food waste reduction is too limited to be implemented in the models (such as consumer decisions on whether to spend savings from avoided food waste on food or non-food products and services which have important impact, e.g., on farm income or jobs in the agri-food sector).

Regarding economic **parameters**, this impact assessment includes the same choices as those made in other policy assessment studies (previously cited) to ensure consistency. As part of the quality checks, elasticities in waste generation were subject to sensitivity analysis (see Annex 4, section 2.1 for details). Finally, since all options are compared to the same baseline, most of the baseline-related uncertainties are reduced in their impact and multiple result checks proved a plausible model outcome.

In addition to results of the MAGNET model, environmental benefits linked to food waste reduction have been assessed with tools developed for the Consumption Footprint indicator[193], also referred as "bottom-up" analysis, which provides support to EU policy

[192] It is assumed that some progress beyond the baseline will be achieved in particular in 12 countries with established strategies and in some of the 11 countries which have started to develop actions – see section 3.2.2.4 for analysis of the situation in Member States.

[193] Sala, S., De Laurentiis, V., and Sanye Mengual, E., *EU Food consumption and waste: environmental impacts from a supply chain perspective*, European Commission, 2023, JRC129245.

development in monitoring[194] and impact assessments,[195] enabling a highly granular analysis of the environmental impacts of consumption. The approach relies on the application of **Life Cycle Assessment (LCA)** method, which allows assessing the environmental impacts of food and food waste by modelling individual food products in their entire life cycle (from agriculture production to food waste management). The resulting environmental impacts that are avoided in the three policy options can be translated in monetary terms by applying conversion factors compiled by Amadei et al., (2021)[196]. See Annex 4 for details on models used.

3.6.2. Overview of impacts considered

Food waste reduction is expected to have a series of significant positive **environmental impacts**. The environmental benefits linked to production, consumption and waste treatment of food, which were considered as most significant are: greenhouse gas emissions, land use, water use and marine eutrophication. Other environmental benefits assessed with the Consumption Footprint indicator (e.g., ozone depletion, acidification) are considered less relevant in the context of food systems and therefore not part of this IA. Nevertheless, they are expected to show the same pattern – environmental benefits increase proportionally with the reduction of food waste.

In terms of **economic impacts**, the reduction of food waste and resulting decrease in demand of food in the EU affects the entire agri-food system and economy as a whole. In addition to the overall macroeconomic impact, the analysis presents a few indicators for the areas, where the distributional effects of food waste reduction are most visible. These are change in the value of agri-food production; change in market prices; trade balance; and farm income. The analysis also includes the presentation of estimated adjustment costs per stage of the food supply chain and per Member State. A detailed overview of economic impacts is presented in Annex 11.

The **social dimension** considered for this analysis relates to the impact of food waste reduction on prices and therefore on food affordability and potential savings for households. As the agri-food production and consumption system will be affected as a whole, the impact on jobs in the agri-food sector is also assessed.

Where impacts could not be quantified (e.g., in part of territorial impacts and the contribution to the 'digital by default principle'), a **qualitative analysis** has been performed.

3.6.3. Impact on food waste: amount of food waste prevented

Option 1 leads to an estimated reduction of food waste of around 7 000 ktons, Option 2 of around 13 000 ktons and Option 3 of around 23 500 ktons. The deciding factor for these different estimated outcomes is the food waste target set at the consumption level. An

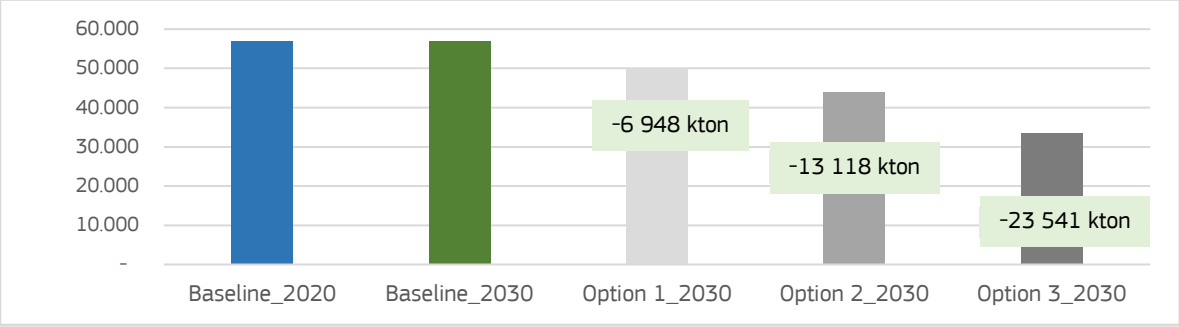
[194] The Consumption Footprint is a headline indicator of the new monitoring framework of the Circular Economy and of the monitoring framework for the 8th Environment Action Programme. Consumption Footprint – Food is being proposed for the monitoring framework of the Farm to Fork Strategy.

[195] The Consumption Footprint has been used in the IA of the 2030 climate targets or the IA of the Ecodesign for Sustainable Products.

[196] Amadei, A.M., De Laurentiis, V. and Sala, S., 2021. A review of monetary valuation in life cycle assessment: State of the art and future needs. Journal of Cleaner Production, 329, p.129668.

increased reduction of food waste in the upstream stages (i.e., 'primary production' and 'processing and manufacturing'), under all 3 options, has more limited impacts. This is due to the smaller share of total food waste attributed to upstream stages of the food supply chain.

Figure 8 – Food waste quantities in the baselines 2020 and 2030, and in scenarios 2030



Source: MAGNET simulation results (2020 baseline based on ESTAT 2022)

Details on reduction of food waste per stage of the food supply chain as well as reduction per food commodity group are presented in Annex 11. All quantified impacts directly depend on the amount of food waste prevented. As mentioned earlier, reduction of food waste from Option 4 would be between Baseline 2030 and Option 1 (i.e., less than 7 mln tonnes).

3.6.4. Environmental impacts

Estimations with the MAGNET model take into account rebound effects of reduced household food expenditures that could result in rising non-food expenditures, which could lead to increases in emissions from other economic activities. As Table 4 shows, while there is a reduction in total GHG emissions in the agrifood, landfill and other waste treatments in the EU, in the rest of the economy there is a slight increase in GHG emissions (+0.3% in Option 3). Still, Option 2 and Option 3 lead to reductions in emissions as a whole. In addition, reduction in emissions in non-EU countries are observed due to a decreasing trend in their exports to the EU (linked to reduced demand for food). The modelling does not take into account other policy constraints, such as the national greenhouse gas emissions reduction targets established in the EU. In reality the rebound effect may actually translate in the need to take less measures in other sectors to achieve the agreed GHG reduction targets, reducing overall mitigation costs in the economy with the same environmental effect.

Table 4 – Savings of GHG emission, MAGNET model results, scenarios vs the baseline

Emission reductions per sector of economy, changes vs. baseline		**Option 1**	**Option 2**	**Option 3**	**Option 4**
		Absolute change, million tCO2eq (% change)			
EU	**Agri-Food**	-3.5 (-0.6%)	-6.9 (-1.3%)	-11.3 (-2.1%)	-3.5 - 0
	Landfill	-1.1 (-2.3%)	-2.5 (-5.0%)	-4.5 (-9.1%)	-1.1 – 0
	Other waste treatment	-0.3 (-2.6%)	-0.5 (-5.0%)	-0.9 (-8.6%)	-0.3 – 0

	Rest of the economy	2.9 (0.1%)	6.0 (0.2%)	10.2 (0.3%)	0 – 2.9
	TOTAL	-2.0 (0.0%)	-3.9 (-0.1%)	-6.5 (-0.2%)	-2 – 0
Non-EU	***TOTAL***	-6.2 (-0.01%)	-12.6 (-0.03%)	-21.3 (-0.05%)	-6.2 - 0

Source: MAGNET simulation results

Avoided **emissions calculated with the bottom-up analysis** are significantly higher in quantity, but the pattern remains the same. Both methodologies show that savings in amounts of food waste, at any stage of the food supply chain, have a direct positive impact on reduction of GHG emissions, both within the EU and globally. According to the bottom-up analysis, which considers emissions embedded in food during its full life cycle (e.g., emissions from production of fertilisers, transport of food or electricity for freezers, waste treatment at end of life), the consumption phase has a major role in the overall avoided emissions as, in a life cycle perspective, products wasted at consumption accumulate all the impacts created in the previous steps of the supply chain. Food waste generated at this stage contributes to 65% of the GHG emissions associated with food waste generation in the 2030 baseline, while the primary production stage accounts for 2%. For this very reason, a target for primary production has only a small impact on avoided emissions overall.

Other environmental impacts considered for this IA – **land use, marine eutrophication and water use** – show a similar pattern for the impacts. An overview of the results obtained with the bottom-up analysis is provided in *Table 5* and a comparative analysis with MAGNET in Annex 11.

Table 5 – Environmental savings linked to food waste reduction according to the bottom-up analysis (the values in brackets are the % savings compared to the impact of food waste in the baseline)

Environmental impact category	**Option 1**	**Option 2**	**Option 3**	**Option 4**
GHG emissions [Million tCO2eq]	-33 *(-14%)*	-62 *(-25%)*	-108 *(-44%)*	-33 - 0
Land use [Trillion Pt][197]	-1.2 *(-14%)*	-2.2 *(-26%)*	-3.8 *(-44%)*	-1.2 - 0
Marine eutrophication [Million kg N eq.]	-283 *(-14%)*	-532 *(-26%)*	-922 *(-45%)*	- 283 - 0
Water scarcity [Bn m3 water eq.]	-43 *(-13%)*	-80 *(-24%)*	-141 *(-42%)*	-43 - 0

Summary of environmental impacts: All options deliver significant environmental benefits. The magnitude of benefits increases with the scope and level of targets, from Option 1 to Option 3. The benefits would be lowest for Option 4.

3.6.5. Economic impacts

Reducing food waste leads to a reduction in the **overall demand for food**[198] compared to the baseline in 2030 for all options (option1: -2.1%; option 2: -4.2%; option 3: -7%) and, in consequence, to increased availability of agricultural commodities in the short to medium term.

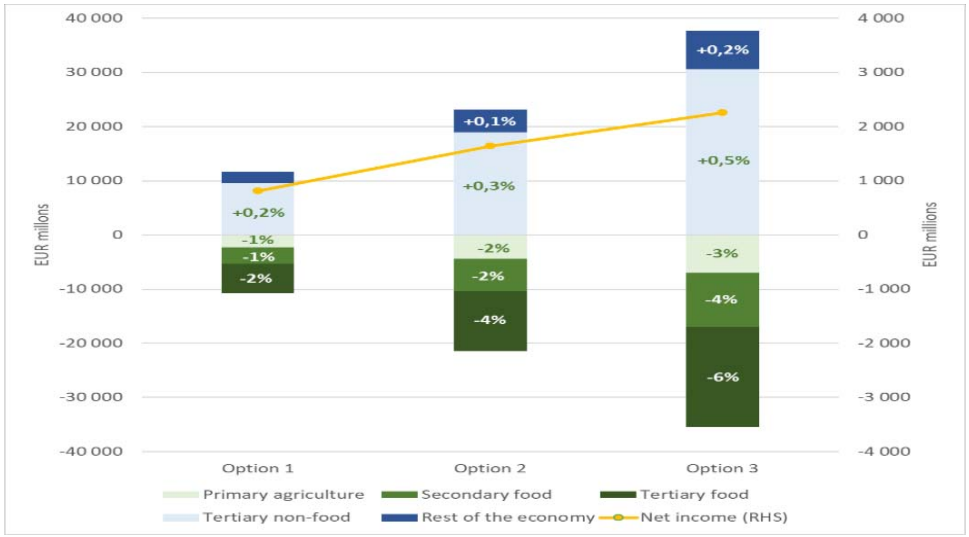
[197] Dimensionless (point) unit representing soil quality index (LANCA model) - taking into account erosion resistance, physicochemical filtration, groundwater regeneration, mechanical filtration and biotic production.
[198] The MAGNET model already includes increased purchases due to improved affordability of food.

Reduction in **consumer demand** increases from Option 1 to Option 3 as more food waste is avoided and food remains available for human consumption or for other uses. This reduction in demand does not fully translate into a reduction of production and is instead likely to be partly counterbalanced through a decrease in imports of certain products and a slight increase in exports, which results in an improved agrifood trade balance. The reduction in consumer demand is highest for vegetables, cereals and fruits as these are the commodities with the highest waste shares. Detailed impacts on the consumer demand for selected commodities, including per individual country, are available in Annex 11.

The economy in the EU27 as a whole is in all three options only marginally affected. Calculating a standard measure for macroeconomic impacts, i.e., the value added at basic prices (output minus intermediate consumption), hereafter called "income", the EU27 shows a slight increase of **net income** of more than EUR 2 bn (0.022%) in option 3. Also, for options 1 (EUR 0.8 bn, 0.008%) and 2 (EUR 1.6 bn, 0.016%), the overall economic impact is positive.

Dividing the effects into representative sectors of the economy, the options show incremental income reductions in the food chain, which in absolute terms are overcompensated by gains in non-food sectors. While the effects in primary agricultural production and secondary food processing are following established supply-demand patterns, the impacts in the tertiary food sector (food service) are considered at the higher end (i.e., most conservative/pessimistic), as the exact behaviour of actors could not (yet) be empirically proven. The model depicts that most of the positive income change comes from tertiary non-food – i.e., non-food services. The net income changes on Member States level depict some heterogeneity, with most countries showing no or small positive changes. Generally, the absolute income change is higher for large countries with strong economy (see Annex 11, section 2.3.5. *GDP and income*).

Figure 9 – Income changes in the EU27, Options compared to baseline (2030) for different actors



Note: Rest of the economy includes a broad number of sectors with either positive or negative income changes. Again, Option 4 would be placed between 0 and Option 1.

Source: MAGNET simulation results

Production of agricultural sector and market prices of food

As a result of reduced demand for food, production and prices are expected to decrease and achieve a new market equilibrium at which less agricultural commodities are sold, at lower market prices (with a reduction respectively between 0.03% up to 1.35% under Option 1, between 0.10% to 2.59% under Option 2, between 0.16% and 4.02% under Option 3) on the domestic market. See Annex 11, sections 2.3.2. and 2.3.3. for more details.

Trade impacts

Reduced demand for food means that consumers purchase less of domestically produced as well as imported food commodities. For some products which become more competitive because of lower prices on the world market, exports from EU to non-EU countries may therefore slightly increase.

The generally decreasing trend in extra-EU imports and increasing trend in extra-EU exports leads to an improvement of EU's agrifood trade balance across all scenarios versus the baseline in 2030. The maximum expected increase is observed in Option 3, which amounts nearly to EUR 7 900 million. The highest increases in the agri-food trade balance are seen in the fruits sector (Option 1: EUR 340 m; Option 2: more than EUR 600 m; Option 3: EUR 1 bn) and the vegetable sector (Option 1: EUR 200; Option 2: EUR 390; Option 3: over EUR 600 m).

The model shows the maximum change, based on the assumption that non-EU countries will not reduce their food waste generation. If they do reduce food waste – in line with the SDG Target 12.3 – the EU's advantage will decrease proportionally to their progress.[199] Due to lack of solid data from non-EU countries, it is not possible to quantify the potential change in the trade balance.

Farm income

Farm income is expected to decrease due to lower food demand and lower prices as explained above. Income losses in the crop sector are higher than in the livestock sector (reflecting the higher share of fruit, vegetables and cereals in total food waste[200]). Option 1 leads to a decrease of around EUR 2.2 bn in farmers' income from crops (EUR 1.4 bn) and livestock farming (EUR 0.8 bn), whereas in Option 2 this decrease reaches EUR 4.2 bn and in Option 3 – EUR 7 bn. This corresponds to a decrease of a total of 3.5% for primary agriculture in Option 3. The income in the total agri-food sector (including food processing but not food services) could experience, in the EU, a similar decrease of about 3.6% in Option 3. The model does not take into account possible developments in production systems and consumption habits[201], such as increased consumption of fruit and vegetables, linked to the transition to sustainable food systems, and which could trigger needs for new products and/or services (e.g., shift to organic farming or increased demand for local products and shorter supply chains). Moreover, these possible negative impacts

[199] On condition that other variables (e.g., population size) will not change.
[200] Promoting the shift to healthier and sustainable diets, as called for by the Farm to Fork Strategy could, however, increase demand for fruit and vegetables.
[201] FAO's SOFA report (2019) indicates that whilst reducing food waste at retail and consumption may lead to reduced farm income, lower prices may also encourage consumers to trade-up their food purchases to more expensive, higher quality food.

may be further mitigated by an increased demand for food globally, linked to the expected growth of the world population and evolving food consumption habits[202]. For this reason, the numbers above should be treated rather as a worst-case scenario.

Costs of implementation – distribution per stage of food supply chain

The reduction of food waste requires both producers and consumers to modify their behaviour. This may entail costs (e.g., additional time required for planning purchases, loss of convenience etc.), not all of which relate directly to financial impacts and cannot easily be quantified. The survey[203] and literature review show a non-conclusive picture for financial costs with values ranging from 8 up to more than 6000 EUR per tonne of avoided food waste[204].

For this assessment, the financial and non-financial costs associated with the implementation of food waste reduction actions along the stages of the food supply chain up to end users are estimated by imposing adjustment costs (simulated for the purpose of the model by inserting taxes) on those agents that generate food waste from the farmgate to the end user (for details see Annex 4, section 2.1.3). As shown in the table below, such costs increase more than proportionally when moving towards more ambitious options as food waste prevention actions usually first target the areas where savings are easiest to achieve.

It should be noted that the adjustment costs (for all groups in the food supply chain) assessed here are not determined as a function of the impact of food waste reduction on the income of farmers or the food sector, trade or other elements. They are calculated independently and then used as a variable for quantifying the economic impacts associated with reaching the assumed food waste reduction levels. The total adjustment costs for food waste reduction are calculated in the following way: in the model it is determined, for each group of actors in the supply chain (i.e., primary producers, food processors, retailers, households), the costs of achieving a specific food waste reduction target, i.e., linked to the change of behaviour of the supply chain actors. These adjustment costs are estimated to be around EUR 0.9 bn for Option 1, EUR 2 bn for Option 2, and EUR 3.8 bn for Option 3 and are much smaller than the economic impacts on the food supply chain caused by market (including trade) and income effects due to the reduced food demand.

Adjustment costs for food waste reduction along the stages of the food supply chain to the end users are shown in the table below, while further information and graphs are in Annex 11, section 2.3.6. Since the largest portion of food waste is generated at the consumption stage, the costs associated with food waste reduction at this stage are the highest (exceeding EUR 3 bn in Option 3). Costs for the industry are estimated to be lower.

[202] SWD(2023) 4 final *Drivers of food security* (section 8.24. Food choices and 8.25. Demographic trends)
[203] Targeted consultations on food waste prevention initiatives aimed at collecting quantitative data on costs of the waste prevention initiatives and amounts of food waste prevented. See Annex 2 for more details.
[204] It is worth to compare these costs with the value of avoided food waste at consumption level, which is on average 2860 EUR/t (source: JRC food waste prevention calculator - https://eplca.jrc.ec.europa.eu/permalink/valeria/prevention_action_calculator.xlsm)

*Table 6 – A*djustment costs per sector of the food supply chain

EU27 - total costs, EUR millions					
	PRIM	PROC	RETAIL	HH	TOTAL
Option 1	1	166	108	670	945
Option 2	2	157	183	1,651	1,993
Option 3	46	286	306	3,147	3,786
Option 4	0-1	0-166	0-108	0-670	0-945

Source: MAGNET simulation results

Regarding adjustment costs of food waste reduction per ton of food waste reduced, the highest costs occur for households – reaching up to EUR 160 per ton (Option 3) on average of food and agricultural products (see Table 7 below). However, costs for the retail and distribution sector are also estimated to be over EUR 100 per ton (Option 3) if food waste reduction targets are high (50% for Option 3).

The distribution of costs between the Member States shows that for countries smaller in size and/or with relatively lower food waste quantities than the EU average in the baseline the total costs are negligible with higher costs for bigger/richer countries (see Annex 11, section 2.3.6).

Table 7 – Main economic impacts

Impacts	**Option 1**	**Option 2**	**Option 3**	**Option 4**
Change in overall income in economy [EUR]	0.8 bn	1.6 bn	2.3 bn	0 to 0.8 bn
Change in demand for food	-2.1%	-4.2%	-7%	-2.1% to 0
Change in the value of agri-food production	-0.9%	-1.8%	-3.0%	-0.9% to 0
Change in market prices of food	-0.0% to -1.4%	-0.1% to -2.6%	-0.2% to -4.0%	-0.0% to -1.4%
Trade Balance (TB) per sector[205] [EUR]	AGRI TB: 1.4 bn FOOD TB: 1.1 bn	AGRI TB: 2.7 bn FOOD TB: 2.2 bn	AGRI TB: 4.3bn FOOD TB: 3.6 bn	AGRI TB: 0 to 1.4 bn FOOD TB: 0 to 1.1 bn
Farm income [EUR]	-2.2 bn	-4.2 bn	-7 bn	-2.2bm to 0
Estimated adjustment costs per stage of the food supply chain per ton	PROC:14 RETAIL: 25 HH: 20	PROC: 13 RETAIL: 51 HH: 59	PRIM: 6 PROC: 29 RETAIL: 123 HH: 158	PROC: 0-14 RETAIL: 0-25 HH: 0-20

[205] AGRI includes all primary agricultural commodities (crops and livestock), FOOD includes all processed food commodities, including food services.

of food waste reduction[206] [EUR/ton]				
Aggregated adjustment costs per ton of food waste reduction [EUR/ton]	17	41	102	0-17
Total adjustment costs for food waste reduction for actors in the food chain [EUR]	0.9 bn	2.0 bn	3.8 bn	0 to 0.9 bn

Source: MAGNET simulation results

Summary of economic impacts:

Food waste reduction by 2030 will have impacts on the economy of the whole food system. The magnitude of such changes increases from Option 1 to Option 3. However, the MAGNET model shows that negative economic impacts on the food production sector are compensated by positive effects in other economic sectors. Even for the most ambitious reduction targets for food waste (Option 3), the associated negative economic impacts for the most affected actors (i.e., primary producers and processing and manufacturing) are not significant (not more than 3.6%[207]) and impacts on the economy as a whole are marginally positive. Reaching the targets set in Option 1 comes at a comparably low cost per ton, while costs tend to increase more than proportionally when moving to medium (Option 2) and high (Option 3) targets. It may be expected that cost of reduction of food waste (per tonne of food waste avoided) would be the lowest for Option 4.

3.6.6. Social impacts

Food affordability

The average share of food expenditure (agri-food and food services) in total household expenditure in the EU for 2020 was around 19%, which, in the baseline scenario, is projected to decrease by 1.5 percentage points in 2030[208]. However, this share differs across Member States.

In all policy options examined, the share of food expenditure is expected to fall further, mostly because of decreased demand for food and food price reductions. The model shows that consumer prices may also change; however, these are small (generally around 1%)[209] and of a mixed pattern for different countries and different types of food (see Annex 11).

Due to an expected decrease in food prices, and the reduced amount of food (and food services) purchased, households could save, on average, from EUR 220 to over EUR 720 per year (depending on target levels) and spend these amounts on better food or other goods

[206] PRIM – primary production. PROC – processing and manufacturing. HH - households (including out-of-home consumption (food services)).

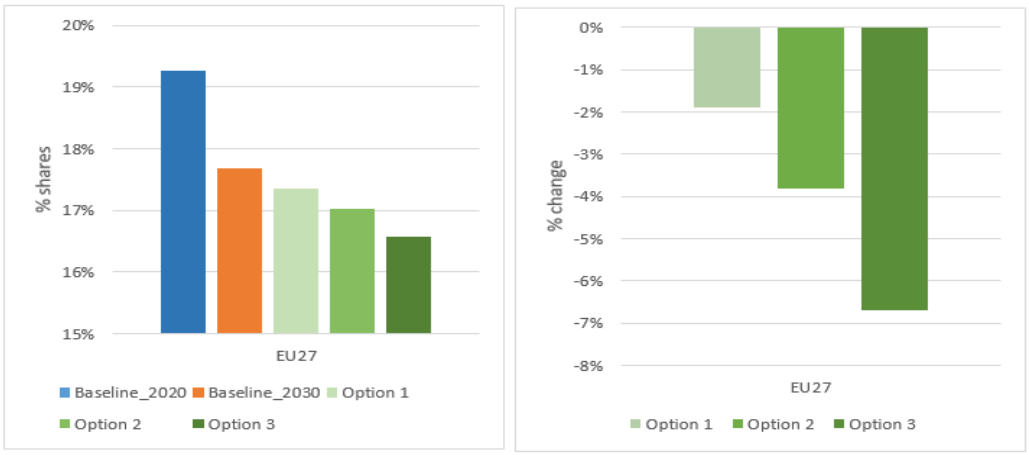
[207] With most pessimistic assumption that all savings on avoided food waste will be spent for non-food products and services.

[208] *EU agricultural outlook for markets, income and environment 2022*-2032, p. 43. See note 115, page 37.

[209] The price effect on the consumer side compared to the farm gate is normally reduced because of the varying and smaller share of farm income, in the final product price.

and services. Such savings are particularly relevant in the current context of rising food prices. See Annex 11 for presentation of country-specific data.

Figure 10 – Food expenditure shares and percentage change deviations in food expenditure share scenarios vs baseline 2030



For Option 4 share would be between 17.4 and 17.7%, while change would be below 2% - i.e., between Baseline 2030 and Option 1.
Source: MAGNET simulation results

Jobs in the agri-food sector

According to the simulations carried out with the MAGNET model, all options generally seem to lead to a decrease in employment in the agri-food sector, compensated by increased employment in non-food sectors. However, the results as regards the reduction of jobs need to be interpreted with caution due to methodological limitations as well as scarcity of relevant data. For instance, as mentioned in the section on farm income, the model does not take into account the possible need for new products and/or services (e.g., shift to organic farming which is more labour intensive). For this reason, also here, the numbers below should be considered as a worst-case scenario. Moreover, Member States which have already made progress in reducing food waste have not reported any decrease in jobs in the food supply chain as a consequence of food waste reduction.

Keeping in mind the abovementioned limitations, the model finds that the decrease in employment in the agri-food sector depends on the level of the food waste reduction target and amounts to 70, 135 and 220 thousand jobs, respectively, for Options 1, 2 or 3 compared to the baseline scenario. In percentage change, this means a reduction for the primary production and food processing/manufacturing sectors of 0.7, 1.3, 2.1% jobs, respectively. However, job reduction in primary production and processing/manufacturing sectors, as a consequence of food waste prevention, is expected to be compensated by job increases related to new service requirements and/or food valorisation in the agri-food sector[210] as well as opportunities in non-agri-food sectors due to increased demand. For instance, based

[210] Other elements of the Farm to Fork Strategy – such as seeking to convert a greater share of land used for food production to organic, which tends to be more labour-intensive than conventional farming – will create additional jobs. Hence reducing food waste could also be seen as an opportunity to free up qualified labour in the agri-food sector to enable implementation of other initiatives linked to sustainable food systems.

on data from surveys to stakeholders, the number of new jobs created is estimated for options 1, 2 and 3, at: 6,700, 12,500 and 22,300 respectively, for roles such as: logistics operators in food banks, coaching supermarkets' staff as part of food redistribution initiatives, collection/transport of products deriving from the valorisation of surplus food and by-products.

Moreover, the MAGNET model calculation for the food services sector, which estimates a rather strong reduction, does not differentiate between the impact of food waste reduction on consumption in- and out-of-home. If food service operators reduce food waste in their businesses, such action does not reduce consumer demand for the services as such; hence the possible impact on jobs is expected to be much more limited, if any.

Table 8 – Social impacts

Impacts	Baseline	Option 1	Option 2	Option 3	Option 4
Change in jobs in agri-food sectors[211]	10.6 m	- 70 000, -0.7%	- 135 000, -1.3%	- 220 000, -2.1%	-70 000 to 0 -0.7-0%
Average share of food expenditure (agri-food and food services) [total household expenditure]	17.7%	17.4%	17.0%	16.6%	17.4-17.7%
Savings in food expenditure per household (of four persons) [EUR per year]	-	221	439	724	0 - 221

Source: MAGNET simulation results

Summary of social impacts:

Quantifiable social impacts are strongly linked to economic impacts and show a similar pattern. The greater the reduction of food waste, the better the options perform in terms of food affordability and household savings. On the other hand, the magnitude of negative impacts on employment in the agri-food sector rise from Option 1 to Option 3, which are, however, expected to be compensated through new job profiles in the sector and gains in other economic sectors.

From the responses to the IIA (see Annex 2 – synopsis report), it emerged that the contribution to food security related to the saving of food that might otherwise be wasted and its redistribution to those in need is seen as the main social benefits deriving from food waste prevention initiatives. Moreover, additional benefits related to awareness raising on the value of food, training provided to employees and volunteers, education and social cohesion were also reported. There are also negative social impacts such as "inconvenience" or the so-called 'labour-leisure' trade-off (i.e., "lost" leisure time linked to more attention to food preparation, more trips to the supermarket etc.).

These impacts are not specifically addressed as they are regarded as minor, however these factors are integrated in the estimation of the costs linked to reduction of food waste at consumption level.

[211] i.e., primary production and processing and manufacturing and not including retail and food services.

3.6.7. Impact on SMEs

The scope of the initiative in the area of food waste is limited to setting food waste reduction targets for Member States and will not apply to individual businesses directly. While Member State authorities will likely engage with all actors in the food supply chain, the actions observed so far in countries which have undertaken coordinated actions to reduce food waste focus on larger businesses and on voluntary measures encouraging engagement in food waste prevention supported by government financing. For more examples on how Member States implement such policies see Annex 7 and Annex 15 (SME Test). It is to be noted that SMEs can be indirectly impacted as part of the supply chains of large companies and changes in strategic decisions by big retail chains. In addition, a change in the business environment due to a reduction in demand for food is estimated to affect SMEs in the same way as for other businesses, with most impacted industries being the food manufacturing, waste collection and treatment and food services.[212] Yet, the impact may be proportionally higher on SMEs due to limited resources, the lower ability to absorb shocks and access to finance. See Annex 11, section 2.5.2 for more details.

3.6.8. Territorial distribution of economic and social impacts

Those regions whose production structure is more orientated towards the sectors most affected by food waste reduction (agriculture, food manufacturing and waste) will also be the most exposed to its overall economic and social impact (see Annex 11, section 2.5.3 for more details). A greater differential impact is expected in the less developed regions (per capita GDP below 75% of the EU average) due to the higher importance of the agricultural and waste collection sectors in their economic activity structure. However, the impact is expected to be marginal as even in Option 3, the economic and social impacts do not exceed 0.5% of both total value added and employment by region.

3.6.9. Impact on fundamental rights

There is no impact on **fundamental rights**.

3.6.10. 'Digital by default' principle and digitalisation

New **digital and smart technologies** can play a role in food waste prevention, such as in the areas of diagnosis and planning (e.g., linked to waste measurement) or food sharing (e.g., use of applications). Any binding target is expected to create incentives for new digital solutions or increase their use; however, the impact of targets on uptake of digital technologies cannot be assessed due to little data on the use and contribution of these technologies on food waste to date.

3.7. Feasibility analysis

The feasibility of reaching the food waste reduction targets set out in the options is understood as the expected ability of Member States to reach the proposed targets. It was assessed taking into account two main criteria:

[212] Farms are not considered as SMEs in Eurostat's Structural Business Statistics data, but it can be expected they will be impacted in similar way.

- the fraction of food waste which can be avoided (i.e., edible);
- the experiences from countries and the results obtained in the last decade.

Concerning the **first criterion**, the data reported so far do not provide a solid EU overview of how much food waste could be avoided. The rough estimation made by JRC suggest that the maximum theoretically achievable level of reduction would be about 70% for retail and consumption stages (see Annex 11, section 2.6 *Feasibility Analysis*). Of course, higher targets are more difficult to achieve.

Concerning the **country experiences**, an analysis was conducted on national food waste strategies and policies on food waste reduction, including their implementation, monitoring and reporting. Moreover, a search for quantitative data on food waste reduction reported by Member States and the United Kingdom was performed[213]. The data search used various sources: information shared in the EU Platform on Food Losses and Food Waste and on the EU Food Loss and Waste Prevention Hub; information gathered by the survey for Member States launched as part of the stakeholder consultation (see Annex 2); national websites; reports from other organisations (e.g., Waste and Resources Action Programme (WRAP), etc.

The results of the analysis show that **monitoring and evaluation** of food waste prevention initiatives is not a widespread practice and where it exists, there is a lack of quantitative indicators (see Annex 11, section 2.6). Moreover, no Member State has reported food waste reduction achieved in primary production, and it is therefore not possible to assess the feasibility of reaching food waste reduction targets for this stage of the supply chain.

As regards the **governance and enforcement capacity** of Member States related to food waste prevention, the experience of leading countries (discussed in section 3.2.2) does not identify any specific technical barriers, suggesting that these should be relatively easy to establish under all options. The WFD already lays down obligations for Member States to establish national food waste prevention programmes, which Member States can make full use of in order to achieve the future targets. The progress of Member States depends more on the level of prioritisation of food waste reduction (including allocation of human and financial resources) and the breadth of the approach taken at national level.

However, the **time remaining to reach the target** also plays a role when considering the feasibility of food waste reduction, with sufficient level of prioritisation being essential in order to achieve higher target levels. It is important to consider that Member States are at different stages in their implementation of such initiatives and, therefore, it cannot be assumed that all could replicate results similar to those achieved by leading countries in the given timeframe. While levels of food waste differ between EU Member States, the targets expressing food waste reduction as a percentage means that countries with lower food waste generation will need to make proportionally less efforts to meet the targets.

In order to make progress in reducing food waste, Member States must adopt an **evidence-based systemic approach** including: 1) carrying out a food waste diagnosis (where food waste occurs, who wastes food, how much and why); 2) identifying actions to address hotspots aiming to improve supply chain efficiency and support consumer behavioural change; 3) establishing clear accountability for food waste reduction within government (e.g., designation of a national competent authority); 4) ensuring an appropriate

[213] The UK was considered in the analysis due to the fact that this country is a pioneer in food waste reduction, implementing evidence-based interventions with regular measurement of progress since 2007.

governance mechanism, led by an authoritative, credible body, to effectively coordinate a national action plan or strategy, involving both public and private sectors; 5) monitoring, reporting and sharing learning on progress made. (Country case studies and further information on national policy initiatives are presented in section 3.2.2 and Annex 7, section 2, section on 'national policies & monitoring').

Member States may also find opportunities to streamline both their allocation and use of resources by **integrating food waste reduction under other policy strands** relevant to the establishment of sustainable food systems, for example in initiatives related to bioeconomy (e.g., Denmark), circular economy (e.g., Denmark, France, Greece, Spain, Sweden) and in particular climate action. For example, Finland has, in 2017, highlighted the reduction of food waste as a climate policy measure in its report on Medium-term Climate Chance Policy Plan for 2030, Germany in its 2015 Climate Action plan, France in its National Low-Carbon Strategy and, outside the EU, Norway has integrated food waste reduction actions in the public and private sectors as part of their Climate Plan 2021-2030.

Still, although Member States committed, as of 2015, to meeting SDG Target 12.3 – which calls for reducing food waste at levels in line with Option 3 – actual progress achieved to date shows that achieving this target level by 2030 would be extremely challenging for the Member States, even with full prioritisation of food waste reduction and allocation of related resources.

However, efforts taken by individual countries and organisations, if replicated by others and when combined with binding food waste reduction targets, are expected to deliver more significant results. **Experience gained by front-runners show the potential** – such as reductions in household food waste reported by the Netherlands (30% reduction over 12 years) and the United Kingdom (17.8% reduction over 11 years). Results and knowledge gained regarding the efficiency of food waste prevention initiatives, better tools and continued sharing of best practice through the EU Platform on FLW and the wide range of existing, ongoing and planned initiatives at EU level (which are detailed in section 3.2.2, 3.5.2, Annex 7 and Annex 10) will support Member States in reaching the targets.

The continued integration of food waste prevention in other EU policy areas (e.g., date marking or marketing standards) and voluntary industry measures such as the Code of Conduct on Responsible Food Business and Marketing Practices[214] are also expected to contribute to food waste reduction in the EU and facilitate compliance with the targets.

Based on the performance of leading countries, table 9 assesses the likelihood that EU Member States as a whole, would be able to implement national policies allowing them to reach the targets included in the selected options, by 2030.

Table 9 – Overview assessment of the feasibility of different policy options (target levels to be achieved by 2030)

	Primary production	Processing & manufacturing	retail and consumption*
Option 1	Not applicable	+	+
Option 2	Not applicable	0/+	0/+
Option 3	?	-	-

[214] European Commission, Food Safety, *EU Code of Conduct on Responsible Food Business and Marketing Practices,* 2021

Option 4	Not applicable	Not applicable	++

* considering only results achieved at household level

++ easily achievable; + achievable ;; – very difficult to achieve; 0 difficult to achieve; ? uncertain;

The table above shows that the second option would already require significant efforts from Member States while reaching the third option by 2030 would be more challenging, in particular given the need to more effectively address behavioural drivers in order to reduce consumer food waste. This analysis also shows that uncertainty exists as to the feasibility of achieving food waste reduction at primary production level, although the impacts from this stage of the food supply chain is insignificant (see Section 3.6). As regards Option 4, since voluntary targets are expected to be easy to achieve, it scores highest on feasibility.

3.8. How do the options compare?

This section compares the expected impacts of the options in terms of their overall effectiveness, efficiency, feasibility, coherence, and proportionality.

Table 10 – Comparison of food waste reduction policy options

Criteria	Baseline	Option 1	Option 2	Option 3	Option 4
Effectiveness					
SO1: assign clear responsibility to Member States for accelerating reduction of food waste in the EU, in line with EU and global commitments.	0	+	++	+++	+
SO2: ensure sufficient and consistent response by all Member States, in line with that of front-runners.	0	+	++	+++	0/+
Efficiency		+	++	+++	+
Coherence					
Internal coherence	0	+	+	+	+
External coherence	0	+	++	+++	+
Technical feasibility (*based on feasibility analysis – section 3.7*)	0	+	0	-	++
Proportionality	0	+	++	++	+

The scores are given on the expected magnitude of impact as explained above: + + + being strongly positive, + + positive, + moderately positive, –/+ neutral, – moderately negative, – – negative and – – strongly negative. For technical feasibility: + means that the assessment is positive, 0 means neutral and – means that it is negative.

EFFECTIVENESS. In terms of assigning clear responsibility to Member States for accelerating reduction of food waste in the EU by 2030 (**specific objective 1**), all options make a **contribution towards achieving EU and global commitments** and perform better than under the baseline. All targets are clearly time bound, built on an existing monitoring mechanism of the WFD and measured through an established common methodology. Moreover, the compliance check by the Commission is based on the existing mechanism of the early warning report in the WFD[215]. If targets are not met, they can be enforced by infringement procedures. For these reasons, all options score positively.

[215] WFD – Art. 11b – see also footnote 178, page 58

The different scores assigned to the different options reflect **the extent to which they allow to reach EU and global commitments**. Options 1 and 4, which allow for the lowest level of food waste reduction, is assigned the lowest score. Given that most of food waste is generated at the household level, introducing higher targets at the consumption level (Option 2: 30% and Option 3: 50%), leads to larger decreases in total food waste generation. For this reason, Option 2 scores higher than Option 1. Option 3 scores the highest due to the reduction foreseen at consumption level in line with SDG Target 12.3 and as it is the only option that also requires to address food waste at primary production.

In terms of the **ensuring sufficient and consistent response by all Member States to reduce food waste, in line with that of front-runners** (**specific objective 2**) all options score positively, as it is expected that the targets proposed will lead Member States to take more effective action than under the baseline. However, due to lower levels of targets, Option 1 requires less significant prioritisation of food waste prevention at national level and thus focuses on results that could be achieved with more limited efforts and resources from national authorities. For instance, it cannot be guaranteed that an evidence-based approach coordinated at national level and involving all players (see drivers 4, section 3.2.2.) will be taken up as a key principle to achieve results under this option. Similarly, there is a risk that in a situation with lower levels of targets, business operators would not be inclined to invest in new processes or use emerging technologies. As Option 4 is voluntary, by definition, and considering the experience to date in the light of the longstanding voluntary SDG Target 12.3, this option cannot ensure that Member States take sufficient and effective action, and therefore it is assigned with the lowest score, just above the baseline.

Options 2 and 3 require Member States to take an active role and strongly engage in food waste reduction and therefore score higher than Option 1. In particular, such higher targets are expected to encourage Member States to carry out clear diagnosis, define actions to address the hotspots identified, define a clear governance, and engage all players, including food business operators and consumers. They are also expected to better and more systematically leverage existing guidelines and best practices and provide the necessary incentives.

Finally, the stronger responses required under Option 3 fort the consumption level require very far-reaching measures. As Option 3 seeks to reduce food waste at primary production, a consistent response will also be required in this area. For these reasons, Option 3 scores the highest.

EFFICIENCY. The analysis carried out in this IA bases its economic assessment mainly on a general equilibrium model (MAGNET). The key measure for cost and benefits is the change of value added/income, which reflects the net impacts on the actors in the whole economy and its different value chains in a coherent manner. This would result in net income increases of about EUR 0.8 bn (Option 1), EUR 1.6 bn (Option 2) and EUR 2.3 bn (Option 3). While the costs of reduction of food waste increase with the ambition level (see point on adjustment costs in section 3.6.5), these costs are compensated in terms of impact on the economy as a whole.

It should be noted that most of the environmental and social impacts are not fully quantifiable in monetary terms and additional quantification for the purpose of efficiency requires combining outcomes from different methodological approaches. Therefore, the

environmental benefits are calculated from the bottom-up approach and based on the assumptions presented in Annex 4, section 2.2.1. Overall, the options could lead to monetised environmental savings of EUR 5-12 bn (Option 1), EUR 9-23 bn (Option 2) and EUR 15-40 bn (Option 3). It should be noted that benefits from avoided GHGs emissions are global, while costs are borne within the EU. As Option 4 is expected to perform in a range between baseline and option 1, it is expected to deliver some economic and environmental benefits, but at lower scale than Option 1.

Table 11 – Overview of net benefits in monetary terms (and cost-benefit ratio)

Benefits and cost	**Option 1**	**Option 2**	**Option 3**	**Option 4**
Economic:				
Sectors of the economy				
Primary agriculture	-2.2 bn EUR	-4.3 bn EUR	-7.0 bn EUR	-2.2 - 0
Secondary food (processing and manufacturing)	-3.1 bn EUR	-6.0 bn EUR	-10.0 bn EUR	-3.1 - 0
Tertiary food (food services)	-5.5 bn EUR	-11.1 bn EUR	-18.4 bn EUR	-5.5 - 0
Tertiary non-food (non-food services)	9.6 bn EUR	18.9 bn EUR	30.6 bn EUR	0 – 9.6 bn EUR
Rest of the economy	2.0 bn EUR	4.2 bn EUR	7.1 bn EUR	0 – 2 bn EUR
Total change of value added/income in economy*	0.8 bn EUR	1.6 bn EUR	2.3 bn EUR	0 - 0.8 bn EUR
Environmental: Overall environmental savings monetised	5-12 bn EUR	9-23 bn EUR	15-40 bn EUR	0 - 12 bn EUR
Social	+	+	+	+
Benefits to cost ratio	+	++	+++	+

* The economic net benefits include all benefits/gains and costs/losses throughout the whole economy.

Source: MAGNET model simulation; environmental results: bottom-up approach

Concerning social impacts, while there are negative impacts on jobs in agri-food industries, which increase from Option 1 to Option 3 (see *Table 8*), the model results depict them to be balanced by increases in jobs in the non-food sectors. In addition, all options result in savings on food spending at household level, with savings also increasing from Option 1 to Option 3. Therefore, the balance of social impacts is regarded as equally positive for all options, with a higher focus on benefits at household level in the most ambitious options and a new equilibrium in the job distribution along the food supply chain and the whole economy.

In terms of overall efficiency, all options provide a good balance between costs and savings and benefits for society at large, with Option 3 scoring clearly highest. While all options have a marginal (but positive) impact on economy they offer significant environmental benefits in the EU and at global level.

COHERENCE. As all options are about the setting of reduction targets – either legally binding (Options 1, 2 and 3) or voluntary (Option 4)- without imposing any additional measures, **internal coherence** with EU food waste policies is ensured. The coherence between the policy options on textiles and food waste is also ensured: related measures address specific problems and do not overlap, and they contribute to the common objective of increasing the level of protection of the environment and public health.

All options are coherent with **other relevant EU policy objectives**. Legally binding targets will lead to GHG emissions reduction, thus contributing to the **EU climate neutrality** objective by 2050 and to the objective of at least 55% net reduction in greenhouse gas emissions by 2030. Achieving the target would also lead to more sustainable use of land, reduced marine eutrophication and less water scarcity, in line **with the** upcoming **Framework for Sustainable Food Systems, the Bioeconomy Strategy and nature protection policies**. Finally, reducing food waste contributes to increased resilience of food systems and contributes to **food security** by improving supply chain efficiency and productivity as well as food affordability. By delivering higher environmental gains, Options 2 and 3 offer higher contributions to these policies.

FEASIBILITY. Technical feasibility was scored based on the extent to which efforts would be required at national level (see section 3.7.).

PROPORTIONALITY. While none of the options exceeds what is necessary to achieve the objectives, lower targets are less suitable to contribute to the achievement of SDG Target 12.3. The options do not set new measures at EU level, as implementation of the targets will build on the already- required national food waste prevention programmes and future monitoring will build on the EU-wide methodology established as part of the monitoring and reporting obligations included in the WFD in 2018. For this reason, the less ambitious options (including voluntary targets) score worse.

3.9. Preferred option

Option 1 and Option 4, while being easier to achieve and contributing to strengthening Member States actions, fall short of the EU's ambition to meet the SDG Target 12.3. Options 2 and 3 are both considered as strongly engaging Member States in implementing actions to reduce food waste. Option 2 will be effective in providing a strong policy impulse for Member States to take action to reduce food waste at national level while being proportionate and feasible.

This option has therefore been selected to present the joint expected impact of the initiative in the next section.

The achievement of Option 3 offers the most significant environmental benefits and therefore scores highest in terms of effectiveness. This option also best reflects the political commitment of the EU and its MS to contribute to the achievement of the aspirational and non-binding SDG Target 12.3. However, given the state-of-play showing limited progress across the EU and therefore doubtful technical feasibility of this option, Member States

would likely consider such a target as challenging to achieve in the required timeframe, making it more difficult to impose.

3.9.1. REFIT (simplification and improved efficiency)

This initiative aims to complement that work already undertaken and planned to address possible barriers to the implementation of the waste hierarchy (see section 3.5.2.(c)). Targets will provide further impetus for the sharing of learning and best practice and coordinating action through existing EU-level support mechanisms, which can help improve the efficiency of food waste reduction actions.

3.9.2. Application of the one in one out approach

In the case of food waste, and as presented in Section 3.6.1, the IA assesses the impacts of setting-up targets giving the overarching indications of range of costs resulting from the measures expected to be enacted by Member States to achieve these targets. Therefore, it does not introduce any new specific measures to be adopted by Member States or direct obligations on food business operators.

3.9.3. How will actual impacts of the preferred option be monitored and evaluated?

Monitoring and evaluation of progress towards **food waste** reduction target will be done on the basis of existing legal obligation i.e., annual reports from Member States on food waste amounts and reporting rules of the WFD (art 37.3). The data are reported to and published by Eurostat (Annex 6 details food waste monitoring). In addition, the compliance check will be based on the existing mechanism of the early warning report of the WFD, at the latest three years before the target's deadline (i.e., by 2027); the Commission will also take stock of progress made in 2030.

The current monitoring of food waste reduction allows to address the operational objectives identified in this IA – see Annex 14.

Implementation of the national food waste prevention programmes as part of the national waste prevention programmes is subject to periodic reviews by the European Environment Agency (as required by Article 30(2) of the WFD). The Agency publishes every two years a report containing a review of the progress made in the completion and implementation of waste prevention programmes, including an assessment of the evolution as regards the prevention of waste generation for each Member State and for the Union as a whole.

4. CUMULATIVE IMPACTS

The table below summarises the cumulative impacts expected by the preferred options for both textiles and food waste.

Table 12 - Cumulative impacts of the preferred options for both textiles and food waste

Preferred combined option	Description of impact	Net impacts
Option 2 - Additional regulatory requirements + target for textiles (measure 3.6) **AND** **Option 2 for food waste reduction targets**	**Economic costs** • €913 million per year for sorting obligations • Register development costs of €2-12.3 million across Member States and maintenance costs of €11 200 and 69 000 per Member State per year • €7.79 million per year for producers to report for the purpose of EPR • €4.04 million costs of operating PRO registers and inspections • €39.2 million euro per year for additional textile collection, sorting and treatment to meet a 50% collection target • €208 euro per competent authority and €78 per exporter annualised per inspection • €750 000 per year for EU enterprises to comply with EU reporting obligations • €26.5 million landfill tax loss for Member States due to textiles diverted from landfills • Reduction in demand for food of 4.2% and a change in value of agri-food production of -1.8% alongside a fall in market prices of between 0.1 and 2.6% • A fall in farm income of €4.2 billion per annum Total adjustment costs for food waste reduction for actors in the food chain - €2 bln [€41/ton of food waste avoided] **Economic benefits for textile sector** • EPR: €3.5-4.5 billion annual overall returns on recycling investment (including the benefits indicated for the other measures) • Additional sorting: €534 million per year of reuse value and €94 million per year of recycling value • Additional collection**:** €28 million per year of combined reuse and recycling value **Economic benefits for food waste reduction** • overall value added for EU economy €1.6 bn (including abovementioned costs) • savings in household food expenditure of €439 per year per household (4 pers.) **Environmental benefits** • €16 million from GHG emission reduction from textile waste as well as reduction in release of pollutants to air, water and land that would otherwise result from poor waste management. • 3.9 (in EU) and 12.6 (out of EU) million tonnes GHG emission reduction (including rebound effect) **OR** 62 million tonnes of GHG avoided (without counting the rebound effect)	**Costs**: €975 million (these costs may fall on consumers, producers or a mix of both). Overall value added for EU economy form the reduction of food waste 1.6 bn EUR (0.016%) **Benefits**: Direct benefits of €656 million of reusable and recyclable textiles for the EU reuse and recycling market as well as support to €3.5-4.5 billion annual overall returns from EPR investments. Savings in household food expenditure of €439 per year per household (4 pers.) Additional GHG emission reduction equal to €16 million per year from textiles and additional GHG emission reduction equal to 62 million tonnes per year (overall environmental savings monetised - €9-23 bn), 8 740 jobs created in waste management but up to 135 000 lost in agri-food sectors (expected to be

	• reduction in release of pollutants to air, water and land that would otherwise result from poor waste management • Reduced impact on land use of 2.2 Trillion Pt, • reduction in marine eutrophication of 532 million kg of Neq • reduction in water scarcity of 80 billion m3 per annum. • **Overall environmental savings monetised - €9-23 bn** **Social benefits** • 8 740 jobs created in relation to textiles and social impacts of EU waste in third countries mitigated (no net impact assessment; see Annex 4 for details and underlying assumptions) • Up to 135 000 jobs lost in agri-food sectors (expected to be compensated in other sectors)	compensated in other sectors) **Overall effectiveness, efficiency and coherence**: positive

1.1.1.

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PART 2/4

COMMISSION STAFF WORKING DOCUMENT

IMPACT ASSESSMENT REPORT

Accompanying the document

Directive of the European Parliament and of the Council

amending Directive 2008/98/EC on waste

{COM(2023) 420 final} - {SEC(2023) 420 final} - {SWD(2023) 420 final} - {SWD(2023) 422 final}

ANNEX 1: PROCEDURAL INFORMATION

1- Lead DG, Decide Planning/CWP references

The preparation of this file was co-led by Directorate General (DG) Environment (ENV.B3) and DG Health and Food Safety (SANTE), with support from DG Joint Research Centre Units B.5 - Circular Economy & Industrial Leadership and D.3 - The Land Resources Unit. The file comprises a targeted revision of the existing Waste Framework Directive (2008/98/EC). The Waste Framework Directive (WFD)[1] sets the basic concepts and definitions related to waste management, including definitions of waste, recycling and recovery. This targeted revision considers two review clauses in the WFD that call on the Commission to consider the setting of preparing for reuse and recycling targets for textile waste and to examine the feasibility of establishing a Union-wide food waste reduction target to be met by 2030.

This file is the result of two separate items in the DECIDE/Agenda Planning database:

- Environmental impact of waste management - Revision of EU waste framework (PLAN/2021/12032)
- Food waste reduction targets (PLAN/2021/11886)

2- Organisation and timing

This initiative is a deliverable under the European Green Deal (EGD)[2] and the new Circular Economy Action Plan (CEAP)[3]. The revision of food waste and textiles aspects of the WFD is in the European Commission's Work Programme for 2023, in Annex I, under the heading 'A European Green Deal'.

The Call for Evidence for textile waste[4] was published on 25 January 2022 with a feedback period until 22 February 2022. The Inception Impact Assessment for the food waste reduction targets[5] was published on 30 September 2021 with a feedback period until 29 October 2021.

One Inter Service Steering Group (ISSG) for the WFD Impact Assessment was set up by DG Environment. It included the following DGs and services: AGRI (Agriculture), CLIMA (Climate Action), COMP (Competition), ECFIN (Economic and Financial Affairs), ENER (Energy), ESTAT (Eurostat), FISMA (Financial Stability, Financial Services and Capital Markets Union), GROW (Internal Market, Industry, Entrepreneurship and SMEs), INTPA (International Partnerships), JRC (Joint Research Centre), JUST (Justice and Consumers), MARE (Maritime Affairs and Fisheries), MOVE (Mobility and Transport), NEAR (European Neighbourhood and Enlargement Negotiations), REGIO (Regional and Urban Policy), RTD (Research and Innovation), SANTE (Health and Food Safety), SG (Secretariat-General, including RECOVER), SJ (Legal Service), TAXUD (Taxation and Customs Union), as well as EUROSTAT (European Statistics), ECHA (European Chemicals

[1] Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste *(OJ L 150, 14.6.2018, p. 109–140),* EUR-Lex - 32018L0851 - EN - EUR-Lex (europa.eu).
[2] EUR-Lex - 4438420 - EN - EUR-Lex (europa.eu)
[3] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 11.03.2020 A new Circular Economy Action Plan For a cleaner and more competitive Europe, COM(2020) 98 final, EUR-Lex - 52020DC0098 - EN - EUR-Lex (europa.eu).
[4] European Commission, Have your say, published initiatives, Environmental impact of waste management – revision of EU waste framework, https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13225-Environmental-impact-of-waste-management-revision-of-EU-waste-framework_en.
[5] European Commission, Have your say, published initiatives, Food waste-reduction targets, https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13223-Food-waste-reduction-targets_en.

Agency) and the EEA (European Environment Agency). Meetings were organised in October 2021 and May 2022.

Another Inter Service Steering Group (ISSG) was set up by the DG for Health and Food Safety. It consists of AGRI (Agriculture), CLIMA (Climate Action), CNECT (Communications Networks, Content and Technology), EAC (Education and Culture), EMPL (Employment), ENER (Energy), ENV (Environment) ESTAT (Eurostat), FISMA (Financial Stability, Financial Services and Capital Markets Union), GROW (Internal Market, Industry, Entrepreneurship and SMEs).

Once it was decided to combine the two initiatives, the WFD ISSG met again between October 2022 and January 2023 covering both textile and food waste with the addition of DG TRADE (Trade) and DG INTPA (International Partnerships) that nominated representatives later in the process.

The ISSG meetings have discussed the main milestones of the process: the impact assessment support study that also identified the problems and proposed relevant measures for the textiles stream and prevention more generally (consulting the group on the contract's terms of reference, and the results of first and second interim reports and the draft final report). The ISSG was also consulted on the scope of the study procured by the Commission to analyse lubricant and industrial oil EPR systems and waste oil collection schemes in Member States.

The ISSG was consulted on the draft Impact Assessment report and provided their input prior to its submission to the Regulatory Scrutiny Board. The impact assessment was revised addressing the services comments largely falling in the following categories. The structure of the report was revised to better integrate the assessments of food and textile options and measures, the types of impacts assessed were aligned where possible across the two initiatives, impacts on SMEs and third countries as well as on competitiveness highlighted in the report, links with other initiatives were clarified, description of measures and options was improved. Following the ISSG meeting of 26 January 2023, where the draft impact assessment was discussed, bilateral meetings were organised with several services to address their comments. A meeting with AGRI was held on 2 February 2023 to discuss monitoring of food waste levels in primary production as well as possible impacts of food waste reduction on this sector. A meeting with TRADE, INTPA, NEAR and EEA was held to discuss how to clarify the measures to identify if they have an impact on third countries and to compete the assessment of the impacts on third countries in relation to the import and export of textiles. Also, bilateral meetings with SG and GROW were held to discuss the SME test Annex, mentioning that the SMEs were addressed in impacts and stakeholder comments in every measure and that measures were designed to reduce the impact on SMEs (i.e., exemption of micro enterprises).

3- Consultation of the Regulatory Scrutiny Board (RSB)

After final discussion with the ISSG, a draft of the impact assessment was submitted to the RSB on 15 February 2023 and discussed at a meeting with the RSB on 15 March 2023. An informal upstream meeting with the RSB took place on 22 March 2022. The RSB issued a negative opinion on 17 March and provided comments that would need to be considered for a re-submission. Following a draft revised Impact Assessment, the ISG was consulted through written procedure on 24 April 2023, followed by a re-submission to the RSB on 3 May 2023. The RSB issued a positive opinion with reservations on 26 May 2023.

The following table details the RSB comments received for its first and second opinion and explains how and in which sections that have been addressed.

Table 1 - Overview of how the RSB comments are incorporated

Stage of opinion	RSB comment	How to address the comment?
Second opinion	The report does not demonstrate the effectiveness of setting the EU level mandatory Member State food waste reduction targets in addressing the identified problems. It does not convincingly explain how the targets should be implemented, nor assess how they are feasible	• The report further outlines the role of EU-level targets in catalysing the development and implementation of national food waste prevention strategies of sufficient breadth and scale to adequately address the behavioural and market drivers of food waste. • The role of EU-level measures in supporting Member States' actions is further explained (section 3.5), with further explanation as to what is required of Member States and expanded analysis of their technical feasibility (section 3.7).
	The report does not provide any alternative options for measures on food waste reduction other than mandatory targets.	• The presentation and analysis of other options considered is expanded in section 3.5. • A new option related to the setting of voluntary food waste reduction targets has been introduced and assessed.
	(1) The report should justify with evidence the setting of EU mandatory food waste reduction targets, when the problems and their drivers comprise behavioural issues such as consumer food management and lack of understanding of safety standards, and the cited examples of Member State best practice are largely based on behavioural nudging. It should also explain how Member States would be expected to implement these targets, and whether their implementation is feasible, in particular considering the contrasted situation between Member States.	• Section 3.5 has been significantly expanded to better justify the choice of options (targets), including analysis of other EU-level measures • It has been further explained, in section 3.5, how EU-level action will support Member States in reaching the targets (including possible additional measures, e.g., updating of guidance and a new text box providing overview of EU measures) and how Member States are expected to take action to achieve (see section 3.7 – feasibility analysis)
	(2) The report should provide and assess alternative choices to address the problems and their drivers other than only the choice of mandatory targets of differing levels for Member States. The report should explain why concrete measures aiming at addressing the specific problems such as consumer behaviour and inefficiencies in the food chain management have not been considered and assessed. Given the focus on reducing food waste at the point of consumption, it should explain why measures designed to promote behavioural change have not been assessed.	• Additional alternative choices are analysed in 3.5.2 including further justification as to why the main problem drivers need to be addressed at Member State level (e.g., supporting consumer behavioural change). • Additional option of setting voluntary targets (Option 4) has been considered (see 3.5.4 and further sections).
	(3) The report should better justify the choice of the preferred option. The effectiveness analysis should not simply assume that targets would be reached, but show that the preferred option is the best approach to ensure such outcome. The extent to which Member States have sufficient governance and enforcement capacity for the	• Additional option of setting voluntary targets (Option 4) has been considered (see 3.5.4 and further). • Further explanations in section on feasibility regarding what Member States need to do to achieve the targets (including governance and enforcement

targets to be implemented should form part of the assessment of the effectiveness of the options. It should also better explain the methodology of the feasibility scoring.	capacity, and concept of designating a national competent authority) and link with feasibility scoring (see 3.7).
(4) The report should present the estimates in a clear and comprehensive manner and ensure the consistency of the figures throughout. In particular, it should ensure that quantitative costs and benefits used throughout the report are consistent, should explain further the relationship between farmers' income, trade and other elements for the calculation of costs, and should include the costs identified in the overview table of benefits and costs.	• Additional explanations have been provided in section 3.6.5 (including regarding adjustment costs) and extension of table comparing benefits and costs table (see 3.8).
(5) The interpretation of the outcome from the MAGNET modelling should consider some conclusions of the feasibility analysis section, in particular the fact that the target for food waste reduction in primary sector for the most ambitious target is uncertain, based on the experience of countries already performing action plan in food waste reduction.	• Additional explanations have been added to section 3.6.1 • Revised feasibility analysis (section 3.7) also puts into perspective the MAGNET modelling results; further elements have been added to explain interpretation of Table 8 (overview assessment of the feasibility of different policy options)
(6) The report should more convincingly explain the EU dimension of food waste and better justify how EU-level intervention is consistent with the principle of subsidiarity.	• Further explanations of the EU dimension of food waste and justification of EU intervention have been added to relevant sections (3.3.2 and 3.3.3)
(7) The report should strengthen the comparison of options on textiles. The analysis should focus on the combination of policy measures with available policy choices and on providing a clear overview vis-à-vis effectiveness/efficiency and coherence. The basic information in the annexes should be summarised and presented better in the main report. The policy measures should be clearly compared in terms of effectiveness, efficiency and coherence with sufficient explanations. The comparison of options/measures should also include an overview table on the impacts on consumers, producers, waste management enterprises and public authorities.	• Included specific information on how options compare into the main document Section 2.7. • This includes a clear overview of the comparison across measures vis-à-vis effectiveness, efficiency and coherence. This includes additional explanations for the comparison across measures. • The comparison across measures also includes an overview table on the impacts on consumer, producers, waste management enterprises and public authorities that has been integrated into Table 3 of the main document
(8) The report should improve the presentation of the impact on competitiveness of the textile options. The key information from the assessment of individual policy measures addressing various competitiveness aspects currently in the annex should be brought to the main report to substantiate the conclusions.	• Additional details provided in Table 2 on the impact on competitiveness, summarised from the more detailed analysis that can be found in the Annex. • The focus is on price competitiveness, dynamic competitiveness and strategic competitiveness.

	(9) The report should make it clear if all SMEs are exempted from the Extended Producer responsibility scheme or if the exemption is only for micro enterprises.	• Additional clarifications included Section 2.8 in the main document explaining that only microenterprises are excluded while other SMEs remain included in the EPR schemes.
	(10) The One In, One Out estimates for the textile area should be presented in the dedicated section in the main report. The section should also explain why certain elements were not estimated.	• Additional information included in Section 2.8.3 in the main document on the one-in-one-out estimates. • Included a footnote explaining which costs (and benefits) could not be estimated.
First opinion	(1) The report should present a more detailed, clearer, and more coherent intervention logic. It should better consider the specificities of both food and textile waste sectors and better explain the rationale behind the design of the policy options. These should refer clearly to the problems, their drivers and relevant specific objectives. In the area of food, the report should better explain to what extent a sole mandatory target will contribute to address the market and behavioural failures in different Member States with differing baselines.	**Textile waste** • Specific problem tree and intervention logic added in Section 2.4 and Annex 7 linking drivers, problems, consequences, general and specific objectives and policy options. • More detailed and improved description of drivers, subsidiarity, objectives and options in Sections 2.2.2., 2.3., 2.4., 2.5. and Annexes 7 and 10. • Added more elaborated description of and rationale underlying the design of measures in Annex 10, containing references to the specific problem drivers each of them aims to address. **Food waste** • Specific problem tree linking drivers, problems and consequences added as well as a specific intervention logic (see SWD, section 3.4.2, Figure 7) linking drivers, problems, options and measures, with clearer link between proposed measures and underlying drivers of food waste generation. • EU intervention focusses on excessive food waste generation and that the potential for reduction is not sufficiently addressed. Section on problem drivers (3.2.2) redrafted/expanded showing also actions needed in Member States (front runner case studies). • Improved description of EU actions taken to date and existing legal obligations (3.1.2) as well as substantiation of the need for binding targets to drive action including new section (3.5.2) describing other policy options considered. • Expanded section 3.5.4 to better explain how policy options were developed and analysed, including how expressing targets as a percentage reduction and consideration of possible earlier baselines takes into account different situations in Member States.
	(2) The report should provide a clear and evidence-based assessment of the EU dimension of intervention in the two sectors. It should better explain the cross-border nature of the textile re-use and waste management value chain following waste collection as well as the transboundary impacts of waste generation and treatment on	**Textile waste** • Additional data added corroborating the cross-border dimension of textile market and textile flows in Section 2.1. and Annex 6, including the following: o turnover of EU textile and clothing sector and number of employees in 2019

the environment. It should provide clear evidence on the material/waste trade within the EU. It should explain the EU dimension of food waste and its prevention, and demonstrate how the imposition of equal level, binding, targets for food waste would respect the principle of subsidiarity given the widely differing situation in each Member State. In doing so, the report should be explicit as to why alternative measures, including setting mandatory or voluntary targets by Member States, would not be sufficient, taking into account the best practices of Member States. It should better substantiate the lack of effective and coordinated action by Member States reflecting more specifically the measures already in place, and explain how setting a target would be effective in addressing the identified deficiencies. It should better explain why mandatory EU level target[s] are considered as the only way to make food prevention a long-term political priority given that the cited case studies point to behavioural nudging as key. It should explain why it did not assess other potential concrete measures aiming at improving Member States' performance and coordination.	o main textile producers MS and manufacturing hubs o transboundary effects of EU textile consumption, according to EEA (updated to 2020), including number of employees worldwide to produce textiles consumed in EU o imports 2019 (according to EEA) and exports 2021 (Euratex) of textile o intra-EU movements of textile goods in 2019 and 2021 o imports and exports of used textiles from third countries • Additional details provided highlighting cross-border environmental externalities in market drivers (distorted incentives) and key environmental drivers (Section 2.2.2) and information in pertinent sections of Annex 7. • Data added on textile exports and destination countries in Annex 7. • Additional evidence provided on diverging EPR schemes in Annex 7. • Additional justification and explanation provided on transboundary impacts in production and end-of-life in Annex 7 (highlighting the social impact the number of employee worldwide). • Further justifications on the cross-border nature in measures 1.1, 2.5, 2.6, 2.8 and 2.14 in Annex 10 **Food waste** • Redrafted section 3.3. focussing on transboundary dimension of food waste and need for EU action in order to more effectively address externalities and consequences of food waste. • Subsidiarity: revised explanation on how targets are expected to set the objectives but give full flexibility to Member States to define actions needed (section 3.5.3). Explanation related to expression of targets as a percentage reduction and consideration of possible earlier baselines takes into account different situations in Member States (3.5.4). • Explained need for targets as catalyst for change: political commitments made by Member States, existing legal obligations and EU supporting measures have not been sufficient to drive progress (sections 3.2.3, 3.3, 3.5.2). • More specific description of gaps in Member States' implementation of food waste prevention including front runner case studies to illustrate type of action needed/possible (3.2.2 and Annex 7). • Expanded section 3.5.4 to better explain how policy options were developed and analysed, including consideration of other possible measures (3.5.2) and possible role of voluntary targets (3.5.4).

(3) The baseline should be improved. It should further elaborate on the likely evolution of the problem given the implementation of existing and upcoming relevant legislation, in particular the upcoming separate collection obligation. The report should better explain why waste generation is expected to increase despite this legislation, efforts at Member State level and the EU commitment to Target 16 of the UN COP15 Global Biodiversity Framework. It should also further explain how the baseline takes into account the likely technological development and consumer trends and any post pandemic / energy crisis effects.	**Textile waste** • Inclusion of baseline estimates made based on JRC and McKinsey studies in Section 2.2.3 and Annex 7, including an elaborated discussion on the limitations of such estimates. • Detailing of the baseline impacts shown, including by taking into account the upcoming separate collection obligation, with ranging from estimated separate collection rate of 60-80% by 2035 (according to McKinsey) and under more realistic assumptions between 50-55% by 2035 and at a more conservative view and approach between 41-45% by 2035 (according to JRC). • Such estimates are further benchmarked to the experience with glass due to similarities, which further corroborates that the JRC estimates seem plausible. **Food waste** • Improved description of baseline and policies reflected, including separate collection obligation and how/which assumptions are made regarding factors such as economic growth, demography, or energy (section 3.5.1) • Described what aspects considered/non considered based on available data (section 3.5.1) • Detailed description of baseline and situation in MS presented in Annex 10
(4) Overall, the proposed targets should be precisely defined in terms of periodicity, numerator, denominator, and statistical base. The extent to which Member States have a sufficient governance structure and enforcement capacity in place for targets to work effectively should be addressed. If such governance and enforcement does not exist, the report should consider the consequences.	**Textile waste** • Further justification provided on how measure 1.2. (indicators) addresses to problem drivers in Annex 10. • Definition of the target added in Annex 10 for measure 3.6: scope, numerator, denominator • Explanations added in Annex 10 measure 3.6. how the feasibility of setting a target is assessed, how it is constructed, why this target is possible if all alternative policy measures are deemed not feasible • Additional evidence on the impacts on competent authorities to enforce the compliance with the collection target added in Annex 3 and 10 (including on the impact on competent authorities, administrative burden assessment and a table for impact on competitiveness). **Food waste** • More precise description of the formulation of targets, including how this varies for different stages of the food supply chain (section 3.5.4) • Detailed description of gaps existing in Member States implementation, including governance required (section 3.2.2), existing EU/international best practice and guidance to support action (sections 3.1.2, 3.5.2) with front runner case studies

	(3.2.2), other best practice examples (Annex 7, Annex 10) and feasibility analysis (section 3.7).
(5) In the area of food waste, the report should explain what the additional commitments added to the SDG Target 12.3 are and why no stand-alone SDG Target 12.3 option was considered, reflecting the existing EU and Member States commitments. Given technical feasibility issues for some of the options, the report should also explain why not staged options were considered. The report should explain how setting a binding EU level target would in itself ensure that Member States undertake efficient and effective measures and processes. It should also give a better idea of concrete measures that can be pursued to reduce waste and their effectiveness, for instance based on best practices identified. Alternatives such as voluntary or differentiated targets at Member State level should be considered.	**Food waste** • Section 3.5.4 outlines how policy options for targets were developed, the rationale for the proposed levels and stages of the food supply chain considered as well as their timeframe and relation to SDG Target 12.3. • Rationale for proposing binding (vs voluntary targets) set out in Sections 3.5.2 (d), 3.5.3 and 3.5.4. • Specific Member States case studies introduced (France, The Netherlands) in section 3.2.2, Annex 7 as well as Annex 10 (section 2.4)
(6) The report should better explain how the Extended Producer Responsibility (EPR) option is intended to work and what will be determined by the Commission (via implementing legislation) and what will be decided by Member States.	**Textile waste** • A much more detailed description of the EPR measure is provided in Section 2.5.2 in line with the detailed description of the measure and the features of the EPR scheme in Annex 10.
(7) The assessment of impacts for textiles is not sufficiently developed. The report should assess all relevant significant impacts. This should include the analysis of the changes in textile treatment under each option as well as the impact on prices (and the likely cost pass through to customers) and the competitiveness of producers and waste management operators. The report should be clearer about the additionality of the costs of the EPR option. It should clarify to what extent the expected quantified benefits can be attributed to the measures envisaged.	**Textile waste** • Additional justification and evidence provided in Annex 4, in particular on how prices and competitiveness impacts been calculated. • For those measures with a direct impact on prices the impacts are now identified in Annex 11. • Also, those economic and environmental impacts than cannot be quantified as well as a justification for why this is the case has been added in tables. • In relation to competitiveness, new tables have been added with underlying analyses for each measure addressing four competitiveness aspects (price, dynamic, export and strategic competitiveness) with likely impacts identified in Annex 11. • Competitiveness impacts were quantified, wherever possible. However, it should be noted that a fully-fledged competitiveness analysis would require more granular data (e.g. firm-level, individual/household data) as well as an adequate methodological design to identify causal effects (e.g. instrumental variable, regression discontinuity design). Within the timeline available, this fully-fledged analysis is not feasible since such data is either not available or challenging to obtain (e.g. requiring merging of various survey data sets) and the methodological approaches would require a new analysis that will likely require a significant amount of time to be conducted.

	• Included an explanation in Annex 11 that unless otherwise stated, the impacts identified in the Annex are directly attributable to the measures themselves (i.e. causal impacts). It should be noted that quantifying such impacts is not possible for all measures and impacts due to data and methodological limitations. • Updates made in particular to the EPR measure 2.9 to better distinguish the additional impacts of EPR beyond the baseline.
(8) The impact analysis for the food waste sector should better explain the key limitations and uncertainties of the modelling approach, in particular as the approach assumes that the targets would be reached. The results of the MAGNET model should be qualified by addressing the assumptions and the key uncertainties of the model related to the parameter choices and the underlying data. The report should further improve the presentation of the distributional impacts. It should be clear about the net benefits or costs for each actor of the agro-food value chain. The trade implications should also be further explained.	**Food waste** • Summary of limitations and uncertainties provided in section 3.6.1 and Annex 4 as well as those relating to specific results of the assessment (sections 3.6.4, 3.6.5 and 3.6.6). • Presentation of basic assumptions and key uncertainties related to parameter choices and underlying data (3.6.1). • Improved presentation of distributional impacts (3.6.5 and 3.6.6). • Clarified net benefits or costs in general (3.6.5, in particular Figure 8) and for each actor of food supply chain where data available i.e. per stage of food supply chain (see Table 6 in 3.6.5). • Trade implications further explained (section 3.6.5) .
(9) The report should improve the section on the One In, One Out approach to include the total estimates for business and citizens. It should also better explain why certain cost savings were not quantified.	**Textile waste** • Additional explanations on the calculations added to Annex 4, in particular on how the expected costs have been estimated. • Further granularity added distinguishing between the costs borne by businesses and/or citizens in Annexes 3, 12 and 13. While the exact level of incidence cannot be estimated, the financial costs are in a first instance borne by businesses. However, depending on many factors (including the level of market power business have in the market), such increased costs could be passed on to consumers. Therefore, the interval of costs borne by businesses and citizens have been added as explanatory notes (assuming either 100% of the costs being borne by business or consumers). • To further clarify the expected impacts on businesses and/or consumers, the estimated costs have been put into the context of how much a typical clothing item is likely to increase in final sales price under *ceteris paribus* assumptions. This demonstrates the relatively low price impacts to be expected from the measures considered in Annex 11. **Food waste** • Section 3.11 explains non-applicability of requirement as proposal introduces no new measures as such.

	(10) The comparison of options should be improved. The options should be assessed against relevant criteria reflecting effectiveness (relevant specific objectives), efficiency and coherence. The comparison of options should be based on a revised intervention logic with clearly specified specific objectives and linked specific problems allowing a more precise effectiveness assessment, including as regards the effectiveness of the envisaged measures towards actually meeting the targets. The technical feasibility aspects should be better brought out, so that the delivery risks associated with more ambitious options become clearer.	**Textile waste** • Revised and combined the effectiveness and efficiency tables already included with additional considerations added into Annex 5 in relation to coherence. • A more elaborated coherence analysis also added to Annexes 12 and 13, in particular related to the Sustainable Textiles Strategy. **Food waste** • Refined comparison of options in the light of (new) specific objectives. In particular, the efficiency analysis was refined and includes an overview of net benefits (table 10). • Delivery risks associated with more ambitious options more clearly outlined in section 3.9.
	(11) The current structure of the report is very difficult to read (swapping constantly between textiles and food). The report should consider ways to present the two issues in a clearer, more decision-maker supportive manner. The core report should be self-standing to the extent possible, and annexes should be confined to additional information on specific issues.	**Textile and food waste** • Restructuring of the main document into a common introduction, two separated sections (one on textiles and one on food waste) with a common section on cumulative impacts. • Added tables of Figures and Tables. • Given the nature and purpose of the document, the structure of the Annexes has remained unchanged. **Textile waste** • In Annex 6 added titles to subsections to better clarify. **Food waste** • In Annexes 7, 10 and 11 added titles to subsections to better present and refer data.

4- Evidence, sources and quality

The Commission procured a study to support this impact assessment of policy options for a revision of the WFD in 2023 – Specific Contract n° 090202/2021/861277/ENV.B.3. It was also supported by several experts and technical assistance studies listed below.

- Ramboll Deutschland GmbH: "Assistance to the Commission on technical, socio-economic, environmental and cost-benefit assessments related to the implementation and further development of EU waste legislation". The study provided analysis to support the development of the European Commission's Impact Assessment (IA) concerning revision to Directive 2008/98/EC on waste. The study initially covered the wider scope of the initiative and subsequently focussed on textile waste and on integrating the part on food waste led by DG SANTE. Publication envisaged along with the adoption of this initiative.
- The EEA developed a framework (publication due Q2 2023) to assess waste prevention progress in the context of policy measures as reflected in the waste prevention programmes (WPPs). It will be based on carefully selected indicators fit for monitoring waste prevention efforts and progress in Europe and will focus on waste prevention effectiveness and not efficiency (which considers the resources used/needed to implement waste prevention efforts).
- JRC technical report (publication due in Q2 2023) on good practices in separate collection of waste. The objective of the report is to identify and assess, based on an extensive stakeholder engagement from the local authorities to waste management operators, best practices in separate collection and based on a qualitative and quantitate assessment of the costs and benefits identify practices that deliver best environmental outcome.
- JRC technical report on "Circular economy perspectives in the EU Textile sector"[6] provided a detailed look at the volumes of post-consumer textiles available for collection, reuse and recycling in EU countries (based on available data) and it detailed existing capacities for the collection and sorting of old textiles, described recycling technologies in order to estimate future sorting and recycling capacities.
- The "Study on the technical, regulatory, economic and environmental effectiveness of textile fibres recycling"[7] improved the knowledge of the effectiveness of recycling capabilities of textile waste with an analysis of their economic and environmental effectiveness and a roadmap of the technologies under development.
- European Commission, Joint Research Centre. Techno-scientific assessment of the management options for used and waste textiles. 2023 (under development)
- Eunomia (2023) Online sales. The study supports this initiative in gathering the evidence base and stakeholder consultation in relation to the regulatory barriers for the enforcement of extended producer responsibility rules in the online sale domain as well as the assessment of the past and future development of the sector for the purposes of the impact assessment. Publication envisaged along with the adoption of this initiative.

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[6] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., *Circular economy perspectives in the EU textile sector: final report*, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144.

[7] European Commission, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, Duhoux, T., Maes, E., Hirschnitz-Garbers, M., et al., *Study on the technical, regulatory, economic and environmental effectiveness of textile fibres recycling: final report*, Publications Office, 2021. https://op.europa.eu/en/publication-detail/-/publication/739a1cca-6145-11ec-9c6c-01aa75ed71a1

- Oeko-Institute report (2020)[8]. Study to support the Commission in gathering structured information and defining of reporting obligations on waste oils and other hazardous waste". Oeko-Institute (2020). This study provided an analysis on good practices of waste oil collection and management in Member States and contains an overview of EPR systems for lubricating oils in different MS. However, a full survey and analysis of EPR system and collection schemes in place and the functioning of Producer Responsibilities Organisations dealing with waste oils was beyond the scope of that study.
- RDC Environment support study (publication due 2023). "Study to analyse lubricant and industrial oil EPR systems and waste oil collection schemes in EU Member States to support measures to increase collection rates". The objective of the study is to provide a detailed analysis of lubricant and industrial oil EPR systems and waste oil collection schemes in EU Member States, analysing best practices and their impact on waste oil collection rates. The study also assesses possible measures and to enhance (mineral) waste oil collection rates and the possibility to propose quantitative collection targets. The study included a questionnaire consultation with Member States, a targeted stakeholder consultation and a dedicated workshop.
- JRC LCA/LCC support study (publication due 2023). This study had the objective of performing a life-cycle-based comparison between waste oil regeneration and energy recovery for several scenarios. These comparisons aimed to: a) quantify the potential environmental impacts and life cycle costs resulting from managing waste oil in the EU via regeneration or energy recovery; b) identify the conditions under which a certain waste oil management options may be the most effective ones, from a life cycle perspective; c) calculate the total uncertainty of the outcome of the study, based on the uncertainty of all the parameters and model choices of the modelled waste management system. The study is due to be published as a JRC "Science for Policy report" following the adoption of the Commission's proposal.
- Eurostat provided an analysis of the data reported by Members States on waste oils and on textile waste. The first reporting on waste oils using the format defined in Annex VI of Decision (EU) 1004/2019 was done by Member States for the first time in 2022, for the reference year 2020. Information on oils placed on the market is the most robust, while collection and treatment data appear to be less reliable. Separately collected waste oils collection rates seemed either very low or very high, pointing to data collection problems. Treatment of waste oils seem plausible at the aggregated level, with inconsistencies in some countries between collection and treatment. Data is less comparable when treatment is broken down: generation and other recycling is not very comparable between countries (regeneration data missing in 9 MSs), and energy recovery shares varies a lot from country to country. Disposal is below 10% in all countries, with very limited exceptions.
- On 25 October 2022, Eurostat published the first dedicated statistical monitoring of the amount of food waste in the European Union – https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Food_waste_and_food_waste_prevention_-_estimates
- JRC support study on food waste targets (2023). JRC has prepared two reports providing analysis to support the development of the European Commission's Impact Assessment (IA) concerning revision to Directive 2008/98/EC on waste on the feasibility of setting food waste reduction targets:

[8] European Commission, Directorate-General for Environment, Stahl, H., Merz, C., *Study to support the Commission in gathering structured information and defining of reporting obligations on waste oils and other hazardous waste : final report,* Publications Office, 2020, https://data.europa.eu/doi/10.2779/14834

- De Laurentiis, V, Mancini, L, Casonato, C, Boysen-Urban, K, De Jong, B, M'Barek, R, Sanyé Mengual, E, Sala, S. *Setting the scene for an EU initiative on food waste reduction targets*. Publication Office of the European Union, Luxembourg, 2023, doi: 10.2760/13859, JRC133967
- De Jong B, Boysen-Urban K, De Laurentiis V, Philippidis G, Bartelings H, Mancini L, Biganzoli F, Sanyé Mengual E, Sala S, Lasarte-López J, Rokicki B, M'barek R. *Assessing the economic, social and environmental impacts of food waste reduction targets. A model-based analysis.* Publications Office of the European Union, Luxembourg, 2023, doi:10.2760/77251, JRC133971.

These teams worked in close cooperation with the Commission, and partly in consultation with one another throughout the process, throughout the different phases of the study. Consistency of data sources and methodological assumptions was ensured to assemble a coherent evidence base, to develop the baseline and to assess, screen and adjusting policy measures and options.

ANNEX 2: STAKEHOLDER CONSULTATION (SYNOPSIS REPORT)

This Annex reports on all consultation activities undertaken as part of the WFD revision. In line with the Better Regulation requirements, it provides an outline of the consultation strategy, describes the consultation activities undertaken, presents the stakeholder groups that participated, and a description of the methodology and tools used to process the data gathered. The results of each consultation activity are briefly presented. More details are available in the studies listed in Annex 1 when these included stakeholder consultations. Stakeholder views are provided as relevant in the sections on the problem definition, the available policy options and the impacts of the policy options.

This document should be regarded solely as a summary of the contributions made by stakeholders to the consultation activities that took place in the context of the Impact Assessment on the revision of the Waste Framework Directive and setting EU-level targets for food waste. It cannot in any circumstances be regarded as the official position of the Commission or its services. Responses to the consultation activities cannot be considered as a representative sample of the views of the EU population.

Contributions have also been received through the Conference on the Future of Europe, held in April-May 2022 and the citizens' panel convened by the European Commission, between 16 December 2022 and 12 February 2023, to sound the views of citizens on actions needed by Member States and other players to step up efforts to reduce food waste. Citizens' recommendations complement the impact assessment and the public consultation to support the setting of legally binding food waste reduction targets and they have been considered in the preparation of this initiative. Outcomes from the Conference relevant to this initiative and the citizens' report including the panel's recommendations are presented in Annex 16.

1- Introduction

The consultation method and strategy were outlined in the Call for Evidence (CfE) for an impact assessment 'Environmental impact of waste management – revision of EU waste framework' [9] and the Inception Impact Assessment (IIA) 'Proposal for a revision of Directive 2008/98/EC on waste – part on food waste reduction target'[10].

The **objectives** of the consultation were to gather:

- Views on the scope of the impact assessment process, in particular to ensure that the correct problems were identified, and objectives were being targeted.
- Views about the options and measures under consideration.
- Further evidence to substantiate the analysis of the options and measures.

Relevant **stakeholders** to be addressed as part of the impact assessment were identified as:

- Member States and their authorities responsible for waste prevention and management including food waste prevention;
- Producers and producer responsibility organisations;
- Waste collectors, sorters and recyclers;
- Industrial/economic actors, including SMEs, of the textiles and food ecosystems;

[9] European Commission, Have your say, Published initiatives, Environmental impact of waste management – revision of EU waste framework, https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13225-Environmental-impact-of-waste-management-revision-of-EU-waste-framework_en.

[10] European Commission, Have your say, published initiatives, Food waste – reduction targets, https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13223-Food-waste-reduction-targets_en.

- Environmental, consumer- and other NGOs (e.g. food banks) and citizens' organisations;
- Academia, research and innovation organisations and institutes; and
- Citizens.

Some specificities for the consultation on the setting of food waste reduction targets are as follows:

- waste collectors and recyclers were not targeted given the focus on prevention
- international organisations were also consulted as part of the EU Platform on Food Losses and Food Waste (FLW).

All stakeholders identified in this mapping were reached, including umbrella organisations that represent SMEs.

2- Methods for engagement of stakeholders

The following methods were used to engage stakeholders.

- IIA on food waste and CfE for other waste streams.
- Public consultation (PC) through an online questionnaire, including expert consultation as part of the same exercise, using the Commission consultation's website.
- Targeted consultations including stakeholder workshops, interviews, surveys on food waste prevention initiatives for Member States and stakeholders, a meeting of Member State representatives via the WFD Expert Group, a meeting of the Member States Expert Group on Food Losses and Food Waste and five meetings of the EU Platform on FLW (one jointly with the Advisory Group on Sustainability of Food Systems).

Inception impact assessment and call for evidence for an impact assessment

The CfE on the revision of EU waste framework included a description of the political context, the preliminary problems identified in the areas of waste prevention, recycling and reuse, and waste oils. The legal basis and practical need for EU action were provided. The CfE outlined the objectives and possible policy options and identified the likely impacts. Finally, it described the relevant better regulation instruments. The Commission received 197[11] separate responses to the CfE. Respondents are based in 25 different countries including four non-EU countries: 65 in Belgium reflecting the number of industry trade associations and NGOs in that country, 23 in Germany, 16 in France, 14 in the Netherlands and 12 in Italy.

A total of 118 documents were uploaded, mainly expanding on stakeholders' responses. Respondents provided several examples where the management of waste was perceived to be inconsistent but limited factual information was provided to support these. Feedback on the possible impacts of the measures foreseen was largely qualitative or based on external studies. This may reflect the difficulty of assessing the impact of theoretical measures and those inherent to isolating the impact of EU rules from other factors such as consumer behaviour or macroeconomic developments.

More specifically in relation to textiles, stakeholders across several categories including NGOs, public authorities, business associations representing SMEs, and companies support EPR schemes for textiles. A business association[12] indicated that associated recycling schemes for textiles require long transition periods to allow the recycling capacity and systems to ensure input qualities to be set up. The association also indicated that the mixed composition of textiles is a challenge for recycling.

[11] 198 indicated on Environmental impact of waste management – revision of EU waste framework (europa.eu)because one is a duplication from WEEE forum.
[12] Wirtschaftskammer Österreich - Austrian Federal Economic Chamber

Another business association[13] advocated for regulatory tools to boost demand for reused textiles and textiles recycling. A company/business association[14] noted that low disposal/incineration costs for textile wastes contribute to low levels of recycling. An NGO[15] pointed to evidence that second-hand clothing contributes to the reduction of textile waste by 50% and noted that separate collection of textiles is essential to ensure reuse. The same NGO suggested a greater application of the polluter pays principle for textile producers. A business association[16] emphasised the benefits of rented textiles to extend textile lifetime compared to owned textiles and the need to coordinate work on textiles under the WFD with ESPR. A company/business association[17] also supported this need for coordination. Several business associations pointed to the importance of clear definitions of reusable / recyclable textiles.

Concerning the part on food waste, the IIA offered all interested stakeholders and citizens the possibility to contribute to the policy-making cycle. The IIA included the description of the problem, the policy objectives and policy options with related expected economic, social and environmental impacts. It also presented the planned evidence base and data collection as well as the consultation of citizens and stakeholders. As the Inception IA focussed on the Commission's commitment to propose legally binding food waste reduction targets, voluntary targets were not part of stakeholders' consultations.

85 contributions were received from respondents in 17 EU countries and 2 third countries (United Kingdom and USA). Most contributions were from business associations (27), followed by NGOs (18, of which 12 with an environmental focus), companies (11), EU citizens (9), consumer (4) and environmental (3) organisations. Six public authorities (including 3 Member States[18]) provided input through the feedback mechanism.

Overall, stakeholders expressed support for the EU legislative initiative, seen as essential in order to achieve the Green Deal objectives of climate neutrality and transition to sustainable food systems as called for by the Farm to Fork Strategy [19] Most stakeholders affirm that food waste reduction targets should cover the whole supply chain (reflecting an integrated food systems approach), with the future EU target in line with Sustainable Development Goal (SDG) Target 12.3 (35 contributions versus 11 favouring the coverage of only selected stages of the food supply chain). Stakeholders in favour of such a holistic approach came from the food industry (12 contributions from various sectors from primary production up to retail and food services), NGOs (17 contributions, 4 from consumer-, 12 from environmental and 1 from social organisations), national and regional public authorities (3 and 1 contributions, respectively) as well as citizens (1 contribution) and academia (1 contribution). Some industry respondents (mainly from primary production - 4 contributions and processing sectors - 3 contributions) prefer a target focussed on retail and consumption only, with some arguing for intermediate, more realistic targets than that of halving food waste by 2030 (i.e., SDG Target 12.3). Other industry stakeholders and non-governmental organisations (NGOs) argue for a holistic approach to ensure shared responsibility and accountability of all actors, promote collaboration and avoid the transfer of food waste between different stages of the food supply chain. Several stakeholders stress the need for a solid evidence base for setting targets (12 contributions, mostly from the primary production and processing sectors, 3 national authorities and 2 environmental

[13] Policy Hub - Circularity for Apparel and Footwear
[14] Ebimex grupa sp. z o.o. – PL textiles sorter and recycler
[15] ANA Members in Europe -
[16] ETSA (European Textiles Services Association)
[17] Ebimex grupa sp. z o.o.
[18] Czech Republic, Hungary, Slovenia
[19] Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Regions 20.05.2020 Farm to fork strategy for a fair, healthy and environmentally friendly food system, COM(2020) 381 final, EUR-Lex - 52020DC0381 - EN - EUR-Lex (europa.eu).

organisations) as well as a baseline that recognises efforts of early achievers (8 contributions mainly from NGOs/academia). Around one-third of contributions received (27) called for ambitious actions and an advanced target level (50%), including almost all NGOs (18 contributions out of 26); on the other hand, the three contributions from Member States suggested that basic or medium options are more realistic. In addition to these countries, there was very little support for the basic and medium levels of the targets (3 contributions). Some stakeholders (environmental NGOs, social enterprises consumers – 14 contributions) call, in addition, for integration of on-farm food losses in the future legislative proposal whilst primary producers (2 contributions) argue that such losses cannot be addressed (for both legal and operational reasons). Concerning the way the targets are set on Member States, stakeholders' feedback indicated a preference for setting an EU collective target based on Member States contributions (21, out of which 13 environmental and consumer- organisations, but also a few industry representatives and public authorities); 14 favoured the same target level for all Member States (6 environmental and consumer- organisations, 4 industry representatives, 2 national authorities, 2 EU citizens) and 5 supported differentiation of target levels by Member States[20](mainly industry representatives). As regards how targets should be formulated, stakeholders gave roughly equal support to expressing these as a percentage reduction in food waste from the baseline year (16 contributions, mostly from primary producers and food processors. environmental NGOs and EU citizens) or as absolute amounts of food waste to be reduced, in kg/capita (18 contributions, mainly environmental and social NGOs and fewer industry representatives). Several industry stakeholders and NGOs highlight that targets should reinforce the need to apply the food use hierarchy, with prevention and redistribution of surplus food for human consumption as the most preferred option (16 contributions). Some NGOs and a food redistribution company recommend additional regulatory measures at national level to facilitate food donation as well as financial support. Finally, many stakeholders call for policy coherence with other strands of the Farm to Fork Strategy (e.g., pesticides reduction, food labelling etc… and the need to build a culture of food value in order to address systemic issues linked to food systems (including but not limited to food waste). In addition, stakeholders comment on the measures needed to achieve any future targets, including both legislative and non-legislative initiatives.

Ad hoc contributions received outside the formal consultation context

In November 2022, 43 organizations led by Feedback EU and European Environmental Bureau have signed a joint statement expressing support for the EU commitment of setting legally binding targets for EU member states to reduce food waste and propose to set 50% reduction target in all food loss and waste from farm to fork and to launch a review of expanding the scope of food waste measurement and targets to include edible food left unharvested or used on farm in primary production[21].

Public consultation

A public consultation was open 24 May 2022 - 24 August 2022 to collect additional evidence on the baseline, seek opinions and insights about the problem, the feasibility and possible impacts of alternative actions, gather examples of best practices and views on the subsidiarity of possible actions. In total, 731 valid responses[22] were received. Of the total of participants, 336 (46%) requested

[20] Commission assessment of these approaches is explained in Annex 10, as the same target level has been selected for all Member States.
[21] Statement on EU legally binding targets to reduce
food waste, https://eeb.org/wp-content/uploads/2022/09/Statement-on-EU-legally-binding-targets-to-reduce-food-waste-Sept-2022.pdf.
[22] All received contributions were considered valid.

their contribution to remain anonymous while 395 (54%), agreed to the publication of all information concerning their contribution. In addition, 207 respondents submitted written contributions.

Stakeholders could select a category amongst: Academic/research institution, Business association, Company/business organisation, Consumer organisation, EU citizen, Environmental organisation, Non-EU citizen, Non-governmental organisation (NGO), Public authority, Trade union. Respondents were mostly company/business organisations and business associations (40%, 299 replies) and EU citizens (36%, 255 replies). The other remaining 177 were: 8 Academic and research institutions, 11 Consumer organisations, 14 ENGOs, 7 non-EU citizens, 65 NGOs, 5 Non-classified organisations, 32 Public authorities, and 3 Trade unions.

The 94% of the respondents (693 replies) are based in the European Union (EU 27) and most of them are based in Belgium (16%, 119 replies), Germany (13%, 96 replies), Italy (11%, 82 replies) and France (8%, 63 replies). The high number of respondents from Belgium is assumed to result from the fact that Brussels hosts many of the organisations representing different groups of interest before EU Institutions, such as industry associations, non-governmental and consumers' organisations etc. Of the non-EU respondents (38 in total), most respondents were based in the United States (2%, 12 replies), Norway (1%, 10 replies) and the United Kingdom (1%, 9 replies).

High-level findings from the responses

This section presents a synthesis of the feedback received, noting that respondents could leave all questions blank, none of the answers was “mandatory”. The percentages presented below relate to the respondents that did provide a reply to the specific question (i.e., total number of respondents minus the respondents that left the question blank), and not to the total number of respondents.

General views on waste and waste generation

Respondents to the survey were generally concerned by the volumes of waste generated across all dimensions and types of waste, irrespective of their stakeholder group. They were mostly concerned by the impacts of waste on the environment (97% of the stakeholders, 648 replies, were either very concerned or concerned.

Even if a strong concernment is still shown by all stakeholder groups when it comes to the amounts of food waste (90%, 579 replies), this ratio is not as high as to the former due to the fact that companies and business associations show a lesser level of concernment on the amounts of food waste (81%, 235 replies) compared to the EU citizens, NGOs and public authorities’ perspective (93-97%, 360 replies). The same pattern applies on the amounts of municipal waste. While EU citizens, NGOs and public authorities convey to a vast preoccupation as regards municipal waste (93%, 367 replies), companies and business associations merely reach an 80% of consensus (186 replies).

The numbers worsen when stakeholders were asked on their level of concernment considering textile waste. Only a 63% of the industry (145 replies) confessed being concerned whereas again EU citizens, NGOs and public authorities show at the very least an 86% of consternation. The tables turned on the cost of managing waste. In this case, companies, business associations and NGOs shown a greater level of concernment (82%) but EU citizens and public authorities were less worried towards this topic (69%).

Prevention

There is a consensus between respondents stating that they know what they can do to prevent waste. Irrespective of all the stakeholders being more or less in line with that statement, especially EU citizens (83%) and public authorities (96%) agreed more to that statement than companies, business associations (78%) and NGOs (67%) did. While public authorities (83%) were keener to strongly agree or agree to have the information needed to help them generate less waste, EU citizens (66%),

companies and business associations (61%) and NGOs (52%) were not rising the same majority numbers.

In addition, at least 60% of respondents of each stakeholder group replied they agreed or strongly agreed that they take on fewer waste prevention activities than they would like due to shortcomings in relevant infrastructure and services (e.g., proximity of reuse or repair services, effort required). The stakeholder group that mostly agreed with that statement were EU citizens (75%, 179 replies). However, there was less consensus on the fact that they would take on fewer waste prevention activities than they would like due to the costs involved. Only public authorities reached positive ratio of agreements in that sense (58%), whilst NGOs (48%), EU citizens (36%), and business associations and companies (34%) rarely agreed to that argument.

EU citizens, NGOs, and public authorities identified 'prevention measures not being an explicit objective of commercial operations' as the most important barriers to waste reduction efforts. According to EU citizens and public authorities, second in that line it goes 'consumers are not used to taking prevention measures (e.g., trying to repair a broken item instead of replacing it). These two stakeholder groups also agreed that these 'prevention measures are economically unattractive' as the repair is too expensive compared to buying a new product. Meanwhile, companies and business associations, and NGOs, are more of the view that the second and third most important barriers to waste reduction efforts are the legal barriers to waste prevention and the lack of data to monitor and identify the most effective waste prevention actions.

Separate collection

Respondents indicated the factors that would increase participation in separate collection of municipal waste are more information about what happens to waste once it is collected and how it can serve a useful purpose; certainty that all the waste separated would be prepared for reuse or recycled; and more information on how to separate waste for collection (e.g., which waste goes into which bin). No distinct differences of opinion by stakeholder category were identified.

All stakeholders coincided determining that the most common effective measure to overcome the challenges and improve separate collection activities was found to be the following: sorting waste into more separate bins at home for door-to-door collection for an environmental benefit. Second was improved information on the products themselves about their composition and how to discard them in separate collection and third 'improved information on waste bins and from waste collection service providers on how to correctly separate waste in different waste containers would be helpful'. The first measure received an 87% (225 replies) support from EU citizens, 82% (49 replies) from NGOs, 80% (20 replies) from public authorities, and a 62% (119 replies) from business associations and companies.

Overall, business associations and companies, NGOs and public authorities shared the view that the most effective measures to separately collect waste were found within their **workplace** more than at local/national/EU levels. In the contrary, EU citizens attributed that merit to the national and local authorities of their home countries. However, responses show that measures to prevent waste are not considered effective at these different levels at present.

Recycling

The majority of respondents (73%, 447 total replies), irrespective of their stakeholder group, disagreed with the fact that there are sufficient regulatory and/or market incentives for businesses to invest in recycling.

Textile waste

As it has been previously mentioned in 'general views on waste and waste generation' subsection above, it is important to stress that textile waste is the type of waste that least concerns the respondents consulted only reaching a 63% of concernment on companies and business associations. The remaining stakeholders (EU citizens, NGOs, and public authorities) showed greater levels of concern in the matter. More than half of the respondents agreed or strongly agreed that they were participating in the separate collection of textile waste, with a deferral on results depending on the stakeholder group they pertained to. EU citizens leaded the collection of textile waste, followed by public authorities; and leaving NGOs and companies and business associations the last positions. However, only 40% of public authorities, 32% of companies and business associations, 28% of EU citizens and 24% of NGOs agreed or strongly agreed (221 replies) that they were satisfied with the waste collection system in place where they live to collect textile waste.

Waste oils

Over 40% of those that responded to specific questions on waste oils indicated that they participate in the separate collection of waste oils while about 18% change their vehicle oil themselves (sometimes, often or always). 30% agreed or strongly agreed that they were satisfied with the waste oil collection system in the place where they live.

All respondents that provided a position paper stressed the importance of waste oil collection, generally with the argument that separation of waste oils at collection stage is key for proper end-of-life treatment as the quality of regenerated oils depends on the quality of the waste oil collected. Respondents recommended setting high and mandatory collection targets for waste oil and better enforcing their strict separate collection. Most stakeholders also advocated the introduction of mandatory targets for regeneration of waste oil.

Food waste[23]

Most respondents across all stakeholder groups agreed or strongly agreed with the benefits brought by reducing food waste (for all the presented benefits more than 50% of the respondents agree or strongly agree). They identified the most important benefits: 92% (577 replies) selected the option "help reduce environmental impacts (e.g., land use, water scarcity)". This percentage, however, was lower in the group of companies and business organizations (62% - 186 replies). 91% (562 replies) agreed or strongly agreed with the benefit to help mitigate climate change, with the groups of companies and business organizations and academia having a lower percentage of agreement (62% - 185 replies and 63%, - 5 replies respectively).

Respondents identified the main actors that need to take more action to reduce food waste as consumers (71%, 438 replies), retailers and other distributors (70%, 435 replies), food manufacturers (62%, 380 replies), and hospitality and food services (hotels, restaurants, canteens, etc.) (59%, 369replies). 73% (449 replies) also selected 'other' actors; however, they were not specified. The group of NGOs consumers/ environmental organizations attributed more importance to the food manufacturers (78% - 65 replies) and hospitality (70% - 58 replies) and less to consumers (41% - 34 replies). Instead, public authorities, academia and companies and business organizations give more importance to consumers as actors that need to the take more action (90% - 26 replies, 86% - 6 replies and 82% - 164 replies, respectively).

Respondents noted that the **most important challenge for the reduction of food waste** concern the need for consumers to adopt new habits, such as improved food management skills (61%, 381 replies-very important; 28%, 178 replies-important). This was the first option for citizens (90% - 237 replies),

[23] More details on the public consultation on food waste can be found at: De Laurentiis, V, Mancini, L, Casonato, C, Boysen-Urban, K, De Jong, B, M'Barek, R, Sanyé Mengual, E, Sala, S. *Setting the scene for an EU initiative on food waste reduction targets*. Publication Office of the European Union, Luxembourg, 2023, doi: 10.2760/13859, JRC133967

public authorities (88% - 28 replies), academia and research institute (88% - 7 replies), others (87% - 33 replies) and companies and business organizations (61% - 182 replies). The challenge on businesses needing to make food waste prevention part of their business operations was the second selected option considering the whole sample (52%, 325 replies- very important; 35%, 219 replies – important) but the first for the stakeholder group NGOs, environmental/consumers organizations (76% of the respondents identified this challenge as "very important"/"important" - 68 replies). Ensuring sufficient action is taken at the pace needed to reach global commitments to halve food waste by 2030 (50%, 314 replies- very important; 30%, 186 replies- important) was considered more important by public authorities than other groups (88% of respondents from this group says it is important or very important – 28 replies). Ensuring no compromise on food safety (47%, 291 replies- very important; 33%, 203 replies- important) was also more important for public authorities (78% - 25 replies) and the stakeholder group "other" (84% - 32 replies) As regards possible EU measures to improve waste prevention, 74% of respondents (488 replies) agreed or strongly agreed with the setting of legally binding food waste reduction targets, with even greater support expressed by public authorities (86%, 25 replies). NGO, consumer and environmental organizations expressed the highest support as 89% (of them either agree or strongly agree with the proposal, followed by EU citizens (87% - 73 replies). The consensus is lower in the case of business associations and companies (54% - 130 replies).

When asked **which measures would be most effective in reducing food waste**, over 4 in 10 respondents cited as "very impactful": 'improving efficiency along the food supply chain' (64%, 399 replies); education and training (55%, 340 replies); facilitating donation of surplus food (51%, 317 replies); measuring food waste to track progress (49%, 308 replies); setting food waste reduction targets (48%, 301 replies); and 'using surplus food and by-products (47%, 291 replies). Except for "other regulatory initiatives," all measures proposed were considered impactful or moderately impactful ((>50%). 'Clearer and more understandable date marking' was rated as impactful/moderately impactful by 70% of respondents (436 replies). The measure 'improving efficiency along the food supply chain' was the option with highest rates across all the stakeholder groups, except for 'others' (including non-EU citizen and trade associations, for which the measure with the highest support was 'sharing of best practices'). However, in the case of companies and business organizations the share of respondents considering this measure very or moderately impactful is lower (56%, 167 replies) compared to other stakeholders. A large share of respondents across the stakeholders' groups agreed on considering as very or moderately impactful the measure 'education and training' (this was the case for 89%, of citizens - 234 replies - 82% of NGOs and consumer organisations – 74 replies - and 81% of public authorities – 26 replies), while the measure 'facilitating donation of surplus food' ranked highest across citizens (being cited as very or moderately impactful by 88% of respondents belonging to this group, 232 replies) compared to other stakeholders (e.g. it was cited as very or moderately impactful by 46% of companies, 138 replies). Amongst respondents belonging to academia and research bodies, 88% (7 replies) cited as very or moderately impactful the options: 'using surplus food and by-products', 'fiscal incentives' and 'clearer, more understandable date marking'. Instead, 'fiscal incentives' do not have high rates in the case of business organizations and companies (42% of the respondents, 126 replies, considered this option very or moderately impactful). The measure targeting date marking received support from most stakeholder groups (being cited as very or moderately impactful by 77% of NGOs and consumer organisations – 69 replies - and 70% of citizens – 184 replies), except for companies (43%, 130 replies, deeming it as very or moderately impactful). In the response papers, many advocated for the adoption of a reduction target on the amount of bio-waste disposed in residual waste by 2030.

Views from **SMEs** do not show significant differences compared to those of large companies as regards the support for setting food waste reduction targets, the expected benefits of reducing food waste, the associated challenges and the actors involved.

Position papers

Stakeholders were invited to submit additional information including position papers. There were more than 200 separate submissions, some of them were documents submitted multiple times by different stakeholders or by the same stakeholder at different points in the revision process. In this case, the document was logged and reviewed once. 75 position papers were received from Business Associations and from Company/Business Organisation. 27 position papers were received from NGOs, 8 from Public Authorities, 6 from other, 3 from Environmental Organisations, 2 from EU citizens and Trade unions and 1 from Consumer Organisations and Non-EU citizens.

Nearly 30 position papers covered the area of textiles waste, of which about half came from **SMEs** or organisations representing them. SMEs pointed out that there is currently no large-scale plan to process textile waste. They stressed the need to promote durable, high-quality textiles, improve their reuse, wherever possible prepare them for reuse and scale up sufficient sorting for reuse, recycling and processing infrastructure. They also recommended that changes in textiles' design and consumption patterns should take place, that the amount of textile waste should be decreased through ambitious waste policies. The same points on durability and reuse of textiles, as well as on sorting and recycling capacity were shared by the recycling industry that also noted that circular and social textile value chains should be developed. Among the recommendations were the need to set quantitative reuse and preparation for reuse targets and to improve separate collection systems. SMEs noted that EPR schemes should enforce the waste hierarchy by setting quantitative targets for waste prevention and preparation for reuse, ensure the eco-modulation of fees and fair competition in recycling markets, granting access to the waste stream to preparing for reuse operators, while also involving social enterprises as key stakeholders in the development, governance and functioning of these schemes. They also advocated consistency with other regulatory initiatives, such as the ESPR and WSR and the harmonisation of end-of-waste criteria at EU-level, which was also endorsed by the recycling industry. SMEs also pointed out the need for guidance to achieve high levels of separate collection of textiles and that mature fibre sorting and pre-processing is critical to scale the recycling of post-consumer waste. Some position papers reflect on a harmonised definition of textile waste.

Many position papers recommended to set waste prevention related targets, including ones on waste prevention for individual product groups and ones for durability and repairability of new clothes. However, others pointed out that while setting targets has been an effective means to create a more circular economy, they are not sufficient. They stressed the need for more economic and legislative incentives to promote waste prevention and reuse, such as tax incentives, innovation grants or financial support schemes. For example, many pointed out that repairers should be granted a VAT exemption or reduction and be legally allowed to remove spare parts from waste streams. Many respondents highlighted the need to reduce VAT on sale of second-hand clothes and introduce a circular tax credit for brands that carry out projects integrating the circular economy, such as take-back schemes or the offering of repairs for life. The need to differentiate support for durable high quality fashion items was stressed.

Respondents disagreed on the application of the waste hierarchy. While many stressed the need to prioritise waste prevention and reuse, others pointed out that in some cases recycling and reuse could not be placed in a strict hierarchy, such as in the case of packaging. Others claimed that recycling was the key solution, as reuse will inevitably end after a number of (re)uses. Several argued that the hierarchy should be adapted to promote high-quality recycling and reuse solutions. Many advocated for adding nuances to clarify the increase of impacts occurring as you go down the steps, differentiating between high quality recycling with preservation of all or almost all properties, recycling with reversible loss of properties, recycling with irreversible loss of properties and recycling to a product that is not circular.

Many position papers highlighted that the Waste Framework Directive should include a transparency provision for public access to nationally reported waste data. Several respondents noted in the response papers that they were in favour of introducing mandatory mixed waste sorting prior to landfilling and incineration to prevent used products from being damaged, thus safeguarding the reusability of products. They also indicated that unwanted products with a high reuse potential should not be mixed with other items. For that reason, clear information on where and how to discard them should be provided to consumers. Some position papers pointed out that it was essential for the directive to enhance its focus on recycling. In line with this point of view, several respondents pointed out that more targets should be developed to promote recycling. As a matter of example, it was considered essential to set mandatory targets for recycling of textile waste to pursue an ambitious implementation of the 'EU Strategy for Sustainable and Circular Textiles' (EU Textiles Strategy)[24].

Many position papers advocated for support to and investment in better waste treatment infrastructure, such as modern recycling facilities and new recycling technologies and excellence centres across member states, in particular high-quality recycling.

Among dissatisfactions, many response papers stressed the need to prevent fashion waste export. To address this issue, some recommended to designate EPR funds to support waste management in the importing locations; ensure the sorting of collected material according to quality specifications to keep clothes at a higher value; mandate the utilisation of digital product passports for all agreed products; and encourage local reuse and recycling of collected textiles based on the EU proximity principle. Furthermore, in keeping with the call for evidence general support for EPR was provided by public authorities, business associations, NGOs and companies businesses. However, the industry, other business and company representatives and some SMEs cautioned the application of EPR, identifying some specific challenges to be addressed in application of EPR to textiles.

53 position papers focused on food waste or included considerations on this topic. 26 papers including comments on food waste were received from business associations, 12 from non-profit organizations, 8 from companies and 7 from public authorities. Among the 8 companies, one has a medium size and 7 are large companies. Most of the position papers expressed agreement on the setting of food waste reduction targets, with 10 papers advocating the need for ambitious targets (50% reduction) and 18 papers in favour of applying targets in all the steps of the supply chain. However, two business organizations disagreed on setting targets at the primary production stage, due to the imbalance of power in the supply chain and market dynamics that cannot be controlled by farmers (e.g., price dynamics, cancellation of orders, etc.). Six papers from business associations stressed the need to take into account previous efforts made to reduce food waste. Concerning waste prevention actions, two papers from business associations, one from an NGO and one from a company stressed the importance of prioritizing those actions with the greatest environmental or climate impact, using a food use hierarchy approach. The role of packaging in preventing food waste, including use of innovative/high performance packaging with the potential to extend the life of food products and compostable and bio-based packaging, was stressed by 17 position papers, mainly from business associations. Concerning the actions and policy initiatives that the EU should undertake, rules on date marking and actions related to awareness raising and education were the most mentioned. The need for a harmonized food waste definition and a better monitoring system was also stressed by five business associations and two NGOs, and four stakeholders (two business organizations, one company and one NGOs) suggested to provide fiscal incentives to spur food waste prevention and incentivize food donation. Policy coherence between food waste and other related policies (e.g.,

[24] European Commission, *EU strategy for sustainable and circular textiles*, 2022, https://ec.europa.eu/environment/publications/textiles-strategy_en.

labelling, climate action, Common Agricultural Policy) was also recommended by two NGOs, one company and one public authority.

Targeted consultations

Targeted consultation for used textiles and textile waste took the form of four virtual stakeholder workshops as detailed below using group discussions as a whole as well as break-out groups and use of digital white boards. Additionally, a meeting of the WFD Expert Group (Member States), interviews and a conference on the future of Europe were used to obtain more targeted evidence. Details on each of these are presented below. The white boards that operated during the workshops allowed anonymous comments to be made meaning that in several cases comments received could not be attributed to any particular stakeholder group.

Waste prevention, preparation for reuse and recycling and used textiles and textile waste

Stakeholder workshops

Workshop One concerned preparation for reuse and recycling and was held 30 March 2022. It focused on the preparation for reuse and recycling of bulky waste, hazardous household waste, construction and demolition waste from households, wood packaging, ceramics packaging, WEEE and batteries. Attendees included 20 Member State representatives (including government ministries and competent authorities), 19 company/business organisations, 8 Environmental NGOs and 3 Academia and research organisations. Numerous stakeholders' statements expressed their views regarding a lack of binding waste prevention targets at EU level in the WFD. Hereby a lack of ambitious mandatory waste reduction targets (overall for municipal solid waste and waste stream specific waste reduction targets) was frequently mentioned. Stakeholders from across all stakeholder groups also stated the need for a sound monitoring system for waste prevention. There was no dispute amongst the stakeholders demanding EPR requirements and fee modulation to be better aligned with waste prevention (for example design, reuse and repair). Several general statements were issued by stakeholders on the need of changing the modes of (linear) production and (over-)consumption patterns and on the missing decoupling of economic growth and waste production. In this context, the legal framework was still perceived as too "linear" and that the concept of "waste" should be conceived in a more circular way.

Stakeholders from across the stakeholder groups agreed on the problem of low demand for repaired / refurbished products, existing market disincentives for more durable products and new products being too cheap, caused by the absence of a tax on virgin materials. Individual stakeholders, particularly NGOs emphasized the problem of control and enforcement of authorities, the problem of landfilling being the cheapest option for waste management and lack of incentives to promote the implementation of the waste hierarchy, with business representatives nothing the problem of soiled recyclables in the collection phase hampering further recycling / reuse.

Workshop Two concerning used textile and textile waste was held on 31 March 2022. The half-day workshop focussed on determining the problems concerning used textile and textile waste, their associated drivers and their likely impacts. Attendees were comprised of 20 Member State representatives, including government ministries and competent authorities, 19 Company / business organisations, 8 Environmental NGOs and 5 Academia and research organisations. Comments were made on the need to standardise definitions, rules, targets and EPR schemes across the EU. Stakeholders also mentioned the need to regulate the design of textiles, through eco-design measures and through consideration of eco modulation in the case of EPR. Some stakeholders, particularly business associations and NGOs indicated the need to facilitate changes in consumer behaviour, and some felt that regulations should address this issue. Comments indicated that priority for the

management of textile should be given to sorting for reuse and then to recycling. Focus should also be given on reintroducing recycled textile into new textile products.

Specifically concerning recycling of textiles, industry stakeholders regretted the lack of economic attractiveness of recycled textile fibres, considering the very low cost of new fibres. It was considered that regulatory incentives could help reverse this pattern. Comments were also echoed across all stakeholder groups on the lack of infrastructure to absorb the volumes of textile waste and on the low quality and durability of textiles due to fast-fashion trends, which result in short product lifetime. Stakeholders, particularly industry stakeholders, identified that some of the main barriers to high quality recycling were due to the diverse mix of materials, coatings, dyes, and non-textile elements that make up garments, which are not designed for reuse or recycling.

Stakeholders overall agreed that the option of no further policy intervention was not sufficient to ensure the collected textiles be sustainably managed. They indicated that the separate collection obligation as of 2025 should be accompanied by other measures (targets). They also pointed out the current lack of harmonised definitions and whilst there was agreement that best practices should be shared, the need for more harmonisation of definitions across Member States was considered of primary importance.

Different aspects of EPR for textiles were highlighted. Stakeholders, particularly NGOs, mentioned that a focus should be given to repair and reuse, and that an EPR scheme should not incentivize recycling over reuse. All stakeholders agreed that collection, sorting and recycling infrastructures needs to be dramatically scaled up, and that EPR could provide the necessary funding to make that happen. However, in the interest of consistency there would also be a need for clear guidance on specific aspects of EPR schemes, such as the responsibilities of actors and governance if there were to be additional measures on EPR at EU level. Finally, the need to consider the overall regulatory framework when thinking of new measures was highlighted.

Different opinions emerged on the topic of targets and restrictions. Industry stakeholders mentioned the importance to consider available capacity (i.e., for sorting, recycling) when setting targets, and to include industry experts in the discussion. Binding targets on the use of recycled content in new textiles were also mentioned, as well as distinct targets between (preparation for) reuse and recycling. Some stakeholders, particularly NGOs, suggested separate targets for household and for commercial/industrial waste. Some concerns were also raised, on necessary monitoring and reporting to monitor targets, on the risk of misaligned application of targets in EU Member States, and on the importance to consider the current status of the different Member States with regards to management of used textile and textile waste when defining targets. Stakeholders mentioned that targets on prevention could also be considered.

Workshop Three concerning waste prevention was held on 5 April 2022. The attendees were comprised of 20 Member State representatives, including government ministries and competent authorities, 19 Company / business organisations, 8 Environmental NGO and 5 Academia and research organisations. Whilst the workshop focussed on Municipal solid waste / Total Waste, Food / Bio waste, Bulky waste, Construction and demolition waste, WEEE, Textile Waste, End-of-Life Vehicles (ELV) and End-of-Life Tyres (ELT) Task 1(b) the input from the workshop was, on the one hand very diversified and covered a wide range of aspects, but in relation to stakeholder feedback had a clear focus on bulky waste. However, as part of the discussions it must be emphasised that in general there were no strong different opinions from different groups. A further overriding theme from all stakeholders related to data limitations in respect to the problems and drivers related to waste prevention. All stakeholders agreed that current practices were insufficient to promote preparation for reuse and recycling and that this can be addressed through a mix of measures. There were universal calls for greater assistance in interpreting existing measures alongside any new provisions.

Workshop Four concerning used textiles and textile waste was held on 7 July 2022. Attendees at the workshop were comprised of 44 Member State representatives, including government ministries, national and regional competent authorities, 31 Company / business organisations, 19 Environmental NGOs and 2 Academia and research organisations. Attendees were presented with the options to address used textiles and textile waste under consideration with lower levels of support for lower ambition measures and higher levels of support for more ambitious measures. Common themes reported by all stakeholder groups included the need to greater consistency in determining the scope of textiles under the WFD and the need to support infrastructure development to manage the textile wastes generated. Correctly targeted and consistent application of EPR was seen as an important measure in this regard. Furthermore, in the context of EPR a Member State noted the need to include consideration of the needs of smaller Member States that may rely on neighbouring Member States when it comes to textile waste treatment.

Waste Framework Directive Member States Expert Group meeting. – 19 October 2022.

Several presentations were given at a virtual meeting of the WFD Member State Expert Group, two of which concerned the topics of this initiative: textiles and food waste. In relation to textiles, Member State representatives were presented with the problems identified, the objectives to be achieved, the policy options that could be applied to achieve the objectives including the specific proposed measures contained therein and a list of the preliminary impacts of the intervention. Member States generally considered that a mix of policy measures were required to address used textiles and textile wastes, with clarification of definitions, establishing minimum requirements on separate collection, mandating the use of EPR for textiles and banning the landfilling of textile wastes seen as the key priority measures to be applied. In relation to food waste, Member States were presented with the set up for policy options and the results of public consultations. As data on food waste generation were not available yet (published on 25 October 2022), discussion on food waste was short and limited to clarification of elements presented.

Interviews

In April and May 2022 interviews were organised with selected stakeholders from across all stakeholder groups primarily focussing on a broader scope at first and then later focussing on used textile and textile waste. Twenty-seven one-to-one interviews / one-to-group interviews were held with regard to problem identification, the scope of the objectives and evidence gathering with regard to the impacts of options and measures. According to the stakeholders, an EU-wide EPR framework should include specific elements in order to be efficient. Measures on re-use, repair and separate collection need to include enforceable, binding targets to stimulate producers to make the transition to circularity. As regards the scope of the initiative, some of the stakeholders suggested that the collection should include textile waste generated by households and professionals that is comparable to household textiles such as clothes, home and interior textiles, bags made from textiles and textile accessories; however, they raised concerns on shoes and technical textiles. They also suggested to limit the scope at the beginning and to expand over time when the infrastructure is in place and to use the Customs Tariff CN codes to define the textiles covered by the suggested EPR scheme. The stakeholders expressed different views on the issue of guidance. In terms of targets, the stakeholders recommended that targets with a gradual increase in their level of ambition over time should be developed, depending on the levels of consumption, as well as enforceable resource reduction targets for textile production, by e.g., a recycled-content target. They also highlighted the fact that any targets should be combined with the scaling up of recycling technologies in the Member States and that the re-use targets should ensure that reuse is actually taking place. They noted that it is important to consider that targets for preparation for reuse and recycling of textile waste should be based on the waste hierarchy.

Prevention and management of food waste

Surveys on food waste prevention initiatives

Targeted consultations on food waste prevention initiatives were carried out by means of two surveys sent to Member State experts and stakeholders in the food value chain[25]. Both surveys aimed at collecting quantitative data on costs of the waste prevention initiatives and amounts of food waste prevented. The survey for Member States (MS) was open March - May 2022. Based on the country profiles published in the EU Food Loss and Waste Prevention Hub[26], the survey listed all the relevant food loss and waste prevention initiatives carried out by Member States. The survey requested to complete this information with general information on the initiatives, amount and value of food waste reduced, links to websites, and data on costs of the initiatives. Contributions were received from 20 countries, with a total of 145 initiatives reported. Data on the overall costs was provided for 18% of the initiatives reported, with 13% including data on the amounts of food waste reduced and 6% providing information both on costs of the initiatives and amounts of reduced food waste.

The questionnaire for stakeholders involved in food waste prevention initiatives was published as an EU survey in April 2022 and promoted through various channels, including the EU Food Loss and Waste Prevention Hub. The survey closed in June 2022, with 62 replies received. The survey included a part that requested general information, including questions on the aim of the initiative, its geographical scope, typology, stakeholders involved, phases of the supply chain addressed, etc. The second part aimed at receiving quantitative data on costs of the initiative and amount of avoided food waste. The last part focused on social benefits, e.g., on possible jobs created by the initiatives, training opportunities and volunteer work. Some respondents were contacted by email in order to request further explanations or to confirm the information provided. When a website of the initiative was available, data reported in the survey was compared with information published online.

The survey for stakeholders allowed to collect quantitative data for about 50% of the initiatives reported. For these initiatives it was possible to calculate an average cost of food waste avoided for the various types of initiatives (the largest share of initiatives reported related to surplus food redistribution). The average costs per unit of avoided food waste (986 EUR/tonne) are high, compared to figures derived from the literature and previous estimates. Possible reasons for the high value can be found in the fact that some initiatives have other (or additional) objectives, like the support to disadvantage people and households for which they receive funds. The group of food redistribution initiatives showed lower average costs compared to the other types (475 EUR/tonne). Concerning the type of stakeholders running the initiatives, retailers, municipalities and consumers were the most selected options. The most represented type of initiative was the surplus food redistribution, but most of the initiatives have various purposes and reduce food waste in various stages of the supply chain. Concerning the social benefits, on average each initiative involved 23 volunteers and created 20 jobs. Concerning the additional social benefits created by the initiatives, food security, poverty reduction, awareness raising, education and social cohesion were the most mentioned by respondents.

Interviews

In the context of the targeted consultations on food waste, four interviews were held with selected stakeholders who replied to the survey (two companies, a no profit organization and a public authority). The interviews took place between May and August 2022 with the aim of collecting additional data and insights on their initiatives, or to clarify the information that they provided in the

[25] More details on targeted consultations on food waste can be found at: De Laurentiis, V, Mancini, L, Casonato, C, Boysen-Urban, K, De Jong, B, M'Barek, R, Sanyé Mengual, E, Sala, S. *Setting the scene for an EU initiative on food waste reduction targets*. Publication Office of the European Union, Luxembourg, 2023, doi: 10.2760/13859, JRC133967

[26] European Commission, EU Food Loss and Waste Prevention Hub, https://ec.europa.eu/food/safety/food_waste/eu-food-loss-waste-prevention-hub/eu-member-states.

survey. Two additional interviews with WRAP and Wageningen University have been conducted in order to receive feedback on the data collected through the Member State and stakeholder surveys conducted as part of the targeted consultation (in particular, the quantitative data received on cost of the initiatives and on the representativeness of the type of initiatives reported through the survey). According to these stakeholders, the survey findings lack data from large-scale initiatives, which have a higher impact on the EU food system as well as data from food waste prevention initiatives undertaken by food businesses. An interview was conducted with a researcher of the Thünen Institute of Market Analysis, in order to compare data from the survey on food waste amounts and costs of initiatives with those from case studies run by the institute, aiming at improving supply chain efficiency at the manufacturing/processing level. Given that results of these studies are not published yet, they could not be used for the bottom-up assessment.

Meetings of the EU Platform on Food Losses and Food Waste (FLW) and other Expert groups

The targeted consultation meetings of the EU Platform on FLW included a dedicated meeting on 22 October 2021, and subsequent discussions with members at 3 plenary meetings held on: 18 November 2021, 17 February and 20 October 2022. The EU Platform on FLW includes international organisations, EU institutions, Member States' experts and stakeholders from the food supply chain including farmers, industry, environmental-, consumer- and other NGOs (including food banks and other charities). Private sector organisations in the food value chain represent SMEs for their specific sector of activity (e.g., food manufacturing, retail, food services etc.)

The most frequent issues raised by stakeholders consist in the inclusion of all the steps of the supply chain in the scope of the targets, with some comments on the importance of monitoring and integrating food losses; the importance of taking into account food and feed safety (expressed especially by private sector organizations); the concern regarding the choice of 2020 as baseline due to the impact of COVID19 (highlighted by some Member States and NGOs); the possibility to differentiate and take into account edible and non-edible food waste (mentioned by private sector organizations); and to consider the results already achieved by Member States when setting the baseline, highlighted by Member States and private sector organizations. Some Platform members also highlighted the need to ensure coherence between the food waste reduction targets and the future reduction targets for municipal waste.

In the context of finalising the impact assessment, the Commission further convened a meeting of the Member States Expert Group on Food Losses and Food Waste (7 March 2023) and a joint meeting of the EU Platform on FLW and the Advisory Group on Sustainability of Food Systems (13 March 2023). In the meeting with national authorities, some countries (Belgium, The Netherlands) questioned whether it would be possible to set a target different from SDG 12.3, highlighting communications issues given the commitments made to the Sustainable Development Agenda since 2015, whilst, at the same time, underlining difficulties in achieving such a target covering both edible and inedible fractions (the latter being difficult for households to reduce). Belgium pointed out that the valorisation of food waste (the inedible fraction) was not the same as avoiding food being lost and that the inclusion of inedible parts of food will necessarily affect the target's level of ambition. Several Member States (Austria, Croatia, Finland and Portugal) questioned whether the 2020 food waste dataset was sufficiently representative to be used as a basis for setting targets, with Finland suggesting the setting of non-binding targets as a possible first approach. Some countries argued for greater simplicity (Latvia, Portugal), suggesting, for instance, the setting of one target covering the whole food supply chain. Several public authorities (Austria, Belgium, Croatia, Denmark and Finland) questioned setting the same target for all Member States (given different national situations) and asked whether efforts made by "early achievers" could be recognised (e.g., via an earlier baseline).

In the joint meeting with the two expert groups, held on 13 March 2023, several stakeholders (an international organisation, representatives of veterinarians in Europe and food services) raised concerns about the comparability of Eurostat data with earlier estimates (FUSIONS, 2016), highlighting that setting targets based on data (which some considered) of questionable quality would be risky. A few also doubted considering 2020 as the baseline year for the targets due to the impact of the Covid-19 pandemic on the food supply chain (representatives of retail and an NGO). Other stakeholders (representing academia and research, a consumer organisation and a regional NGO) expressed the wish to differentiate between edible and non-edible parts of food; moreover, due to differences in dietary patterns across Member States, this may introduce significant biases when setting targets across the EU. Concerning the expression of the targets, some stakeholders representing food services and a regional NGO advocated for expressing reduction targets in absolute amounts (i.e., kg per capita). Several environmental NGOs, as well as representatives of a social NGO and the food services sector, noted that the target options considered in the Impact Assessment were not ambitious enough in the light of the global SDG Target 12.3. As regards the targets' coverage of the food supply chain, a few stakeholders (from an environmental NGO, a research institute and food services sector) asked to cover the whole the food supply chain in order to avoid shifting food waste from one stage to another, while other stakeholders warned that setting targets for selected stages only could create silo actions (industry representatives and a research institute). Stakeholders expressed opposing views concerning setting targets for primary production: representatives from two environmental NGOs and from the retail sector were in favour, while representatives of primary producers argued against, referring to the absence of an agreed definition for food losses and that, in this sector, waste may occur due to factors beyond producers' control. Representatives of the retail sector warned against setting a common target for consumption covering both retail and households, arguing that reducing consumer food waste would be more difficult and could shift the burden to retailers.

3- Use of the information gathered

The information gathered as part of the consultations and in the context of the support studies was combined to identify the problems, set the objectives and identify relevant measures. The evidence was analysed to identify contradictory or consensual views and to reach the conclusions contained in this report. In this context, all widely supported views are entirely considered, with less widely supported views identified as such.

The preliminary steps, including the CfE, the initial interviews and the first three stakeholder workshops conducted through the support study, covered a broad scope addressing waste prevention, preparation for reuse and recycling, used textile and textile waste and food waste. The analysis of these materials was conducted up to June 2022. Taking into account the ongoing efforts across the EU to implement "the 2018 waste package" and the variety of new and ongoing initiatives by the Commission (including the review of the Directive 94/62/EC on packaging and packaging waste (PPWD) [27], Batteries Regulation, Industrial Emission Directive, Eco-design for Sustainable Products regulation (ESPR)), the Commission then refined the scope of the policy initiative. The refined scope focuses on used textiles and textile waste as well as an assessment of the feasibility of setting food waste reduction targets to implement the Union's commitments under the UN Sustainable Development Goals and the Farm to Fork Strategy and limit the food supply chain's impact on the environment and climate.

Hence, the stakeholder consultations after June 2022 focused on textiles. Most of the views on textiles point to the challenges in understanding the nature of used textile and textile waste, the collection,

[27] European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste *(OJ L 365, 31.12.1994, p. 10–23)*, EUR-Lex - 31994L0062 - EN - EUR-Lex (europa.eu).

sorting, reuse, recycling and disposal of textile waste and the relationship between the measures foreseen under the ESPR proposal and the expected impacts on textiles at their point of discard. The largest challenge regarding used textile and textile waste is identified as the scarce data on generation of textile waste and the infrastructure that exists for its subsequent treatment.

Stakeholders provided information on the policy measures that was used to expand the scope to assess matters such as online sales of textiles and end-of-waste provisions that were not part of the original inception impact assessment. Further, stakeholders raised concerns with regard to the impacts of EU discarded textiles on third countries and this was considered when designing the proposed measures. Finally, all stakeholders advocate for greater consistency in Member States' approach to textiles waste management. There were also number of matters raised by stakeholders that fall outside of the scope of the WFD, most notably in respect to textiles design for circularity that is better addressed by the ongoing work on ecodesign under the EU Strategy for Sustainable and Circular Textiles[28].

Information gathered during stakeholder consultations (IIA, targeted and meetings of the EU Platform on FLW) helped inform the definition of policy options, in particular that targets not be limited to the consumption and retail stages but that they cover the food supply chain more broadly. The data on costs of food waste prevention collected through the survey for stakeholders showed a high variability and were generally higher than values found in the literature. Therefore, they were not directly used in the model to calculate the macro-economic impacts of targets.

ANNEX 3: WHO IS AFFECTED AND HOW?

1- Introduction

This annex sets out the practical implications of the preferred policy package for the different stakeholders concerned. It describes the actions that different stakeholders would need to take to comply with the obligations under the revised legislation and indicates the likely costs to be incurred in meeting those obligations, or where quantitative information is not available, the nature and order of magnitude of such costs. It also presents the implications for the public.

2- Practical implications of the initiative: for textiles and textile waste

Producers of textiles: Upon the date of application of the provisions on extended producer responsibility (EPR) (i.e. at or after the transposition date for the targeted amendments to the WFD) producers will be required to provide information on the quantity of textile goods subject to the EPR obligations that are placed on the market. Furthermore, as Member States enact their EPR systems in compliance with the harmonised framework set out in the revised Directive, producers will have to pay fees into the respective producer responsibility organisations (PRO) to cover the costs of collection, sorting, preparation for reuse, recycling, energy recovery and disposal of textile waste as well as other defined costs on reporting, awareness raising, R&D.

Producer responsibility organisations (PROs): The implementation of an EPR scheme would require the setting up of new PROs or the expansion of the activities into the textile sector for existing PROs. PROs will be required to ensure that the scope of textiles covers at least the scope set at the EU level and to comply with the minimum obligations set in the revised legislation. This includes reporting on the operations of the EPR scheme put in place. PROs, based on fees collected from producers, will fund the waste management enterprises, including social enterprises, to finance the

[28] See footnote 24.

collection, sorting and treatment of textile waste as well as in waste prevention activities at the national level.

Waste management enterprises including social enterprises: Upon the date of application of the revised legislation (i.e., transposition date for the WFD and entry into force at the national level) waste management enterprises will be required to comply with the revised provisions on textiles waste management. It is expected that these obligations will take several years to set up given the timeframe of the relevant infrastructure investments. The most important aspects in relation to investment in collection, sorting and treatment infrastructure will be to make sure that full scope of textiles defined at the EU level is managed effectively.

Social enterprises, one of the key stakeholder groups in the collection, sorting and reuse of textiles and textile waste in the EU, will be provided with a clearly defined role in the application of the new measures, ensuring that Member States and PROs engage with those enterprises to ensure the ongoing viability of their operating models. The obligations proposed on separate collection of textile waste should improve the quantity and quality of textile streams suitable for recycling, to the benefit of recyclers. Funding via the EPR scheme will be directed to innovation and the creation of closed loop recycling infrastructure.

Additionally, reporting on certain aspects of waste management activities will be required in terms of collection, sorting and treatment of textiles. In most cases this reporting is in place and the provisions of the initiative will add clarity to those provisions, rationalising reporting across the EU and reducing administrative burden. In a small number of cases, additional reporting would be required e.g., in relation to collection and sorting and subsequent treatment, to ensure that the obligations set at the EU level are complied with and the monitoring framework overall is improved and future proof. Enterprises that are involved in the shipment of used textiles will face additional data recording obligations to prevent illegal shipments.

Competent authorities: Competent authorities will have increased responsibilities in ensuring the management of used textiles and textile waste. This will include:

- the setting up of EPR schemes and permitting of PROs.
- ensuring that the necessary infrastructure is in place to comply with the collection target set.
- adapting the waste prevention programmes to monitor textile waste prevention based on harmonised EU indicators.
- applying the necessary compliance / inspection regimes in relation to collection, sorting and shipments of used textiles.
- providing revised and additional data in relation to textile waste management within their territory.
- support the development of the implementing acts to be developed by the European Commission.

The public: The new legal provisions should result in additional separate textile collection infrastructure being made available to the public, making collection easier. This will better feed the reuse market within the EU and provide additional second-hand clothing for sale to the public (in comparison to increased recycled fibres that will reach consumers through an indirect route).

Additionally, via the EPR scheme, the public should be better informed as to how they can contribute better to textile waste prevention as well as in relation to additional information on waste prevention measures taken across the EU via the waste prevention indicators. Furthermore, data collected at the EU level in relation to used textiles and textile waste management will lead to a better-informed public on the textile challenge and the success of actions put in place to address that challenge.

The application of EPR fees is going to increase the cost of placing textiles on the market. However, it is not certain whether the producers will or to what extent pass these costs to consumers. This increase in price is likely to be small – on average less than 0.6%, depending on the specific costs of waste management in country where the EPR fees are being collected.

Other: Under the preferred option, the European Commission will be required to:

- Develop, adopt and implement an implementing act setting out minimum sorting requirements for re-use and recycling;
- Develop, adopt and implement an implementing act on end-of-waste criteria at the EU level for waste textiles for re-use and recycling;
- Develop, adopt and implement an implementing act harmonising the reporting formats for reporting on textile waste management;
- Develop, adopt and implement an implementing act harmonising the fee modulation criteria under extended producer responsibility scheme;
- Develop, adopt and implement an implementing act setting out a harmonised methodology for the calculation of the collection target
- Establish and maintain a data flow management system for re-use of products data, including textiles (EEA);
- Establish and maintain a data flow management system for textile waste management (adaptation of the existing data flow management system on textiles);
- Support Member States in the transposition and the operationalisation of the new obligations through the Waste Committee.

3- Summary of costs and benefits for textiles and textiles waste

Table 2 – Overview of Benefits of the Preferred Option

I. Overview of Benefits (total for all provisions) – Preferred Option		
Description	***Amount***	***Comments***
Direct benefits		
Application of the polluter pays principle through EPR	Funding to address the collection, sorting and treatment costs of used textile and textile waste management to the value of 2.2 billion euro for the EU overall. Benefit to consumers reducing their volumes of mixed waste	
Reduction of pollution resulting from the discard to used textiles and textile waste in residual waste streams	The additional diversion of approximately 137 000 tonnes of waste from incineration and landfill to treatment higher up the waste hierarchy as a result of collection targets will reduce GHG emissions as well as other emissions to air, water and land.	Additional reductions through waste prevention measures are also expected. It has not been possible to quantify the benefits resulting from the waste prevention measures foreseen in relation to indicators or in relation to EPR prevention measures employed at the national level.
Increases in employment infrastructure for waste management	The additional obligations in relation to waste management would result in approximately 8 740 new jobs being created in the collection, sorting and treatment of used and waste textiles.	
Better data on used textile and textile waste generation across the EU	It has not been possible to quantify the benefits resulting from better data. However, the comparability of the situation of different Member States in relation to used and waste textiles will be significantly improved in comparison to the status quo, with additional information able to support development of new infrastructure, most notably in support of textile recycling.	
Reduction in volumes of waste textiles exported as reusable to third countries	The social and environmental impacts of waste textiles exported from the EU to third countries would be reduced as a result of greater sorting obligations as well as record keeping in relation to such exports.	
Increase in circularity of used and waste textiles	The development of sorting requirements and EU end-of-waste criteria will result in easier flows of textiles in the future whilst ensuring consistency of approach in determining when textile wastes are no longer wastes across all Member States. Greater reuse and recycling of textiles will result on the retention of the economic value of the textile materials contained therein. In some cases, this could cover 75% of the costs of management of the wastes themselves.	
Indirect benefits		
Increase in the volume of reusable textiles able to be placed on the market within and outside the EU	Measures targeting increased reuse will lead to greater volumes of goods made available on the second-hand market. Consumers will have a larger offer of items to purchase on both price and ethical grounds.	

*Administrative cost savings related to the 'one in, one out' approach**		
Reporting cost reductions resulting from clearer scope of textiles under the WFD as well as greater compliance against a clearer set of rules across the EU	It has not been possible to quantify the benefits but it is expected that alongside reduced costs of reporting greater consistency of approaches to addressing a more clearly defined scope of textiles will reduce costs for operators having to comply with a single set of rules across the EU in comparison to the baseline.	

*(1) Estimates are gross values relative to the baseline for the preferred option as a whole (i.e. the impact of individual actions/obligations of the preferred option are aggregated together); (2) Please indicate which stakeholder group is the main recipient of the benefit in the comment section;(3) For reductions in regulatory costs, please describe details as to how the saving arises (e.g. reductions in adjustment costs, administrative costs, regulatory charges, enforcement costs, etc.;); (4) Cost savings related to the 'one in, one out' approach are detailed in Tool #58 and #59 of the 'better regulation' toolbox. * if relevant*

Table 3 – Overview of Costs of the Preferred Option

II. Overview of costs – Preferred option							
		Citizens/Consumers		**Businesses**		**Administrations**	
		One-off	**Recurrent**	**One-off**	**Recurrent**	**One-off**	**Recurrent**
Action (a)	Direct adjustment costs	Note that the one-off and recurring costs identified for businesses in this row may instead fall upon citizens and consumers through increased prices for textile goods in circumstances where EPR costs are added to textile good prices	Note that the one-off and recurring costs identified for businesses in this row may instead fall upon citizens and consumers through increased prices for textile goods in circumstances where EPR costs are added to textile good prices	Revision of waste management permits, where necessary to adapt to the new regulatory requirements.	970 million euro per year sorting and treatment costs	Costs for setting up EPR schemes (inter alia producer register, permitting system for PROs). Revision of waste management permits, where necessary to adapt to the new regulatory requirements. Adaptation of the data collection systems and requirements on economic operators.	Operational costs in relation to ongoing collection, sorting and onward treatment of textiles collected if incurred by municipalities ought to be covered by the producers in line with the principle of necessary cost.
	Direct administrative costs	Note that the one-off and recurring costs identified for businesses in this row may instead fall upon citizens and consumers through increased prices for textile goods in	Note that the one-off and recurring costs identified for businesses in this row may instead fall upon citizens and consumers through increased prices for textile goods in circumstances where EPR costs are added to	Cost of registering in a producer register and a PRO.	6.8M euro for reporting of products PoM and eco-modulation data 750K euro per year for additional reporting by waste management operators 1M euro per year for producers	Revision of the Waste Prevention Programmes on prevention indicators.	EUR11.2–69K per year per Member State to operate producer registers Monitoring of waste prevention based on common indicators and more granular data collection on textile waste management. 208 euro per competent authority annualised for additional inspection

		circumstances where EPR costs are added to textile good prices	textile good prices		to assist PROs 78 euro per exporter annualised per inspection		
	Direct regulatory fees and charges						Landfill tax loss of 26.5 million euro for Member States due to textiles diverted from landfills but tax gain on the sale of secondary materials
	Direct enforcement costs						4 euro million costs of operating PRO registers and inspections
	Indirect costs						
Costs related to the 'one in, one out' approach							
Total	Direct adjustment costs	Note that the one-off and recurring costs identified for businesses in this row may instead fall upon citizens and consumers through increased prices for textile goods in circumstances where EPR costs are added to textile good prices	Note that the one-off and recurring costs identified for businesses in this row may instead fall upon citizens and consumers through increased prices for textile goods in circumstances where EPR costs are added to textile good prices	Revision of waste management permits, where necessary to adapt to the new regulatory requirements.	970 million euro per year sorting and treatment costs		

	Indirect adjustment costs						
	Administrative costs (for offsetting)	Note that the one-off and recurring costs identified for businesses in this row may instead fall upon citizens and consumers through increased prices for textile goods in circumstances where EPR costs are added to textile good prices	Note that the one-off and recurring costs identified for businesses in this row may instead fall upon citizens and consumers through increased prices for textile goods in circumstances where EPR costs are added to textile good prices	Cost of registering in a producer register and a PRO.	6.8M euro for reporting of products PoM and eco-modulation data 747K euro per year for additional reporting by waste management operators 1M euro per year for producers to assist PROs 300K for exporters		

(1) Estimates (gross values) to be provided with respect to the baseline; (2) costs are provided for each identifiable action/obligation of the preferred option otherwise for all retained options when no preferred option is specified; (3) If relevant and available, please present information on costs according to the standard typology of costs (adjustment costs, administrative costs, regulatory charges, enforcement costs, indirect costs;). (4) Administrative costs for offsetting as explained in Tool #58 and #59 of the 'better regulation' toolbox. The total adjustment costs should equal the sum of the adjustment costs presented in the upper part of the table (whenever they are quantifiable and/or can be monetised). Measures taken with a view to compensate adjustment costs to the greatest extent possible are presented in the section of the impact assessment report presenting the preferred option.

4- Practical implications of the initiative for food waste

Competent authorities

The first affected stakeholders will be public authorities. They will have to review their existing food waste prevention programmes and decides if the measures included there are sufficient to meet the food waste reduction targets. While the initiative does not set any new obligations on Member States, meeting the targets would require more effective implementation of current rules. In order to meet the targets, Member States will need to implement efficient food waste reduction strategies. Key components of such strategies would include carrying out a food waste diagnosis; defining and implementing actions required to address the major hotspots identified; national coordination of efforts by public and private stakeholders and regular assessment of progress made. Competent authorities will be expected to help coordinate efforts of stakeholders in the food chain as well as will be key in helping in education and awareness raising. Examples of measures taken by Member States

so far are described in Annex 7. Exact scope of actions will depend on national situation and decisions to be taken by Member States.

Food business operators

May be requested to review their operations with a view to search for opportunities to reduce food waste by organisational, technical or social innovations. Business organisations may be requested to participate in different cooperative forms (e.g., voluntary agreements, platforms) to improve communication and collaboration along the food supply chain. Measures taken so far by Member States was of voluntary and supporting character. Reduction of food waste may in longer term impact the incomes of food producers (e.g., farmers) and sector of food processing and manufacturing. More details is included in the Annex 11 – section on economic impacts. On the other hand, reduction of food wastage in their operations should improve their profits and competitiveness.

The public

The public should be better informed about practical way to reduce food waste as well as issues of systemic impacts of food in general. By reduction of food waste households are expected to reduce their spending on food which was not consumed and use these either for food of better quality or for other purposes. Food waste reduction may be linked to some inconveniences (e.g. more attention to food preparation, more trips to the supermarket, less choice at the close of shopping etc.).

Waste management enterprises

In longer term reduction of food waste, especially at consumer level, is expected to reduce amount of waste destined for recycling. This may be partly compensated by recycling of food waste which are currently landfilled or incinerated, which is expected to be supported by obligation of separate collection of biowaste, entering info force from 31 December 2023.

Other

The European Commission will be required to continue support to Member States in practical implementation of food waste policies and measures and in the sharing of best practice between Member States, in particular via the EU Platform on Food Losses and Food Waste and knowledge development (e.g., dedicated Horizon Europe projects, European Consumer Food Waste Forum, etc). The support will also include dedicated grants already envisaged under Single Market Programme.

5- Summary of costs and benefits for food waste

Table 4 – Overview of Benefits of the Preferred Option

I. Overview of Benefits (total for all provisions) – Preferred Option		
Description	***Amount***	***Comments***
	Direct benefits	
Reduced climate change impact	Up to 62 million tCO2eq avoided emissions, when calculated with footprint bottom-up analysis	This does not include the rebound effect.
Reduced land use	Food consumption land footprint reduced by 2%	As calculated with the MAGNET model.
Reduced impacts on soil	Impacts on soil due to land use of the food system reduced by 4%	As calculated with the bottom-up analysis
Reduced impacts on water	Impacts caused by water use of the food system reduced by 3%	As calculated with the bottom-up analysis
Reduced impacts on marine eutrophication	Impacts on marine eutrophication caused by the food system reduced by 4%	As calculated with the bottom-up analysis

Reduced energy consumption	Food consumption energy footprint reduced by around 680 MJ per capita per year equivalent to a 2.6% decrease.	The food consumption energy footprint is calculated with MAGNET. Food waste reduction helps to reduce the demand for gas, oil and electricity.
Reduced food prices	Reduced food prices, e.g. vegetables (-2,5%) fruits (-1,5%), other food smaller reductions	Increased food affordability.
Additional income available for higher quality food or non-food consumption	About 100 Euros per citizen per year	The share of food expenditure in total expenditure decreases because of the lower food prices, offering additional spending possibilities. (MAGNET)
Increase of agri-food exports	Extra-EU exports increase between 1 and 5 % for main agri-food commodities.	This increase is compensating to some extent the income loss of farmers due to the reduced demand within the EU. (MAGNET)
Less dependence for agri-food imports from world markets	Extra-EU imports decrease between 1 and 9% for main agri-food commodities	Given the strategic importance of the agri-food sector, this is a contribution to strengthen the open strategic autonomy. (MAGNET)
Reduced waste collection and treatment	About 170 Euros per tonne of avoided food waste/ Approximately 2.2 billion Euros~~...~~	Estimated considering the cost to society of waste collection (including subsidies, taxes and collection)
Indirect benefits		
Increase of other economic sectors	Increase of value added for services by 0.3%, manufacturing by 0.1%	(MAGNET)
Potential for bio-based industry	The reduction of food demand frees up land, which can be used for other purposes.	The uptake of bio-based industrial applications to reduce fossil-based production, depends on additional instruments/policies
Reduction of food packaging	Around 3% reduction of glass and paper waste	It should be noted that this number assumes a status-quo of packaging in the food chain.
Virtual trade of land and CO_2 emissions	Less demand for food imports, leads to a reduction of virtual land imports (-4.2%), and a reduction of virtual emission imports (-3.3 %).	Reducing food waste could indirectly contribute to reducing deforestation and to mitigating emissions in other countries.
Administrative cost savings related to the 'one in, one out' approach*		
(direct/indirect)	n/a	n/a
	n/a	n/a
	n/a	n/a

Target-setting does not require Member States to take additional actions compared to what has already been established by the WFD as amended in 2018, as the necessary elements are already included there (i.e., obligation to reduce food waste at each stage of the food supply chain, preparing food waste prevention programmes, implementing related actions, monitoring and reporting on progress achieved). Moreover, Member States have already committed, since the adoption of the Sustainable Development Agenda in 2015, to take action to reduce food waste in order to achieve SDG Target 12.3, which is a non-binding, aspirational target. For this reason, it is expected that the proposal does not entail additional cost for administrations.

Concerning impacts on farmers, business and consumers specific impacts will depend on the measures to be taken by Member States. Literature and case studies generally show that food waste

prevention is profitable for food business operators[29]. However, such change in food system requires adaption from all its participants. General cost of change into less wasteful economy, for the proposed option have been assessed in the model at following levels:

Household and food services: 43 EUR/ton to 70 EUR/ton

Retail : 34 EUR/ton to 53 EUR/ton

Processing and manufacturing: 7 EUR/ton to 22 EUR/ton

All values are given per ton of avoided food waste and are insignificant in comparison to value of saved food.

Table 5 – Overview of Costs of the Preferred Option

II. Overview of costs – Preferred option							
		Citizens/Consumers		**Businesses**		**Administrations**	
		One-off	**Recurrent**	**One-off**	**Recurrent**	**One-off**	**Recurrent**
Action (a)	Direct adjustment costs	none	none	none	Farmers loss of income [give value]	none	none
	Direct administrative costs	none	none	none			
	Direct regulatory fees and charges	none	none	Not expected	Not expected	Not expected	Not expected
	Direct enforcement costs	none	none	Not expected	Not expected	Not expected	Not expected
	Indirect costs	none	none				
Costs related to the 'one in, one out' approach							
Total	Direct adjustment costs	n/a	n/a	n/a	n/a		
	Indirect adjustment costs	n/a	n/a	n/a	n/a		
	Administrative costs (for offsetting)	n/a	n/a	n/a	n/a		

6- Relevant sustainable development goals

Table 6 – Overview of relevant Sustainable Development Goals for the Preferred Option

III. Overview of relevant Sustainable Development Goals – Preferred Option(s)		
Relevant SDG	**Expected progress towards the Goal**	**Comments**
SDG no. 3 - good health and well-being: ensure	The project is linked especially with target **3.9** which aims to the substantial reduction of the number of deaths and	Trade-offs with targets 1.5: "By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related

[29] See e.g. Champions 12.3, *The Business Case for Reducing Food Loss and Waste*, 2017.

healthy lives and promote well-being for all at all ages,	illnesses from hazardous chemicals and air, water and soil pollution and contamination. Through the amendment an improvement in public health and safety due to decrease in pollution from waste disposal practices is expected.	extreme events and other economic, social and environmental shocks and disasters.", 10.6: "Ensure enhanced representation and voice for developing countries in decision-making in global international economic and financial institutions in order to deliver more effective, credible, accountable and legitimate institutions.", 15.5: "Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species." and 16.8: "Broaden and strengthen the participation of developing countries in the institutions of global governance".
SDG no. 8 - Decent work and economic growth: promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.	The project is linked with targets **8.3:** "Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services.", **8.4:** "Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead." and **8.7:** "Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms". Combating the fast fashion phenomenon will address the issue of workers suffering poor working conditions with long hours and low pay, with evidence, in some instances, of modern slavery and child labour. The measures aim to ensure that textiles are reused as much as possible and when they do become waste, they are treated as high up the waste hierarchy as possible. The higher steps of the waste hierarchy are more labour intensive than the lower ones. Hence, the proposed measures are expected to enhance the development of SMEs, and in particular social enterprises active in the reuse market that often also have social integration objectives.	Trade-offs of target 8.3 with targets 8.4, 14.2: "By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans." and 14.5: "By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information".
SDG no. 9 – Industry	The project links with target **9.4** on increased resource-use efficiency and	Possible trade-offs with targets 12.4 and 12.5.

innovation and infrastructure	greater adoption of clean and environmentally sound technologies and industrial processes, and target **9.5** on enhancing scientific research, upgrade the technological capabilities of industrial sectors.	These trade-offs will be mitigated through the EPR scheme.
SDG no. 11 - Make cities and human settlements inclusive, safe, resilient and sustainable	The target **11.6** refers to the reduction of the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management. This will be achieved by increasing the proportion of municipal solid waste collected and managed in controlled facilities.	Trade-offs with targets 12.4 and 12.5. The trade-offs will be mitigated by introducing requirements for recyclability of components and availability of spare parts for 7-years after the end of production.
SDG no. 12 - Responsible production and consumption: Ensure sustainable consumption and production patterns	The specific targets linked to the project are: **12.1** "Implement the 10-year framework of programmes on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.", **12.3** 'By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.' **12.4** "By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.", **12.5** "By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.", **12.6** "Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle." and **12.8** "By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature". WFD's primary objective is the prevention of waste, namely the reduction of textile waste generation including through reuse. Further, adopting clarified definitions would help people and businesses to have all the relevant information on textiles.	Trade-off of target 12.1 with target 17.11 "Significantly increase the exports of developing countries, in particular with a view to doubling the least developed countries' share of global exports". Trade-off of target 12.4 with targets 6.3, 7.1, 8.1, 9.2, 9c and 17.8. Trade-off of target 12.5 with targets 6.3 and 17.11. Trade-off of target 12.8 with target 3.3.

Values of SDG indicators linked to food waste reduction:

As food waste reduction have very wide environmental and economic impact, the most relevant SDG indicators linked to food waste reduction was identified for each of the four environmental impact categories considered in this analysis. The outcome is presented in Annex 11, section 2.5.1.

7- Summary of overall costs and benefits

Table 7– Summary of overall costs and benefits

Preferred combined option	Description of impact	Overall balance
Option 2 - Additional regulatory requirements + 2 targets for textiles	**Economic costs**: €913 million per year for sorting obligations Register development costs of €2-12.3 million across Member States and maintenance costs of €11 200 and 69 000 per Member State per year €4.53 million per year for producers to report for the purpose of EPR €2.34 million costs of operating PRO registers and inspections €39.2 million euro per year for additional textile collection, sorting and treatment in Member States that are unlikely to meet a 50% collection target by 2035 €208 euro per competent authority and €78 per exporter annualised per inspection €750 000 per year for EU enterprises to comply with EU reporting obligations €26.5 million landfill tax loss for Member States due to textiles diverted from landfills Reduction in demand for food of 4.2% and a change in value of agri-food production of -1.8% alongside a fall in market prices of between 0.1 and 2.58%. A fall in farm income of euro 4.2 billion euro per annum.	**Costs**: €970 million (these costs may fall on consumers, producers or a mix of both). Combined costs of 84 euro / tonne to 145 euro per tonne of food produced for food. **Benefits**: Direct benefits of €656 million of reusable and recyclable textiles for the EU reuse and recycling market as well as support to €3.5-4.5 billion annual overall returns from EPR investments A reduction in household food costs of 439 euro per year. Additional GHG emission reduction equal to €16 million per year from textiles and additional GHG emission reduction equal to 62 million tonnes per year (overall environmental savings monetised - €9-23 bn), 8 740 jobs created in waste management but up to 135 000 lost in agri-food sectors (expected to be compensated in other sectors)

	Implementation costs of 43 EUR/ton to 70 EUR/ton for household, 7 EUR/ton to 22 EUR/ton for producers and 34 EUR/ton to 53 EUR/ton for retailers. **Economic benefits** EPR: €3.5-4.5 billion annual overall returns on recycling investment (including the benefits indicated for the other measures) Additional sorting: €534 million per year of reuse value and €94 million per year of recycling value Additional collection**:** €28 million per year of combined reuse and recycling value **Economic benefits of savings in household food expenditure** of 439 euro per year **Env benefits**: €16 million from GHG emission reduction from textile waste as well as reduction in release of pollutants to air, water and land that would otherwise result from poor waste management 4.1 million tonnes GHG emission reduction as well as reduction in release of pollutants to air, water and land that would otherwise result from poor waste management. Reduced impact on land use of 2.16 trillion Pt, reduction in marine eutrophication of 532 million kg of Neq and reduction of water use of 80 billion m3 per annum. **Social benefits**: 8 740 jobs created in relation to textiles and social impacts of EU waste in third countries mitigated. 135 000 jobs lost in agri-food sectors.	**Overall effectiveness, efficiency and coherence**: positive

ANNEX 4: ANALYTICAL METHODS

The assessment presented in this report establishes the impacts of measures that may be used to address the challenges identified in the current EU legislative framework addressing waste generation, reuse, and preparation for reuse and quality recycling.

1. Textiles

Methodology

The method used for the analysis was as follows:

- Identifying the problems that need to be addressed through an examination of the results of existing literature and a small number of pilot interviews with stakeholders, including Member States, waste management actors (mainly SMEs) and non-governmental organisations.
- Defining the baseline by considering:
    - Static aspects – the existing framework for waste management, namely the Waste Framework Directive and experiences to date in implementation including in relation to quality of data.
    - Dynamic aspects – including the expected interaction of the Waste Framework Directive with other EU policies including circular economy and bioeconomy policies, the European Green Deal and the Waste Shipment Regulation. Given the uncertainty on measures in relation to textiles under the ESPR, the JRC baseline has not considered this initiative.
- Defining policy objectives. These objectives were defined based on the problems identified and with the input from stakeholders and the Inter-Service Group.
- Assessing the effect of possible measures to achieve the objectives. The measures were assessed using a specific modelling to estimate the effects on consumption, waste generation and treatment of waste. For other measures that could not be modelled to estimate a quantitative effect, a qualitative explanation of the expected effects is provided.
- Modelling economic impacts of the measures (Annex 11). Modelling considers i) the effects of changes in both the volume and nature (in terms of reuse and recycling potential) of waste generated that will require investment in additional collection, sorting and recycling capacity under the baseline – this is particularly important in respect to the application of extended producer responsibility ii) the effects of additional measures beyond the baseline that would require additional investment iii) the resulting potential savings made by moving waste management higher up the waste hierarchy and recovering the economic value of the waste concerned by this shift in treatment.
- Modelling environmental impacts. Focussing on the environmental impacts of changes in consumption, waste generation (in particular waste prevention) and waste treatment. This includes the estimation of climate impacts in terms of GHG emissions.
- Modelling social impacts in terms of the likely changes in waste generation within the EU and its treatment routes, including impacts on employment.

Assumptions

This report assumes the following:

- Without further policy intervention, until at least 2030, waste management in the EU will remain largely aligned with the varying levels of compliance identified in the European Commission's Early Warning Report (EWR) planned for adoption Q2 2023. In addition,

Directive 2019/904 [30] on the reduction of the impact of certain plastic products on the environment (the SUP Directive), the proposal for the revision of the PPWD [31] and the impacts of the proposal for a Regulation establishing a framework for setting ecodesign requirements for sustainable products [32] will have an impact on the baseline. The support study used the impact assessment materials developed under those initiatives to ensure full consistency of the baseline (Annex 10).

- The support study used the most reliable data and statistics available. The sources were analysed and discussed amongst the study team, the Commission services (including the JRC and Eurostat), and the European Environment Agency (EEA). Priority was given to the data and statistical sources of evidence referred to in the European Commission's Better Regulation Toolbox.

Assumptions made in relation to individual policy measures are included in the description against each of the measures in Annex 10. There are instances when views from stakeholders appear in contrast with hard evidence, within unavoidable (presumed or stated) uncertainty margins. Where such differences were encountered, the approach taken to assess the impacts is further explained in the specific instances. Further, determining the impacts of preventing waste generation in the EU is complex because of the lack of available and harmonised indicators and because of the relatively recent amendments in the '2018 waste package'.

Calculations performed in the analysis

This section describes the calculation methods employed and the source data used in the modelling work undertaken. It is important to note, however, that not all impacts can be assessed quantitatively. A description of the quantitative and qualitative approaches is provided below.

Quantitative Assessment

In relation to examining trends in textile waste generation, collection and sorting the basis of calculations is the JRC study [33]. It examined materials flows and value chains of textiles products and the subsequent flows and treatment of post-consumer textiles. The study considered raw fibres, yarns and fabrics as well as finished garments and home textiles. Given the majority of textile waste generated stems from finished garments and home textiles this part of the report has been used for determining future trends.

The JRC study uses information from both ProdCom and Comext.

- Eurostat's ProdCom database[34] comprises statistics on manufactured goods and services together with trade data for the same products. The study notes that at the 8-digit disaggregation level, the database includes approximately 3900 distinct product types defined using a Prodcom code which is derived from 6-digit CPA headings and 4-digit NACE codes. Broadly speaking, the Prodcom data includes for each product category: — the volume of

[30] Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment *(OJ L 155, 12.6.2019, p. 1–19)*, EUR-Lex - 32019L0904 - EN - EUR-Lex (europa.eu).
[31] European Commission, All Environment Publications, Proposal for a revision of EU legislation on Packaging and Packaging Waste, https://environment.ec.europa.eu/publications/proposal-packaging-and-packaging-waste_en.
[32] Proposal for a Regulation of the European Parliament and of the Council establishing a framework for setting eco-design requirements for Sustainable Products and repealing Directive 2009/125/EC, COM(2022) 142 final, EUR-Lex - 52022PC0142 - EN - EUR-Lex (europa.eu).
[33] Joint Research Centre. 2023. "Techno-scientific assessment of the management options for used and waste textiles - Preparatory study for the possible setting of preparation for re-use and recycling targets" (unpublished work).
[34] https://ec.europa.eu/eurostat/web/prodcom.

production (sold and/or produced) given in a physical unit selected according to the product type (pieces, kg, m2 etc.) — the physical volume of the product exported and imported in the same physical unit — the value of production sold in Euros — the value of imports and exports In each reporting country, the National Statistics Institute carries out a survey of industrial production in that country, collates the results and transmits them to Eurostat. Eurostat calculates EU totals and publishes the national and EU data together with the related external trade data. Individual EU and EEA countries can be selected as reporting countries or groupings of countries including the grouping EU-27_2020.EU Comext[35] is Eurostat's' reference database for detailed statistics on international trade in goods. Data included in Comext addresses imports and exports to and from the EU both by value (Euro) and by weight (100 kg) of all goods including textiles. Data is captured in two different ways within COMEXT:

  - Extrastat: data on trade in goods with non-EU countries collected by customs authorities and based on the records of trade transactions in customs declarations. The dataset on trade with third parties is considered particularly robust as it is based on all reported customs movements.
  - Intrastat: When the EU was created and the original member states became part of the EU Single Market, customs and border formalities were removed. The dismantling of customs clearances and controls within the EU meant it was no longer possible to obtain information about the movement of goods (i.e. dispatches and arrivals) between EU member states from customs documents. Intrastat was developed to address this gap in data the statistical system. It replaces the customs declarations and collects information directly from traders about dispatches and arrivals of goods among the Member States by collecting data directly from intra-EU trade operators once a month.

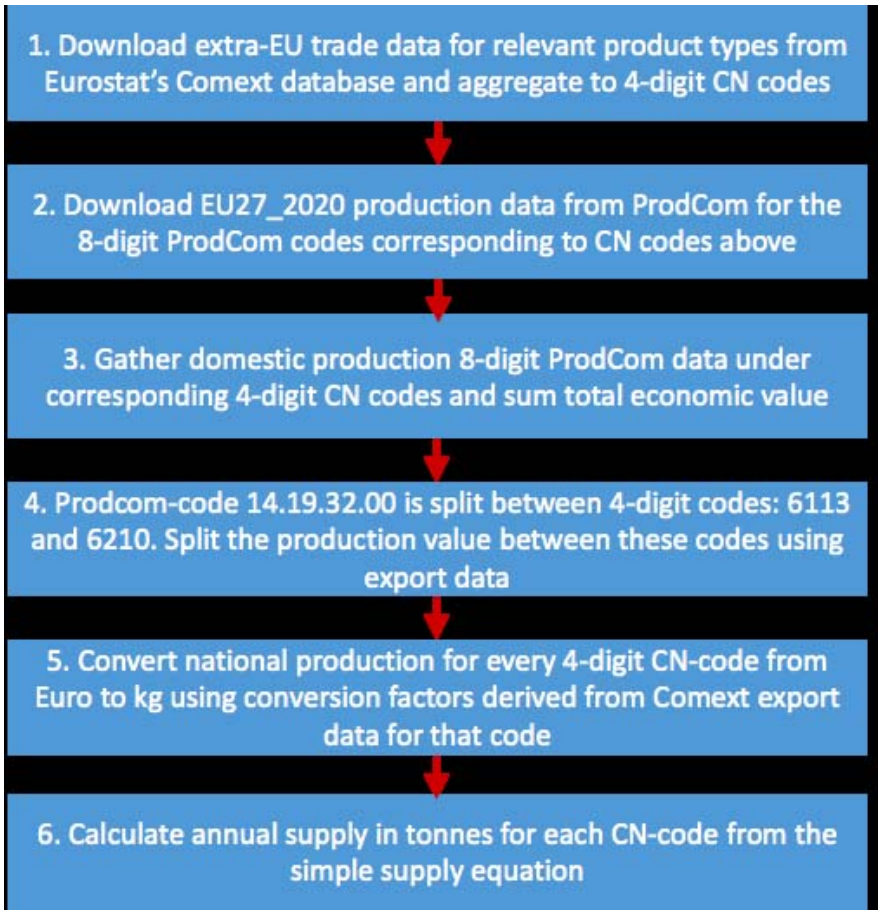
- There are a number of points in relation to Intrastat data in particular that may be considered shortcomings in the comprehensive nature of the data, albeit these shortcomings are considered minor in relation to the overall quality of the data available. These shortcomings include:
  - Businesses and private individuals that are registered for VAT purposes and that dispatch or receive goods are required to submit Intrastat declarations only if the dispatches or the arrivals exceed the relevant threshold.
  - The Intrastat system is based on EU Regulation No. 638/2004 (EU Regulation) and supplemented by Commission Regulation (EC) No. 1982/2004. Since the main Intrastat rules are provided in the Regulation the rules should normally be applied uniformly across the EU. However, there are differences in implementation as some Member States provide guidelines on how the general principles in the Regulation should be applied in specific situations (e.g., commercial samples, return of goods, etc.). Consequently, these guidelines may produce different results for various situations in EU member states.
  - The authorities responsible for Intrastat reporting differ from country to country. Some Member States delegate oversight of Intrastat to their tax or customs authorities, others to their statistics office and still others to their national bank. The nature of reporting by each Member State may, therefore, vary in approach.
- Domestic production data for finished garments and home textiles is available from Prodcom in Euro, but the physical unit is not a weight but provided in 'pieces' or m2. Moreover, Prodcom codes and the CN8 codes given in the Comext database are not immediately compatible despite there being a many-to-one relationship between Prodcom 8-digit and CN4 4-digit codes in Comext. In the case of the JRC report this allowed for estimating weights of

[35] https://ec.europa.eu/eurostat/web/international-trade-in-goods/data/focus-on-comext.

production for each 4-digit CN code by using a Euro/kg conversion factor derived from the Comext trade data.

An overview of the method for calculating supply of new clothing and home textiles to EU final users and, thereby, the generation of textile waste is presented below.

Figure 1 – Method used for calculating total supply of new clothing and home textiles to European final users



Source: JRC, 2021[36]

The support study team was provided with the data used by the JRC covering the period 2004-2018. It is noted that these data are limited to apparel and home textiles, and do not include other textiles included by households (e.g., cleaning wipes) and industrial textiles. Nonetheless, apparel and home textiles make up a major share of the total post-consumer textile waste. To forecast resulting trends in textile consumption up to 2035 a linear regression was applied with a 95% confidence rate applied to determine the likely high and low trends over the same period. Linear regression provides the opportunity to predict trends based on an observed set of values – the 2004 to 2018 data in this case – with a degree of certainty. This is important in the case of textiles given the somewhat wide variation in predictions of textile waste available from existing literature. The data used is also

[36] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144.

comparable to the one used in the context of the EU strategy for sustainable and circular textiles[37] that also refers to the JRC figures.

Impacts calculations

The Better Regulation Toolbox groups impacts in three main categories, economic, social, and environmental, as well as their mutual combination. However, for the purpose of this impact assessment, the different impacts have been grouped by the three main categories, according to the table below.

Table 8 – Categorisation of impacts

Specific impacts	Broad categories according to Better Regulation Toolbox (BRT)	Broad categories that will be used in this assessment	Change compared to BRT
Conduct of business Position of SMEs Administrative burdens on business Sectoral competitiveness, trade and investment flows Public authorities and budget	Economic	Economic	No change
Working conditions, job standards and quality Public health and safety, and health systems Governance, participation, and good administration	Social	Social	No change
Climate Quality of natural resource Biodiversity, including flora, fauna, ecosystems, and landscapes	Environment	Environment	No change
Education and training, education and training systems Employment Income distribution, social protection, and social inclusion Consumers and households	Economic, Social	Social	Change
Technology development/ Digital economy	Economic, Social	Economic	Change
Sustainable consumption and production Efficient use of resources (renewable and non-renewable)	Economic, Environmental	Economic	Change
Land use The likelihood or scale of environmental risks	Economic, Environmental	Environmental	Change

[37] European Commission, EU strategy for sustainable and circular textiles, 2022, https://ec.europa.eu/environment/publications/textiles-strategy_en.

Innovation and research	Economic, Social, Environmental	Economic	Change
Waste production, generation and recycling Sustainable development	Economic, Social, Environmental	Environmental	Change
Third countries, developing countries, and international relations	Economic, Social, Environmental	Social	Change

The assessment includes a mix of qualitative and quantitative assessments of costs and benefits. To make the assessment robust and make it possible to compare all the measures in terms of their respective net impact, a qualitative scoring indicating the direction of impact has assigned to each sub-category of impact. The qualitative assessment uses a + and – approach to determine the direction of impacts with – indicating a negative impact or cost and + indicating a positive impact or saving. The quantitative assessment was performed using the methods outlined below.

In addition, to simplify the assessment, each measure is assessed individually and the changes in impacts stemming from a combination of measures will not be calculated.

Determining economic costs and benefits

Measures resulting in changes to the volumes of textiles collected and managed carry both administrative and waste management costs.

Administrative costs have been calculated using the ENV Admin burden calculator v2 that is based on the Eurostat Structure of earnings survey, Labour Force Survey data for non-Wage labour Costs (last updated 2021). The average hourly wage of 26 euro per hour was applied to the actions needed to improve the management of used textiles and textile wastes. This value was multiplied by the estimated time required to perform a particular action as well as the number of entities that would be required to perform the action to determine the total administrative burden resulting from the measure concerned. In some cases, the number of entities concerned is not known. In such cases a cost per entity has been provided only.

The following assumptions have been used in the calculations of administrative burden.

Table 9: Assumptions made to calculate the administrative burden

One-off admin costs		
Target group	**Description of the action**	**Initial cost (EUR)**
Textile producers	Registration of producers in producer register	€108 comprising four hours to complete the necessary registration process in a national register
Recurrent admin costs		
Target group	**Description of the action**	**Time required per action per year in hours**
Used textile exporters to third countries	Filling in forms in relation to exports for reuse	8 hours
Used textile exporters to third countries	Cooperating with competent authority inspections	3 hours

Producers of textiles	Reporting on volumes of goods placed on the market and eco-modulation data	20 hours
Producers of textiles	Cooperating with Producer Responsibility Organisation inspections	3 hours
Textiles waste management operators	Submission of waste management data	21 hours
Competent authorities	Inspections of enterprises involved in the export of used textiles	21 hours (per inspection)
Producer Responsibility Organisations	Operation of the producer register	1 716 hours (1 FTE per Member State)
Producer Responsibility Organisations	Inspections of producers	3 384 hours (2 FTEs per Member State)
Reduced administrative obligations		
Target group	**Description of the action**	**Time required per action per year in hours**
Used textile reuse companies	Simplification of data reporting through better scope of textiles to be reported against	4 hours
Textile waste management operators	Simplification of data reporting through better scope of textiles to be reported against	4 hours

Waste management costs result from changes in the way in which used textiles and textile wastes would be collected, sorted, reused, recycled and subject to further treatment in comparison to the status quo. Two different sources have been used to determine the costs of collection and the costs of subsequent sorting and management as described below.

Costs of collection: The costs of collection are dependent on the type of additional infrastructure that would be required to be added. In keeping with most of the collection being made via separate bins, the costs of collection have been based on the operation of separate textile collection bins. Data from the CESME project that considered the Humanita textile recycling programme in BG [38] indicates that addressing approximately 3 400 tonnes of textile per year came with combined container, transport and storing costs of 367 000 euro of costs per year leading to an average cost of 108 euro per tonne collected. However, this figure appears low in comparison to data from the ECAP study on used textile collection in European Cities[39] that indicates costs of collection in the NL of 165 euro per tonne. The BG figures are considered to be at the low end of costs within the EU and the NL figures

[38] CESME, "3.1.5 HUMANITA textile recycling", *The CESME White Book*, https://www.cesme-book.eu/book/level-1-d/3.1-best-practices/3.1.2-humanita-textile-recycling.
[39] ECAP, *Used Textile Collection in European Cities*, 2018.

at the higher end. The high value was used to perform the calculations of collection costs to avoid their underestimation.

Costs of sorting and treatment: In keeping with the Staff Working Document[40] accompanying the proposal for a Regulation on shipments of waste (WSR)[41] the costs of treating textile wastes need to consider the capital and operational expenditure related to material sorting and treatment costs. The source material for the WSR Impact Assessment in relation to textile waste has been used in this assessment to ensure consistency in the calculations performed given the significant crossover between the WSR proposal and this initiative in relation to textiles. The sorting and treatment costs of 650 euro per tonne have been used which are taken from a COWI, Eunomia Study on investment needs in the waste sector and on the financing of municipal waste management in Member States[42]. The costs consider a textile reuse/recycling process based including sorting and grading, preparation for reuse for high and low value clothes/other items that require no further treatment, mechanical recycling to low quality recycled fibres and chemical recycling for high quality recycled fibres. The economic values of the wastes retained under certain measures because of their treatment higher up the waste hierarchy is challenging due to the wide variety of textile types that are addressed by separate collection, with the reuse value of, for example, collected t-shirts lower than that of jackets and coats. This variation in terms of types of materials collected is addressed by the JRC[43] at table *Table* 25 in Annex 6.

It is not possible to determine an accurate resale value for each of these constituent parts for reuse or recycling separately. Consequently, the market value of used and waste textiles sold on the market have been applied using sales values per tonne from Fashion for Good for 2022[44]. These values are broken down as in the table below.

Table 10 – Sales value by textile treatment route, euro per tonne

Textile treatment route	**Sales value in EUR per tonne**
Value of textiles suitable for reuse per tonne for export outside the EU (EUR)	760
Value of textiles suitable as feedstock for closed loop recycling per tonne (EUR)	230
Value of textiles suitable as feedstock for open loop textiles per tonne (EUR)	120

[40] Commission Staff Working Document Impact Assessment Accompanying the document Proposal for a regulation of the European Parliament and of the Council on shipments of waste and amending Regulations (EU) No 1257/2013 and (EU) No 2020/1056, SWD(2021) 331 final.
[41] Proposal for a Regulation of the European Parliament and of the Council on shipments of waste and amending Regulations (EU) No 1257/2013 and (EU) No 2020/1056, COM(2021) 709 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0709.
[42] COWI, Eunomia, *Study on investment needs in the waste sector and on the financing of municipal waste management in Member States*, 2019.
[43] JRC, Technical report on Material Flow Analysis of textile, forthcoming'
[44] Fashion for Good, *Sorting for Circularity Europe. An evaluation and commercial assessment of textile waste across Europe*, 2022.

Subsequently, in determining the economic benefits stemming from the movement of used textiles and textile waste up the waste hierarchy to the tonnes of textiles affected.

Calculation of the impacts on prices of individual items as a result of the proposed measures is complicated by the sheer variety of textile goods collected (see Table 9 above) and the fact that the prices of textile goods also vary. In the case of fees that may be applied in the case of extended producer responsibility schemes Ecologic[45] examined the EPR fees in comparison to product costs for a number of product types including textiles as shown in the figure below.

Figure 2 EPR fee to product cost ratios identified by Ecologic

In the case of textiles, it was identified that the costs currently applied in FR represent a small cost in comparison to the product cost – approximately 0.04% of the total cost.

In order to consider the maximum increase that may apply on an item whereby all waste management costs for all discarded textiles are applied to the cost of a product, a T-shirt has been used as an example item in keeping with the Ecologic example above. The costs of sorting and collection per tonne of discarded textiles is presented above as €815 per tonne encompassing €165 per tonne collection costs and €650 per tonne sorting and treatment costs. Using a theoretical example of a T-shirt which, as noted under determining environmental costs and benefits weights on average 155g, in a tonne of textiles waste that were composed entirely of T-shirts there would be 6,450 T-shirts contained therein. Dividing the total costs per tonne by the number of T-shirts would give a maximum cost of €0.12 per T-shirt. This represents an extremely conservative estimate of cost given that T-Shirts are generally easier to treat than other textile products. However, even at this cost the potential fee applicable would represent 0.6% of the total cost of the product. Where possible impacts on costs are presented against the measures assessed.

In some cases, measures would have an impact on a fraction of the total discarded textiles. This may be the case where a target is set for collection that would require an additional percentage of discarded textiles would be required to be collected but the costs of that collection could be applied to all goods

[45] Ecologic, 2021. Extended Producer Responsibility and Ecomodulation of Fees

placed on the market. In such cases the relative value is presented as a fraction of the 0.6% used as the maximum total cost calculated above.

There are several economic costs and/or benefits that could not be calculated as part of this assessment as outlined in the table below.

Table 11 - Economic costs and benefits that are relevant for the assessment but could not be quantified

Type of cost and/or benefit	**Reason for lack of quantified assessment**
The costs of reusing and recycling textiles that are not generally approached by Member States at present	The levels of collection, reuse and recycling of textiles that are not generally separately collected by Member States at present are not well known, with little research in existence in respect to possible innovations that would increase reuse and recycling for products including carpets and mattresses. This prevents an assessment of the full costs and benefits that might result from the additional collection of those materials in future.
Total EU reduction in costs of waste management licensing for textile waste collectors	Member States employ a variety of approaches to the collection of textile wastes and for determining whether a waste license is required for collectors of such materials. Consequently, no data exists that identifies the number of licenses that currently apply at the EU level for such collection. This makes it impossible to determine the total reduction in costs that might result from removal of waste licensing requirements where it is currently obligatory.
Total costs and benefits from the application of end-of-waste criteria for textiles	The impacts of end-of-waste criteria for textiles are dependent on the eventual scope of textile types that may be included and so the environmental impacts cannot be determined. However, given the need under Article 6 of the WFD to not overall adversely impact the environment or human health the assessment considers that impacts would be minimal accordingly.
Financial impacts of changes in waste management of EU textile wastes in third countries	The financial impacts that presently result from EU wastes being treated in third countries cannot be calculated given the diverse range of countries that receive used EU textiles and a lack of data on textile waste generation, textile waste collection and treatment costs in third countries.

Savings resulting from treatment of separately collected waste in comparison to mixed waste	Treatment of mixed waste is more expensive that treatment of separately collected waste. However, the application of the polluter pays principle in respect to waste management is not applied by all municipalities in the EU and where it is, it is implemented in a variety of ways, by weight, by volume, by collection, by bag etc rendering a cost saving calculation for the EU not possible.

*Determining **social costs and benefits***

There are two large social impacts stemming from some of the measures foreseen:

- Those related to additional employment within the EU as a result of greater collection and treatment of used textiles and textile wastes that are currently disposed of.
- Those related to the social impacts on standards of living i.e., the living conditions of citizens that are or would be impacted as a result of the disposal of used textiles and textile wastes both within the EU and outside of the EU for used and waste textiles that are exported to third countries that would be mitigated under certain measures.

To calculate the employment benefits of greater collection and treatment of used textiles and textile waste the results of a report published by the Scottish government that averages the results of four earlier studies[46] have been applied as shown below.

Table 12 – Employment benefits of textiles waste management

FTEs/10 000 tonnes of waste per year					
Source				**Value**	
Gray et al 2004	Cascadia 2009	FOTE 2010	Eunomia 2014	Average	FTEs/tonne/year
50	85	50	50	58.8	0.005875

Calculation of the employment benefits resulting from the retention of wastes in the EU, i.e., the additional collection, sorting and recycling of wastes that would have otherwise been exported in the absence of the measures proposed, have used the FTE/tonne figure in the right-hand column. It should

[46] Gray, A., Jones, A. and Percy, S, Jobs, 2004. from Recycling: Report on Stage II of the Research, Local Economy Policy Unit, London South Bank University; Cascadia, *Recycling and economic development: a review of existing literature on job creation, capital investment, and tax revenues,* King Country Linkup, 2009, https://kingcounty.gov/~/media/depts/dnrp/solid-waste/linkup/documents/recycling-economic-development-review.ashx?la=enhttps://kingcounty.gov/~/media/depts/dnrp/solid-waste/linkup/documents/recycling-economic-development-review.ashx?la=en; Friends of the Earth, *More Jobs, Less Waste: Potential for Job Creation Through Higher Rates of Recycling in the UK and EU,* 2010, https://www.foeeurope.org/sites/default/files/publications/foee_more_jobs_less_waste_0910.pdf; Eunomia, Development of a modelling tool on waste generation and management, Final Report for the European Commission DG Environment under Framework Contract No. ENV.C.2/FRA/2011/0020, 2014.

be noted that this assessment considers a partial equilibrium only and does therefore not factor in general equilibrium considerations that may arise, including negative employment effects.

*Determining **environmental costs and benefits***

Calculating the environmental benefits stemming from the measures concerned is also challenging given the different impacts that may result but which are subject to uncertainty (i.e. indirect uncertain costs and benefits) in comparison to those that are direct and more easy to measure. An explanation of calculations discarded or retained is provided below.

Table 13 – Discarded and retained environmental benefits

Environmental impact	**Direct or indirect**	**Rationale for retention or discard**
CO2e emissions resulting from changes in management at the point of discard for used textiles and textile wastes	Direct	Retained as the emissions can be calculated based on the volumes of used textiles and waste textiles that would be moved from one stage of the waste hierarchy to another
CO2e emissions resulting from the replacement of new clothing and household textiles by reused clothing and household textiles as well as use of recycled textile fibres	Indirect	Retained as the emissions resulting from reusing textiles in comparison to their replacement with a new textile or reusing textile fibres in comparison to their primary counterparts addresses the knock-on effects of primary production GHG emissions that would be avoided.
Non-GHG Emissions from production of textiles	Indirect	Discarded as there is uncertainty as to impacts of second-hand sales may have on primary sales figures and the knock-on effects of primary production emissions other than GHG that would be avoided.
Water use reductions resulting from the replacement of new clothing and household textiles by reused clothing and household textiles as	Indirect	Retained as the emissions resulting from reusing textiles in comparison to their replacement with a new textile or reusing textile fibres in comparison to their primary counterparts addresses the knock-on effects of primary

well as used of recycled textile fibres			production water use that would be avoided.
Transport emissions		Direct in relation to exports and indirect in relation to imports	Some of the measures would result in direct reductions in emissions related to the transport of used and waste textiles to third countries. However, the extent of the impact is highly uncertain as Member States may still export to third countries as a waste under the WSR where sorting would take place so such a calculation has been discarded. Indirectly, emissions resulting from the transport of new textile products into the EU that would be replaced by second-hand clothing sales within the EU is also subject to a large degree of uncertainty and has been discarded.
Emissions resulting from the open burning and landfilling of textiles in third countries in comparison to the EU	Direct in relation to exports	Some of the measures would result in retention of textile wastes for disposal within the EU that would otherwise have been disposed on in third countries. The difference in CO2eq emissions and externalities has been calculated where relevant.	

In relation to the calculation of changes in CO2e emissions resulting from changes in management at the point of discard of used textiles and textile wastes the European Environmental Bureau (EEB) [47] value have been applied as presented below.

Table 14 – CO2 equivalent emissions saved by destination of textile at EoL (in tonnes per tonne of textile), EEB

[47] European Environmental Bureau, *Advancing resource efficiency in Europe*, 2014.

Route	Cotton t-shirt	Wool jumper
Direct reuse	12.8	9
Preparing for reuse	11	8
100% recycling	<1	<1
100% landfill	-0.2	-0.2

In relation to the value of one tonne of CO2e emissions, in keeping with Commission Staff Working Document Impact Assessment[48] accompanying the proposal for a Directive concerning urban wastewater treatment[49] a value of 100 euro per tonne has been applied.

Water use has also been calculated on the basis of water savings through reuse and recycling of used textiles. In its January 2023 study, EuRIC[50] identified the water savings resulting from the reuse and recycling of certain qualities of European used textiles. Several scenarios were developed based on reuse and recycling of different grades of t-shirt as detailed below.

Table 15 – Overview of the three considered quality levels and associated scenarios used by EuRIC

Scenario	Quality level	Reused garment	New garment
1	Crème	100% cotton second-hand shirt sorted in Europe and sold in Europe	100% cotton new shirt produced in Asia and sold in Europe
2	B-grade	30/70 polycotton second-hand shirt sorted in Europe and sold in sub-Saharan Africa	30/70 polycotton new shirt produced in Asia and sold in sub-Saharan Africa
3	C-grade	100% polyester second-hand shirt sorted in Europe and sold in Pakistan	100% polyester new shirt produced in Asia and sold in Pakistan

The EuRIC study considered grades representing various qualities of t-shirt with fibre types selected to ensure the affordability on global markets. Countries of production and consumption were based on the EUs export of second-hand clothing that generally involves sub-Saharan Africa and Pakistan and the lifetime of the textiles was determined on the number of wears and washes. The water savings that have been derived from the LCA[51] and applied in the calculations for this study are listed in the table below.

[48] SWD(2022) 541 final
[49] COM(2022) 531 final
[50] Norion consult for EuRIC, LCA-based assessment of the management of European used textiles, 2023.
[51] The EuRIC study provides values in relation to mechanical recycling (taken as open loop in the context of the calculations for this study) and chemical recycling (taken as closed loop in the context of the calculations for this study. Where more than one value was provided an average was applied.

Table 16 – Overview of waste savings used by EuRIC

Quality level	Reused water saving compared to new equivalent	Recycling closed-loop water saving compared to new equivalent	Recycling open-loop water saving compared to new equivalent
Crème	30.7m^3 per item	0.7m^3 per item	2.6m^3 per item
B-grade	21.4m^3 per item	0.2m^3 per item	No value provided
C-grade	0.9m^3 per item	0.2m^3 per item	No value provided

To determine the potential savings per tonne of collected textiles the average weight of a t-shirt was taken from the same EuRIC study – 155 grams. The following values per tonne were derived accordingly.

Table 17 – Values of water savings per tonne used by EuRIC

Quality level	Reused water saving compared to new equivalent per tonne of textiles collected	Recycling closed-loop water saving compared to new equivalent per tonne of textiles collected	Recycling open-loop water saving compared to new equivalent per tonne of textiles collected
Crème	198 000 m^3	4 500 m^3	16 800 m^3
B-grade	138 000 m^3	1 290 m^3	No value used
C-grade	5 800 m^3	1 290 m^3	No value used

Clearly there are shortcomings in the approach applied to calculating water savings given that:

- T-shirts are just one of the textile types collected, and the savings per textile item type are likely to vary.
- There are assumptions made about the water use in recycling that are difficult to reconcile with the relative immaturity of the textile recycling market at present.
- There are assumptions made about the destinations of used textiles exported from the EU.

In relation to the environmental impacts of landfill and incineration in the EU and in third shipments of textiles are made for a variety of reasons but are predominantly made in relation to reuse. However, not all textiles that are shipped for such purposes are able to be reused or recycled and a proportion of the materials shipped will fall lower down the waste hierarchy. In such cases these materials will either be sent for recovery through incineration or uncontrolled disposal, mainly consisting of open dumps and open burning. For the purpose of the calculations made in this report, we assume that 1) the quantity of material recycled and the corresponding process losses would be the same if the waste was retained within the EU (i.e. no differences in efficiency between EU and third countries); we also assume that 2) the environmental impact (burdens and savings of primary virgin materials) of such recycling operations would be the same in EU and third countries (i.e. no differences in environmental control of emissions between EU and third countries). This means that ultimately, we only account for the different impacts associated with the management of the rejects generated during the sorting operations. On this basis, in calculating the environmental benefits stemming from management of the rejects within the EU in comparison to third countries, the

performance of EU treatment facilities in comparison to third country management (e.g., open dumps and open burning) has been quantified using the available scientific literature and datasets.

The first part of the calculation requires an estimation of rejection rates for textiles shipped. For textiles 10% of the volumes have been considered as rejects – this is in keeping with the impact assessment accompanying the revision of the Waste Shipments Regulation and is based on 2019 data from Norup et al 2019. With this rejection rate applied a comparison or reject management in third countries in comparison to the EU needs to be considered. In this case the impacts of the open dumping or open burning in third countries of those rejects in comparison with energy recovery in the EU. To identify these differences, the dedicated waste LCA-model EASETECH used, among the others by JRC has been used applying the datasets describing open dump and open burning activities for textile wastes as provided by the latest ecoinvent 3.7 database . In the absence of specific dataset for textile, the impact of textile waste has been approximated as a mix of plastic (15%) and paper/cardboard (85%) based on the assumption that ca. 15% of the textile is composed of biological fibres while the rest is synthetic (Riber et al., 2009).

The impact of landfilling and incineration in EU has been obtained using the same tool but applying typical datasets for EU landfills and incineration (Manfredi & Christensen (2009); Manfredi et al. (2010); Manfredi et al. (2011). Notice that these, on top of the environmental emissions associated to the treatment itself, also include the downstream environmental savings obtained through energy recovery (i.e. incineration generates as co-products electricity and heat that are assumed to displaced the average EU electricity and heat production mix). The substituted mix of electricity and heat follows the logic applied in similar recent studies (Tonini et al., 2021 ; Nessi et al., 2020) and in the Product Environmental Footprint and represents the current situation of the EU energy system. The pricing of environmental emissions is based on the CE Delft Environmental Prices Handbook EU 28 version as is the case of transportation externalities detailed later on. The report provides a state-of-the-art dataset of the shadow prices of environmental emissions, i.e. the external costs of emissions that are not monetised in the current market/financial prices (also known as externalities or shadow prices as opposite to financial prices).

While there is no definitive source of data that reflects on the amounts of waste subject to open burning or open dumping in third countries, scientific sources estimate that about 40% of the waste globally generated is subject to open-burning, mainly in developing and populous countries (China, India, Brazil, Mexico, Pakistan, and Turkey). Open burning occurs for many reasons, e.g., to get rid of waste in residential areas/streets, in open-dump sites (e.g. to free space for dumping more waste) as well as because of natural firing occurring in uncontrolled open dumpsites. It is clear according to the materials collected during this assessment that both take place.

An examination of the likely destination of rejects for the waste types considered under this study indicates that landfilling of waste represents by far the largest method of disposing of textile wastes. To determine the ratio between open dump and open burning, the support study assumes that 60% of the reject material is subject to open dump and 40% to open burning. This ratio is applied consistently across all materials investigated, as dumping/burning would take place regardless of the nature of the material (dump sites consist of a mix of heterogeneous waste materials).

The first calculation, therefore, relates to the emissions resulting in third countries resulting from waste management per tonne. In this case the third country impacts from the open dumping and burning of textiles in third countries equates to 1 151kg CO2-eq per tonne of textile waste with additional externalities of 308 euro per tonne disposed. The emissions resulting from waste management in the EU are -391 kg-eq per tonne of textile waste managed in the EU and 23 euro per tonne in terms of externalities. The net benefits of managing rejects within the EU in comparison to third countries is 1 701 kg CO2-eq and 285 euro in externalities saved per tonne of textile waste concerned.

There is one environmental benefit that could not be calculated as part of this assessment as outlined in the table below.

Table 18 - Type of environmental costs and benefits that could not be quantified

Type of benefit	**Reason for lack of quantified assessment**
Total costs and benefits from the application of end-of-waste criteria for textiles	The impacts of end-of-waste criteria for textiles are dependent on the eventual scope of textile types that may be included and so the environmental impacts cannot be determined. However, given the need under Article 6 of the WFD to not overall adversely impact the environment or human health the assessment considers that impacts would be minimal accordingly.

Qualitative Assessment

As noted above, in some cases it has not been possible to quantify impacts of measures or parts thereof. In such cases a qualitative assessment using a + and – approach to determine the direction of impacts with – indicating a negative impact or cost and indicating a positive impact or saving has been made. Alongside the + and – scoring a description of the likely impacts has been included.

2. Food Waste

Two modelling approaches were adopted in the analysis[52]:

- The MAGNET general equilibrium model
- A bottom-up modelling approach based on life cycle assessment

The following subsections provide details of the two approaches.

2.1 Extended modelling framework for the assessment of food waste reduction targets

This study employs and further extends the Modular Applied GeNeral Equilibrium Tool (MAGNET) to assess the impacts of a set of food waste reduction target scenarios. MAGNET is an economy-wide dynamic global computable general equilibrium (CGE) simulation model (Woltjer & Kuiper, 2014). It is well suited to run sustainability analysis from an economic, social, and environmental perspective at the medium-to-long-run time horizon. The MAGNET model is suited to assess the impacts of agricultural, trade, land, (bio)energy and other policies at the national and global level with a particular focus on the impacts on land use, agricultural prices, nutrition and food security. For the present study, the model is further extended to account for food waste reduction throughout the full supply *chain.*

2.1.1 MAGNET model and database

MAGNET (Modular Applied GeNeral Equilibrium Tool) is a global general equilibrium model. The MAGNET consortium includes Wageningen Economic Research (lead), the European Commission's Joint Research Centre, and the Thünen-Institute. The model has been widely used for policy support and its scientific excellence is proven through diverse scientific publications in high-ranked journals and scientific policy reports for the European Commission and other international organizations. It is one of the 47 models listed in the Modelling Inventory and Knowledge Management System of the European Commission (MIDAS). It is also a core model of the integrated Modelling Platform for Agro-economic Commodity and Policy Analysis (iMAP) hosted by the JRC (M'barek, 2012; M'barek & Delincé, 2015). Examples of MAGNET applications for policy analysis are M'barek *et al.* (2017) on the CAP reform, Sartori *et al.* (2019) on land issues, Philippidis *et al.* (2020) on sustainable development goals (SDGs), Ferrari *et al.*, (2021) on the cumulative impact assessment of trade agreements on EU agriculture, and Boysen-Urban *et al.* (2022) on impacts of food loss and waste reduction and dietary changes. The MAGNET consortium also contributes to different European Commission research projects such as BioMonitor, BatModel, Brightspace, and Lamasus.

Figure 3 employs economic optimisation theory (i.e., welfare maximisation, cost minimisation) to characterise the behaviour of consumers and producers to endogenous price changes, where producers exhibit constant returns to scale technologies and zero long-run economic profits. A further series of factor and commodity market clearing equations enforce the condition that supply must equal demand, for which equilibrium prices emerge. Finally, to 'close' the macro circular flow, accounting equations ensure that the value of income from production factors, expenditures and output are assumed equal, whilst the net balance between the current account (exports minus imports) and the capital account (savings minus investments) amounts to zero.

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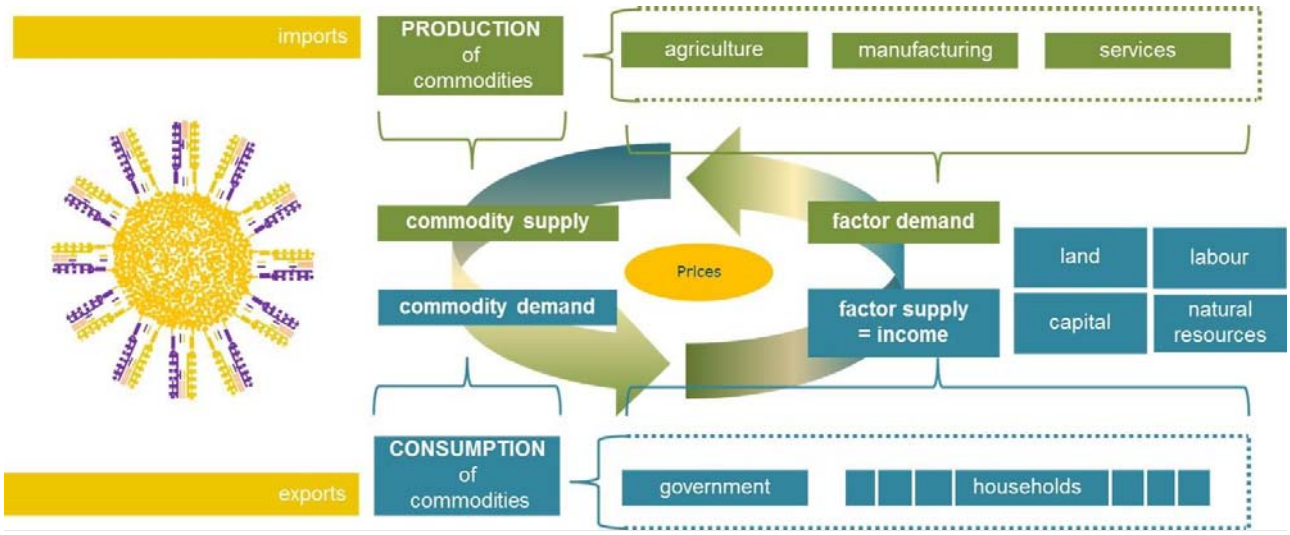
[52] This assessment is based on: De Jong B, Boysen-Urban K, De Laurentiis V, Philippidis G, Bartelings H, Mancini L, Biganzoli F, Sanyé Mengual E, Sala S, Lasarte-López J, Rokicki B, M'barek R. *Assessing the economic, social and environmental impacts of food waste reduction targets. A model-based analysis.* Publications Office of the European Union, Luxembourg, 2023, doi:10.2760/77251, JRC133971.

Figure 3 – Graphical representation of the CGE model framework



Source: MAGNET 2023

MAGNET is built on the Global Trade Analysis Project (GTAP) model and data structure at its core, which is widely accepted and regularly used for global and EU impact assessments. The GTAP model consists of an input-output accounting framework. The behaviour of households, firms, and the government in the global economy is included in the model. Households opt for utility maximization and firms are cost minimizing, while all agents are price takers (Corong, 2017). All income is collected by a representative regional household and allocated to private or government consumption or savings to maximize regional utility. Factors of production (i.e., land, skilled and unskilled labour, capital and natural resources) are supplied by the household and employed by the producers. The model is fully equipped with economy-wide bilateral trade flows between regions; trade barriers are also included. Hence commodities given in the model can be locally supplied or imported. Total income is determined by the sum of factor income and tax revenues (Aguiar *et al.*, 2019a).

For this study, version 10 of the GTAP database with a benchmark year of 2014 and completed with 65 tradable sectors, eight primary factors and 141 regions, is used (Aguiar *et al.*, 2019b). In addition to bilateral trade and protection data, the GTAP database also includes information on the input-output structures of each of its 141 economies – including intermediate input purchases and final demands by private households, governments, and investors. All transactions within the database are measured at basic, producer and purchaser prices including relevant tax/subsidy distortions and international transport margin data. In the development of the MAGNET model only minimal changes are done to its foundation GTAP core. One of these changes is the introduction of by-products which enables the distinction between production sectors and produced commodities. This results in an extended MAGNET database that covers 113 sectors and 127 commodities, consisting of 14 by-products (MAGNET, 2022).

2.1.2 The MAGNET model in policy assessments and science

MAGNET is a CGE model and therefore suitable for economy-wide simulation of the impacts of policy scenarios. In fact, Tool #61 (Simulation tools) of the Better Regulation Toolbox mentions explicitly general equilibrium models (such as MAGNET, see also Tool #35). With regard to Tool #18 (Identification of impacts), the whole-economy model MAGNET covers several of the impact categories mentioned as well as a broad range of SDGs. Lately, the European Parliament in its "Assessment of current initiatives of the European Commission on better regulation" (2022) suggested that "future research and public sector training should be oriented towards using enhanced simulation (e.g. "digital twins"; *general equilibrium models*) to perform resilience testing of existing

rules and policies. These implies a rather new set of skills, which future policymakers will need to develop."

The Modelling Inventory and Knowledge Management System of the European Commission (MIDAS) includes MAGNET as one of the models used for impact assessments. Apart from different policy relevant studies e.g. on trade issues, transition pathways, MAGNET is mentioned in the impact assessment on modernising and simplifying the Common Agricultural Policy and described in SWD(2018) 431 final on the Bioeconomy Strategy[53] as a model "including various features for assessing policy coherence" (p. 68). MAGNET studies on diets are presented in SWD IMPACT ASSESSMENT REPORT accompanying the COM(2021) 554 LULUCF. MAGNET is based on the Global Trade Analysis Project (GTAP, the EC being a consortium member), which is used by almost all CGE models. Recently it has also been used by FAO (State of Food and Agriculture 2019) and IFAD (Rural Development Report 2021). In 2021, the GTAP model assessed global economic impacts of environmental change.

MAGNET was selected by UN-DESA as one of the 16 outstanding SDG Good Practices across the world and features also in this 2021 OECD/JRC report on "Spillovers and Transboundary Impacts of Public Policies". Several scientific articles witness the methodological developments and applications over a broad range of topics.

The Better regulation toolbox Tool #60 *Baselines* mentions the Agricultural Market Outlook and GECO (Global Energy and Climate Outlook, see also Tool #61) as examples for the consistency of baselines, employed also in the current model set-up.

In the yearly EU agricultural outlook report, published European Commission in December 2022, a short chapter analyses some dimensions of food security using a selected set of indicators, provided also by the MAGNET model (see section 5 in report Medium-term (europa.eu)).

2.1.3 Extension of MAGNET modelling framework

One of the key specifications of MAGNET is its modular design (Woltjer & Kuiper, 2014). Multiple adaptions and extensions can be added to the model. This modular design enables users to select among the extensions depending on the interest of the policy question. For this impact assessment, the standard MAGNET core has been enriched by modules that improve the depiction of nutrients (Rutten et al. 2013), bio-based sector coverage (Philippidis et al., 2018), Common Agricultural Policy (Boulanger et al., 2021), footprints and virtual trade (Philippidis et al., 2021). These extensions allow for a holistic assessment of the impacts of food waste reduction on the food system. Some of the following questions arising from reductions in EU food losses and waste can be addressed:

- **Food Loss reductions:** how do reduced losses in food supply chains impact upon consumer demand via price changes?
- **Food Waste reductions:** how does reduced final food demand affect market prices and thus the use of biomass in non-food activities?
- **Processed food:** how is processed food production and consumption affected via changed input costs, how does this affect final demand? Diets?
- **Cost:** To correct for the externality of food loss and waste, what are the costs that must be internalised by the market?
- **Trade:** What are the impacts on non-tradable virtual commodities (i.e., land and emissions) and resulting leakage effects?

[53] European Commission, Directorate-General for Research and Innovation, *A sustainable bioeconomy for Europe: strengthening the connection between economy, society and the environment: updated bioeconomy strategy*, Publications Office, 2018, A sustainable bioeconomy for Europe - Publications Office of the EU (europa.eu).

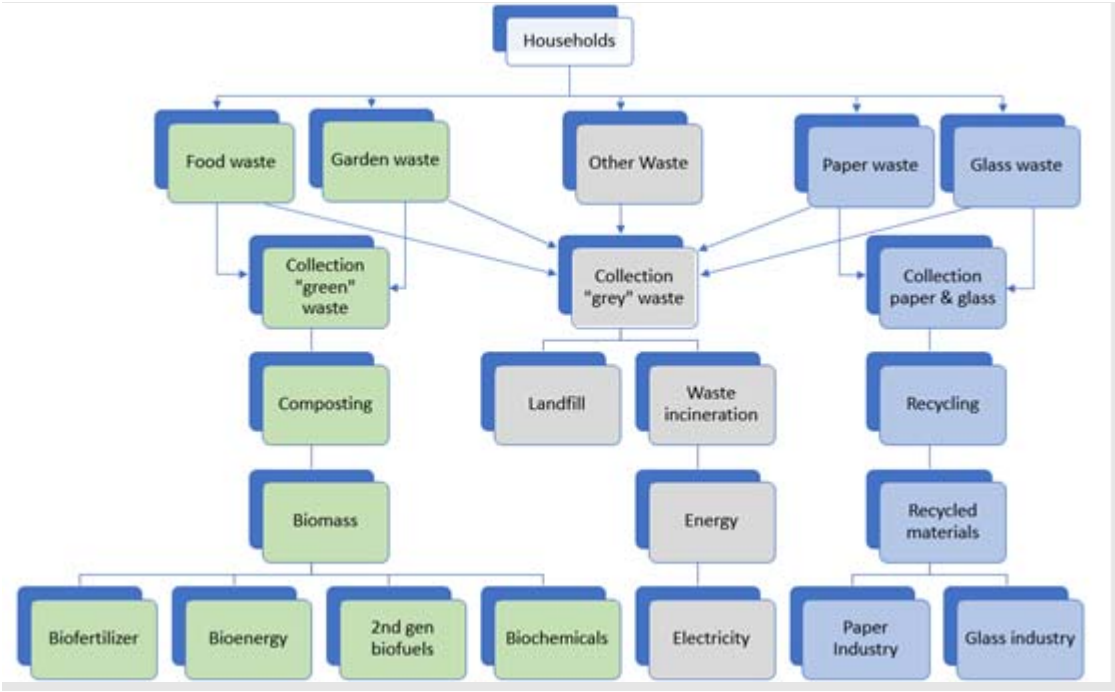
- **Labour:** what is the impact on employment in the agri-food sector, biobased industries? Are the impacts heterogeneous across EU MS?
- **Farm2fork:** dietary change, food waste reductions, less fertilizer use etc… how do these policies affect each other?
- **(Economic) development:** how do different development pathways impact on the outcome (e.g., recovery from COVID, increased green investments)?

In previous work, the MAGNET model has been used to assess the impact of food waste and loss reductions (Boysen-Urban et al., 2022; Kuiper & Cui, 2021; Philippidis et al., 2019) using an approach, where the cost of internalising such an externality was not explicitly modelled. A key development of the current study is that it improves the depiction of food waste in the MAGNET modelling framework building on (Bartelings et al., 2021), whilst additional model code is inserted to accommodate the adjustment costs associated with food loss and waste reductions. The extensions are described in the following sections.

Waste module set up in MAGNET

The waste module in MAGNET enables the model to account for waste streams, covering the entire cycle from generation of waste to collection, treatment and disposal (Bartelings et al., 2021). The MAGNET model therefore captures a degree of circularity. The model calculates waste as a product that is generated automatically through consumption of products. The private households generate waste in the process of consumption and demand waste collection services to collect the waste. Consumption of a commodity can generate one or more of the five types of waste – food waste, garden waste, paper waste, glass waste and other (unsorted combination) waste. **Figure 4** offers an overview of the waste stream scheme in the model. Depending on the waste material generated, there are different options of collection and treatment. Three types of waste collection services exist: 1) collection of rest waste or grey waste (WCR), 2) collection of organic or green waste (WCG), 3) collection of glass and paper (WCGP). Food and garden waste is collected by either WCG or WCR services. Paper and glass waste is collected by WCGP or WCR services. WCR can collect all five kinds of waste, but other waste can only be collected by WCR and not the other two waste collection services.

Figure 4 – Waste stream schematic as implemented in MAGNET



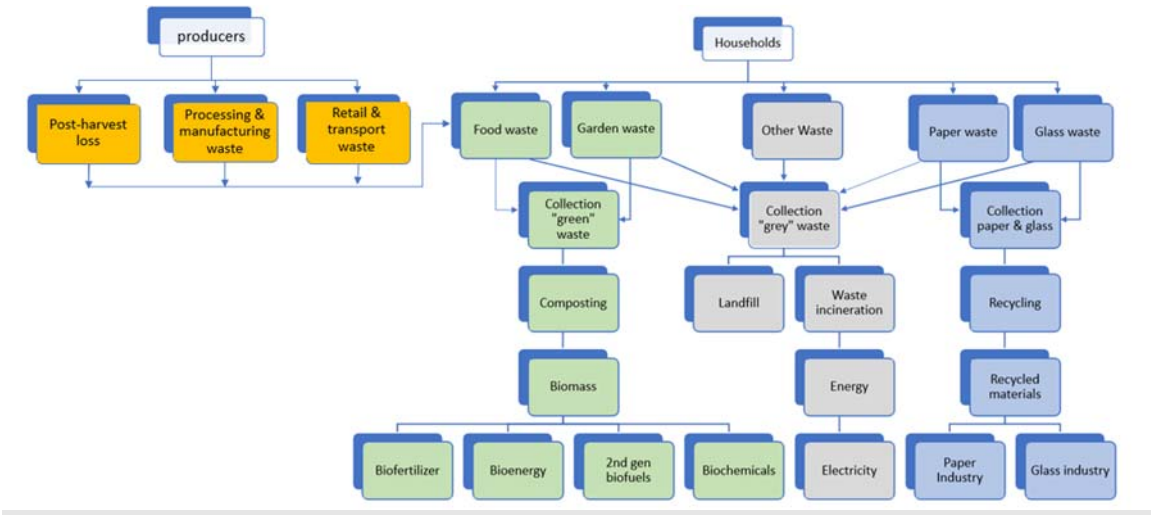
Source: Bartelings et al., 2021

Waste collected by WCR is sent to final disposal delivered by two different sectors: landfills and incinerators. WCG waste collection is then sent to a composting sector which produces biomass to be used in the bio-fertilizer sector or in the second-generation bioeconomy sectors: bioenergy, 2nd generation biofuels or bio-based chemicals. The use of biomass in bioeconomy sectors substitutes for residuals and pellets. Finally, WCGP collection is sent to the recycling sector. Recycled paper and glass are then used in the paper and glass industry as a substitute for virgin materials. The incineration sector produces electricity using waste. Landfill is the only waste disposal option which does not provided any usable material or energy.

Extension of the waste module

Originally the waste module in MAGNET captured only municipal waste. For this study, the module has been extended to account for food waste generation along the full supply chain from primary production to processing, retail and consumption. Producer food waste is modeled in a similar way as household food waste. A waste margin commodity is added to the intermediate demand of certain food commodities. **Figure 5** shows an overview of the new module, which is depicted on the left-hand side of the picture. Producers can now generate food waste and demand waste collection services. Like household food waste, they can demand either green waste collection or rest waste collection. If producer food waste is collected as green waste, the waste is sent to a composting unit and is composted. If it is collected as rest waste, it goes to final disposal: landfilling and incineration.

Figure 5 – The new waste stream schematic including food waste producers



Source: Bartelings et al., 2021

Like for the household waste, production of producer food waste is modelled as a margin commodity. Hence, a link between consumption of goods that generate waste and type of waste that is generated/collected/treated is introduced as a margin commodity in the model – meaning if a household consumes a good, it will also need to demand some waste collection services. With the extension to the waste module, the consumer price for a commodity includes now both the price for the original commodity and the price of collecting waste generated as a result of consumption of said commodity. In this way, the new commodity can be seen as a composite bundle of the original commodity and waste collection services required to collect waste associated with the consumption of that commodity. In addition, a waste margin commodity is also added to the intermediate demand of certain food commodities.

Modelling changes in waste quantities

In MAGNET, households and industries are assumed to generate waste in relation to the changes in demand for the commodity upon which the waste flows are based. More specifically, there is a price substitutability between the purchase of commodity 'c' and the waste flows that accrue upon that transaction. There are two effects that need to be considered when modelling changes in waste quantities, namely, the "price effect" and the "quantity effect".

Examining the price effect, the logic is that if the unit cost of generating waste on purchases of (food) commodity 'c' rises relative to the price of (food) commodity 'c', then by only focusing on relative price changes, the waste rate will fall as more commodities will be purchased and less waste will be generated.

In addition, however, it is logical to assume that if (food) waste generation is falling, there is a degree of complementarity (i.e., 'quantity effect') such that less of the (food) commodity will be demanded in concert with less waste, since some of the original waste is virtually recovered for human consumption.

In order to avoid overly strong 'price' effects (i.e., rising demands for commodity 'c' when the waste generated falls), the sensitivity of this price substitutability (i.e., elasticity) must be small. The result is that the quantity effect will dominate the price effect.

Further considerations are, however, necessary. In modelling the reductions in waste quantities, one assumes that agents are rational to the point that waste generation in production accompanies the lowest cost production technologies. In a similar vein, waste generation in consumption (at least in western societies) is a by-product of the most convenient lifestyle choices of consumers. These are considered as market externalities as the full cost of this behaviour is not internalised by the market.

Any attempt to move away from these 'optimum' points is therefore assumed to be accompanied by a cost, either apportioned to the producer in terms of an adjustment to the production technology, or to the consumer in terms of 'inconvenience' or the so-called 'labour-leisure' trade-off (lost time preparing food more carefully, more trips to the supermarket etc.). Thus, for a realistic treatment of food loss and waste reductions, the maintained hypothesis is that it should be modelled with an accompanying cost to the responsible agent.

In this study, these added costs are characterised by employing taxes. Thus, by inserting pre-tax and post-tax price variables on residential (i.e., household and food services) and industrial (i.e., post harvest, processing, retail and distribution) waste generation demands, tax variables can be used as a policy instrument to target predetermined household, foods service, primary, processed and retail food waste reductions. This approach also implies that price effects must play a role in helping to target waste quantity reductions, which means that some price sensitivity (i.e., non-zero elasticity) must be included in the waste generation functions. The resulting rise in post-tax prices will encourage a reduction in the behaviour of generating waste on commodity 'c' relative to the demand of commodity 'c'.

The shocks on waste reductions are not enough in order to produce accompanying consistent reductions in demands for commodity 'c'. This is because of the strong price substitution effects discussed above, between rising waste costs and purchases of commodity 'c'. As a result, further shocks are imposed as associated exogenous reductions in household final demand. The magnitude of these private household demand reductions by commodity 'c' are calculated employing secondary data on total household consumption quantities by commodities and their associated waste quantities.

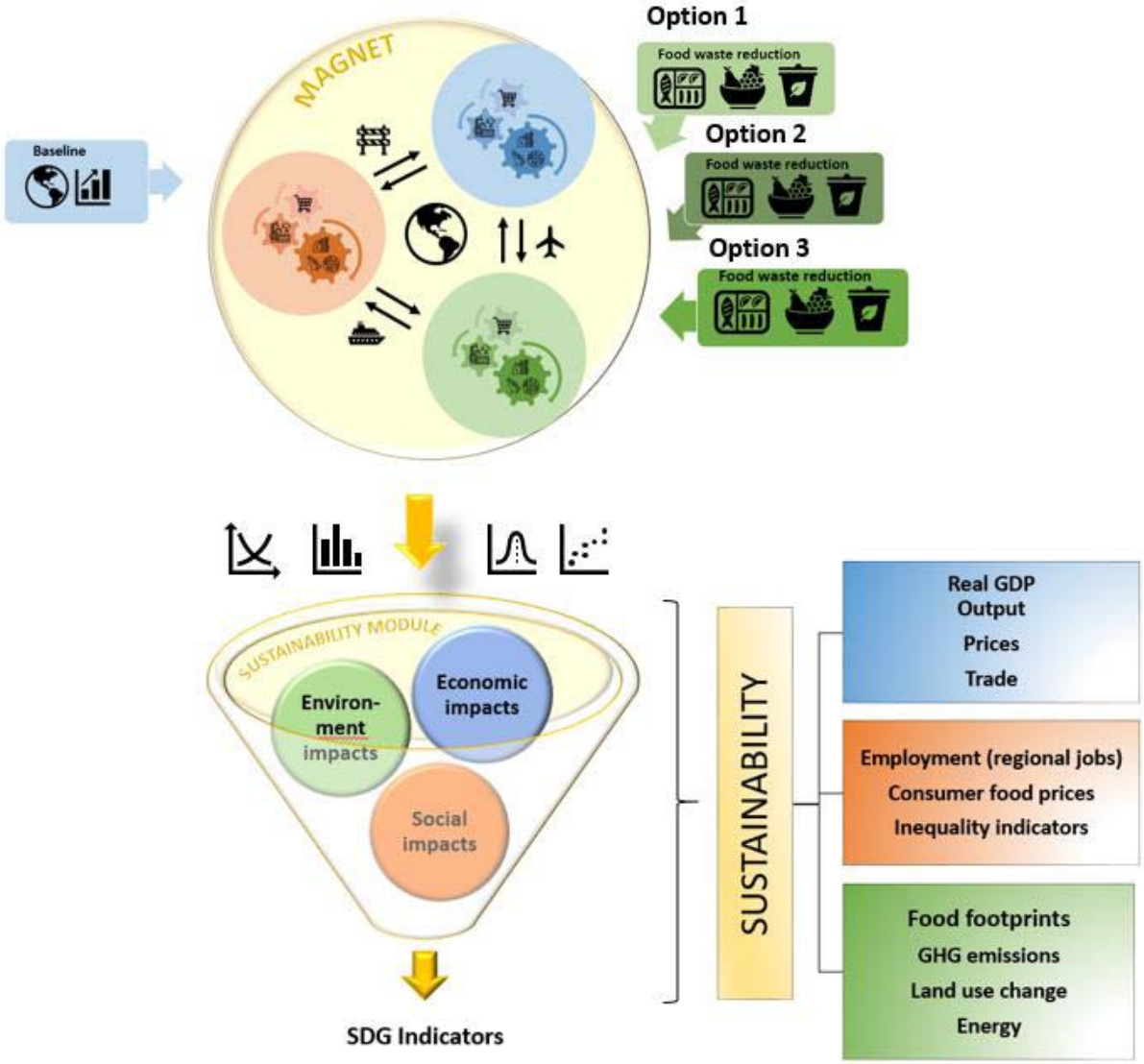
MAGNET indicator framework

According to the focus of the study on achieving the SDG target 12.3, one feature of the envisaged approach is to evaluate the effects with a focus on multiple indicators across the SDG dimensions.

While some indicators are calculated in MAGNET as in the SDG framework, most of the indicators are not matching the official SDGs listings, but rather are a series of model outputs that are indicative of the spirit of each of the SDG dimensions. For example, to enable the tracing of food consumption and production on environmental impacts such as land use and emissions, the CGE model is extended by a module that calculates footprints such as the average per capita per year land use related to household food consumption or the food production. This module allows the tracking of non-tradable virtual commodities (land, water, emissions) along the food supply chain associated with household food consumption and food production (Philippidis et al., 2021).

Figure 6 summarizes the general modelling approach that is used to first set-up a baseline and then to assess the impact of different scenarios on multiple SDG indicators covering economic, social and environmental impacts as well as using footprint measures

Figure 6 – Overview of the modelling approach



Source: Based on Boysen-Urban et al., 2022

2.1.4 Database and model aggregation

The main data source for this impact assessment is version 10 of the GTAP database, with reference year 2014 (Aguiar, Chepeliev, et al., 2019). The GTAP database covers 141 countries and regions and 65 tradable sectors.

The MAGNET variant of the GTAP version 10 database includes additional sector splits covering fruits, vegetables, meat, fish products, bioenergy, bio-based industry, and municipal waste. These additional sector splits give the modeller some choice regarding the different biomass sources and their uses as e.g., food, feed, energy or industry. The underlying database is aggregated to 22 individual EU MS, two aggregated MSs and five larger regions and covers 80 commodities as outlined in Table 19.

Table 19 – Overview regional and sectoral aggregation

Regional disaggregation (29 regions)
Individual MSs (22) Austria, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Lithuania, Latvia, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden **Aggregated MSs (2)** Greece, Cyprus and Malta (GreCypMlt); Belgium and Luxemburg (BelgLux). **Non-EU countries (5)** USA and Canada (USACAN); Latin America (LATAM); Africa (Africa); Asia (Asia); rest of the world (ROW).
Commodity disaggregation (80 commodities)
Crops (11) Paddy rice (pdr); wheat (wht); other grains (gro); vegetables, pulses, roots and tubers (veg); fruits and nuts (fruit); oilseeds (osd); other crops (ocrops); sugar cane and beet (c_b). **Livestock (5)** Beef cattle (bfctl); sheep, goats and horses (ctl); poultry (pltry); raw milk (rmk); pigs (oap). **Food products and food service (11)** Beef meat (bfcmt); rest of cattle meat (cmt); poultry meat (poum); pork meat (omt); dairy (dairy); vegetable oils and fats (vegoil); processed sugar (sugarpro); processed rice (ricepro); processed fish and crustaceans (fishp); other food products (ofood); food service (foodserv). **Fertiliser (1)** Fertiliser (fert). **Feeds (4)** Animal feed (feed); fishmeal (fishm); oilcake (oilcake); 1st generation bioethanol by-product distillers dried grains and solubles (DDGS). **Bio-based activities and natural resources (13)** Fishing (fishing); forestry (forestry); crude vegetable oil (cvol); residue processing (res); by-product residues from rice (r_pdr); by-product residues from wheat (r_wht); by-product residues

from other grains (r_grain); by-product residues from oilseeds (r_oilsd); by-product residues from horticulture (r_hort); by-product residues from other crops (r_crops); by-product residues from forestry (r_frs); pellets (pellets); energy crops (egycrops); biomass for compost and bioenergy (biom).

Bio-fuels (8)

1st generation biodiesel (biod); 1st generation bioethanol (biog); 2nd generation thermochemical technology biofuel (ftfuel); 2nd generation biochemical technology biofuel (eth); bio-ethanol (bioe); bio-kerosene (bkero); bio-heat (bheat); energy from waste (wely).

Fossil-based energy (10)

Coal (coa); crude oil (c_oil); gas (gas); heat generation (heat); kerosene (kero); petroleum (petro); electricity and heat generation (elyheat); coal-fired electricity (ely_c); gas-fired electricity (ely_g); gas manufacturing and distribution (gdt).

Nonbio-based renewable energy (3)

Nuclear electricity (ely_n); hydroelectric (ely_h); solar and wind (ely_w).

Waste services (8)

Composting (comp); incineration (inc); landfilling (landf); recycling (recy); waste collection green waste (wcg); waste collection services glass and paper (wcgp); waste collection rest waste (wcr); recycled paper and glass (pagl).

Manufacturing (3)

Beverages and tobacco products (bevtobac); paper products and publishing (pap); other manufacturing (manu).

Services (2)

Trade (trade); services (serv).

Transportation (1)

Transportation (trans).

Source: Authors' own elaboration

2.1.5 Food waste data in the model

In the standard GTAP database, waste is included in the sector waste and water ("wtr"). Based on this, we assume that intermediate demand for waste collection services is already present in the underlying database, but that this is included in the intermediate demand for "wtr". Therefore, we subtract the demand for waste collection services from the intermediate demand for "wtr" and add it to demand for waste collection services. This means that the total production value of the different sectors in the underlying database remains unchanged.

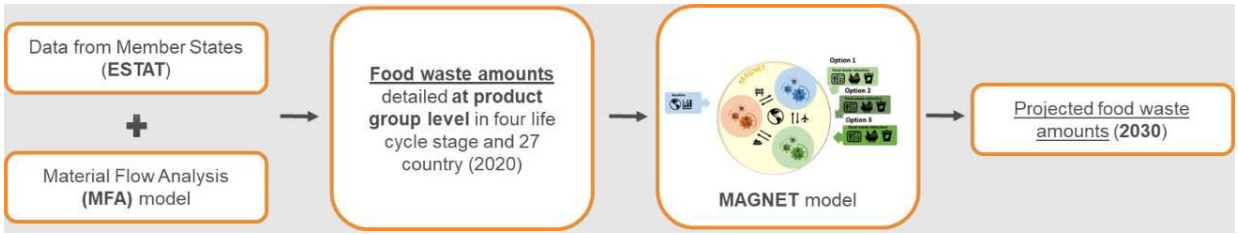
The consumer waste module (Bartelings et al., 2021) uses data taken from the World Bank Report "What a Waste2 – A Global Snapshop of Solid Waste Management to 2050" (Kaza et al., 2018) and data from various other sources (RDC-Environment and Pira International, 2003) providing information on the cost structure. Kaza et al. (2018) provides information about organic waste for 217 countries and economies, however, the work does not distinguish between food and green waste. Therefore, the consumer waste from the Food Waste Material Flow Analysis (FW MFA) developed by the JRC (Caldeira et al., 2021; De Laurentiis et al., 2021) is used to split organic waste into food waste and garden waste. Food waste is linked to the consumption of food products and food services, while garden waste is linked to the consumption of the commodity dwellings. By linking the

production of food waste and garden waste to different commodities, the model can estimate how both food waste and garden waste will develop in future time periods. In some regions the organic waste data from World Bank (Kaza et al., 2018) is lower than the food waste generation in the FW MFA model. For these countries total organic waste generated is adjusted.

For this impact assessment, an additional module was developed, which includes waste collection and treatment related to production and distribution activities. In the implementation of food waste data, three stages are distinguished for the food waste generation at the supply side: primary food production stage, processing and manufacturing stage, and retail and distribution stage. The primary food waste collection has been included in the primary agricultural sectors; retail and distribution food waste collection has been included in the food service, retail and transport sectors. The processed food waste collection has been included in any non- retail sector that uses over 1% of the total intermediate demand of the primary product in the country. This excludes the possibility of a primary sector using its own primary commodity as this is considered waste generation during the primary process. Finally, the production of waste collection services and waste treatment are increased to collect and treat the extra producer food waste.

Food waste amounts for Member States provided by ESTAT (2022) were disaggregated by food chain stage. Since this data is not specific for products, the Material Flow Analysis model developed by JRC (De Laurentis et al. 2021) was used in order to derive amounts of food waste for individual product groups, to be used in MAGNET for projections to 2030 (**Figure 7**).

Figure 7 – Methodology for deriving data on food waste amounts for 2030, disaggregated by product group



Source: Authors' own elaboration

The FW MFA model is combined with data from Corrado et al. (2020) to derive information on waste treatment. Although this model includes different shares for waste treatment per supply chain stages, it uses an EU average to determine how waste is treated for all MSs. In order to account for MS differentiation for waste treatment, World Bank database is used, which provides detailed information per country on waste treatment options. By multiplying the quantity with food collection prices gathered in the household waste module, we can calculate the value of waste collection. FW MFA provides data on food waste at different stages of the production nests product groups. All the food waste data coming from this database is mapped to the MAGNET commodities. Table 20 below shows the link between commodities in the FW MFA model and the MAGNET commodities.

Table 20 – Mapping between the FW MFA and MAGNET models in terms of commodities

Food commodities MFA	***MAGNET commodities***
Cereals	Paddy rice (pdr), processed rice (ricepro), wheat (wht) and other grains (gro)
Dairy	Raw milk (rmk), dairy products (dairy)

Eggs	Poultry live animals (pltry)
Fish	Processed fish and crustaceans (fishp), fishing (fishing)
Fruits	Fruits and nuts (fruit)
Meat	Beef cattle (bfctl), sheep, goats and horses (ctl), poultry (pltry), pigs (oap), beef meat (bfcmt), rest of cattle meat (cmt), poultry meat (poum), pork meat (omt)
Oilcrops	Oilseeds (osd)
Sugarbeets	Sugar cane and beet (c_b)
Vegetables	Vegetables, pulses, roots and tubers (veg)
Potatoes	Vegetables, pulses, roots and tubers (veg)

Source: Authors' own elaboration

Note: In addition to the FW MFA commodities, additional MAGNET commodities include other food, which comprises of mostly packaged and prepared food, and processed sugar which is mapped as others.

2.1.6 Discussion of the modelling approach

As for all simulation modelling exercises, a number of general caveats are also true for the MAGNET approach employed in this study.

Economic simulation models are a conceptual framework representing the economy in a structured but schematic and simplified manner. By definition, they cannot reproduce the reality in its full complexity and thus have shortcomings and limitations, which affect the results of the studies based on such models.

The model employed is designed as a tool for conducting policy experiments in which a reference scenario or baseline is first simulated over a future period and then, after changing one or more underlying assumptions (e.g., policy settings, exogenous macroeconomic developments) a new scenario incorporating these changes is run over the same time period. The deviation between the new scenario and the baseline scenario at a given point in the simulation period establishes the direction and relative magnitude of the impacts on all the endogenous variables (e.g., prices, quantities, incomes etc.). In this study, the deviation year of interest is 2030, and the alternative states of the world correspond to different, hypothetical rules of waste reduction.

Although the model can be used to project individual values of particular variables, it must be stressed that it is not a forecasting model and users should be aware that the projections should not be taken as accurate predictions of the state of the world in any given future period. A no change, or status quo baseline is set up to include, as far as reasonably possible, what we currently understand and can reasonably assume about medium-term future market developments to preserve the economic structure (i.e., relative importance) of different economic activities. It is not typically appropriate for capturing potentially short-term market developments nor unforeseen events (i.e., bad weather, economic crises). If one understands these limitations, then the subsequent deviations in model outcomes purely reflect exogenously controlled changes in those market mechanisms of interest (i.e., technology change, preference changes, tax changes).

General (and partial) equilibrium model solutions become less reliable the further into the future outcomes are simulated. Given the very large number of assumptions, estimated or calibrated parameters, and stylised specification features that these models assemble, each of which is 'correct' only up to an (unknown) probability, it is difficult to establish confidence intervals or margins of error around individual projected numbers.

Specific caveats are relevant with a view to the implementation of the food waste baseline and scenarios.

First of all, model results can only be as good as the underlying databases and are influenced by the assumptions made of treating those within the context of the model. In the case of this assessments, **food waste statistics** have been made available only end of October by ESTAT (published 25 October 2022 under this link). These numbers, provided by Member States, are very different from earlier estimates and do not provide time series. ESTAT explains in a detailed methodology description: "In this first data collection, several countries have used estimates or have indicated that for some data points their definitions differ. Estimates and differences in definitions are due to limitations in sample size, exclusion of small subsectors or of small companies or activities, incompleteness of sector surveys, suboptimal estimation of coefficients for the fresh mass calculation, misinterpretation of definitions by data reporters, difficulties in attributing the waste measurement in between two or more sectors."

The limitations of the data set above have important impacts on the preparation of the baseline, more specifically the **projections** of food waste over the next decade. Details are explained in the next section on the baseline.

This study does not account for **changes in consumer attitudes** to food waste in the baseline. Following for example, Verma MvdB et al. (2020), future studies could account for the evolution of food waste as a function of (*inter alia*) wealth, applying time series information on food waste development. In addition, the baseline does not consider potential technological changes that might have contributed to reducing food losses in agricultural production and post-harvest losses in the baseline.

Another issue is related to the **edible and inedible parts of food waste**. According to the UNEP food waste index report "understanding the split between edible and inedible food waste is not a requirement for reporting on SDG 12.3 using the Food Waste Index, and SDG 12.3 is a target to halve total consumer food waste, including inedible parts." In this modelling exercise we do not distinguish edible/inedible waste.

As shown in the surveys, there are **costs** associated with the reduction of food waste and losses, however, with a high degree of uncertainty regarding the size of these costs. For this reason, an approach has been chosen to fix the reduction target and approximate costs needed through variable swaps.

In line with the objective of this study, the MAGNET model simulates the impact of achieving the **SDG 12.3 target**. It does not provide a detailed analysis of the concrete instruments to implement the policy.

Furthermore, the MAGNET model includes households as one representative household per region. As a result, this study does not depict the impact of the different scenarios on poverty, food accessibility and food affordability of specific households.

The MAGNET model depicts the **interlinkages and rebound effects** of the whole economy. A rebound effect arises when through efficiency gains (in this case due to food waste reduction), resources (physical and monetary) are released, which then can provoke an increased consumption of the same good (called direct rebound effect) or a reallocation of the resources to other sectors (called indirect rebound effect). In this study, for instance in the case of households consuming less agri-food products, the released economic means can be used for other purposes and consumption, thus increasing again emissions, which have been saved in the agri-food sector. Therefore, results are different from partial or linear models, and in general show smaller savings of resources such as greenhouse gas emissions.

In the applied modelling approach, the **benefits of ecosystem services** cannot be measured. At the time the study was conducted, to the best of our knowledge, there was no global economic model available that explicitly considered ecosystem services. However, ecosystem service models provide information on how production changes that affect the ecosystem structure lead to changed values of ecosystem services. Linking CGE models such as MAGNET to ecosystem services models would provide an interesting springboard for future research but is far beyond the scope of this study. Such an approach would also require an ecosystem services database covering multiple ecosystem services in EU member states. To overcome this gap, this study provides a qualitative discussion of the potential implications of model results for ecosystem services provision and associated benefits.

The reduction of food waste leads to a decrease in labour demand in the agricultural sectors. In this version of the MAGNET model, unemployment is not taken into account as the long-run equilibrium corresponds to the natural rate of unemployment, which is a common assumption in deterministic global CGE models.

2.2 Bottom-up Life Cycle-based analysis of food waste reduction targets

In this section, we describe a complementary modelling approach that was applied to the analysis of food waste prevention targets in order to support the policy impact assessment. The approach relies on the application of **Life Cycle Assessment (LCA)** method, which allows assessing the environmental impacts of food and food waste by modelling individual food products in their entire life cycle (from agriculture production to food waste management).

2.2.1 Methodological approach

The JRC developed over time a number of studies on the environmental impacts of food and the food system adopting a product perspective (bottom-up)[1]. In particular, the **Consumption Footprint indicator** includes the area of consumption "Food" as part of EU consumption (Castellani et al., 2017; Sanyé Mengual et al., 2023a), which is composed of a so-called Basket of Products with 45 representative food products[2] (associated with more than 70% of EU food and beverage consumption in mass). These representative products have been assessed by applying the LCA methodology and calculating their impacts for the 16 impact categories of the Environmental Footprint (EC - JRC, 2021; Zampori & Pant, 2019; Andreasi Bassi et al., 2023). The impact of each representative product is then multiplied by annual EU consumption of each product in terms of mass[3], allowing for the calculation of the Consumption Footprint due to the EU food consumption (EC - European Commission, 2022; Sala & Sanye Mengual, 2022; Sanyé Mengual & Sala, 2023). The same approach was used for other areas of consumption (i.e. appliances, household goods, mobility, housing), in order to derive the overall Consumption Footprint. The Consumption Footprint – Food can also be assessed with methods to quantify the biodiversity footprint (Crenna et al., 2019; Sanyé-Mengual et al., 2023b)

The life cycle assessment-based approach aims at complementing the outcomes of the macroeconomic model described in the previous chapter providing additional insights from a bottom-up perspective (i.e., starting from the analysis of single products) on the effects of setting food waste reduction targets.

In particular, it allows the estimation of the environmental impacts associated with the food waste that would be prevented in 2030 according to the different policy options (i.e., specific targets for different stages of the supply chain). Three different data sources have been combined in order to obtain these results:

- Quantities of food waste avoided in the different policy scenarios (at food group level), calculated as presented in Section 2.1.5

- The environmental impact of individual food products from the Consumption Footprint, calculated by performing life cycle assessment of a set of 45 representative products and multiplying these impacts by the amounts of avoided food waste, calculated by applying the reduction targets to the food waste generated in the 2030 baseline.
- The environmental impact of avoided waste treatment, based on the Food Waste Prevention Calculator (De Laurentiis et al., 2020). This impact was calculated by multiplying the quantities of avoided food waste by the impacts of waste treatment, as presented in (Notarnicola et al., 2017), considering an average EU mix of waste treatment options.

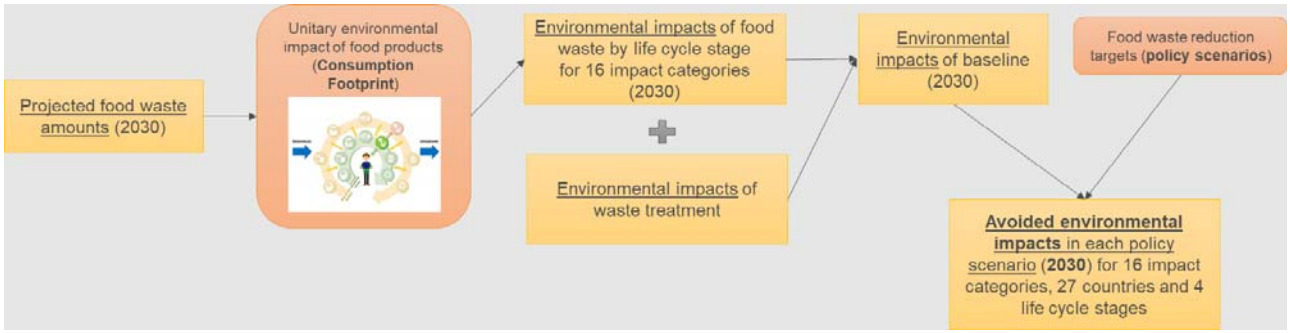
Within the framework of the Consumption Footprint, environmental impacts of the production of imported goods consumed in the EU are included in the analysis, whereas the impacts of production of exported goods are not.

The methodological steps are illustrated in **Figure 8**. In a first step, the projected amounts of food waste generated in 2030 (derived from MAGNET, Section 2.1.5) at product group level are multiplied by the environmental impacts of food products calculated performing process-based LCA of representative products from the Consumption Footprint.

In a second step, the impacts of waste treatment, calculated as presented in Notarnicola et al., (2017) and considering an average EU mix of waste treatment options - following the approach of the Food Waste Prevention Calculator (De Laurentiis et al., 2020), are multiplied by the amount of food waste generated in the baseline, and added to the impacts of the wasted food products calculated at the previous step to calculate the overall impact of food waste generation in the baseline. In a third and final step, the food waste reduction targets envisaged by the different policy options are applied to calculate environmental savings (i.e. avoided environmental impacts) brought by each policy option.

The same approach was used to quantify the environmental impacts of food waste generated in 2020, based on the food waste data published by Eurostat.

Figure 8 – Modelling approach for the macro-scale assessment of projected environmental impacts deriving from the setting of food waste reduction targets



The Life Cycle Assessment-based approach has the advantage of estimating environmental impacts due to EU food consumption and related food waste, considering the whole life cycle of products and 16 different impact categories (including a comprehensive list of emissions to the environment and resources use). At the same time, the proposed framework shows certain limitations and is affected by different sources of uncertainty: e.g., in the data used in the modelling of representative products (Consumption Footprint) and in the impact assessment models of the Environmental Footprint, including temporal and regional representativeness. Moreover, the Consumption Footprint scope is limited to the currently modelled product groups. Finally, this approach does not consider the rebound effects or effects of re-exports when dealing with transboundary impacts (Sanyé-Mengual & Sala, 2023).

The resulting environmental impacts that are avoided in the three policy options can be translated in monetary terms by applying conversion factors compiled by Amadei et al., (2021)[54]. Although these combine different methodological approaches, they can be employed for an estimation of the magnitude of the externalities associated to the environmental impacts calculated with the Environmental Footprint method. The monetary valuation coefficients used are provided in Table 21.

Table 21. Monetary valuation coefficients based on Amadei et al., (2021).

Climate change	Land use	Marine eutrophication	Water scarcity
Euro/kgCO_2eq.	Euro / Pt	Euro /kg N eq.	Euro /m^3 water eq.
0.076-0.272	0.000178	6.02-10.3	0.00508

2.2.2 The Consumption Footprint model in policy assessment

The Consumption Footprint assessment framework has been used to:

i. monitor the evolution of impacts over time (Sanyé-Mengual et al., 2019)(EC - European Commission, 2022);
ii. test scenarios of impact reduction along the food value chain, both as technical (e.g. efficiency improvements) or behavioural transitions (e.g. dietary shift) (Castellani et al., 2017; Polizzi di Sorrentino et al., 2016; Sanyé-Mengual & Sala, 2023);
iii. assess the impacts of the EU food system against the Planetary Boundaries as absolute sustainability reference (Sala et al., 2020).

The Consumption Footprint was also used to support different European Green Deal ambitions in impact assessments (e.g., 2030 climate target plan[55], ecodesign for sustainable product requirements[56], legislative framework for sustainable food systems[57]) and in monitoring frameworks (e.g., resilience dashboards[58], 8th Environment Action Programme[59], Circular Economy Action Plan[60]). The Consumption Footprint also features in the 2021 OECD/JRC report on "Understanding the spillovers and Transboundary Impacts of Public Policies"[61].

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[54] Amadei, A.M., De Laurentiis, V. and Sala, S., 2021. A review of monetary valuation in life cycle assessment: State of the art and future needs. Journal of Cleaner Production, 329, p.129668.
[55] European Commission, Climate Action, 2030 Climate Target Plan, https://climate.ec.europa.eu/eu-action/european-green-deal/2030-climate-target-plan_en.
[56] European Commission, All Environment Publications, Proposal for Ecodesign for Sustainable Products Regulation https://environment.ec.europa.eu/publications/proposal-ecodesign-sustainable-products-regulation_en.
[57] European Commission, Food safety, Farm to Fork strategy, Legislative framework for sustainable food systems, https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy/legislative-framework_en.
[58] European Commission, 2020 Strategic Foresight Report, Resilience Dashboards, https://commission.europa.eu/strategy-and-policy/strategic-planning/strategic-foresight/2020-strategic-foresight-report/resilience-dashboards_en.
[59] Decision (EU) 2022/591 of the European Parliament and of the Council of 6 April 2022 on a General Union Environment Action Programme to 2030 *(OJ L 114, 12.4.2022, p. 22–36),* EUR-Lex - 32022D0591 - EN - EUR-Lex (europa.eu).
[60] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 11.03.2020 A new Circular Economy Action Plan For a cleaner and more competitive Europe, COM(2020) 98 final, EUR-Lex - 52020DC0098 - EN - EUR-Lex (europa.eu).
[61] OECD, *Understanding the Spillovers and Transboundary Impacts of Public Policies, Implementing the 2030 Agenda for More Resilient Societies,* 2021, https://www.oecd.org/gov/pcsd/understanding-the-spillovers-and-transboundary-impacts-of-public-policies-862c0db7-en.htm.

ANNEX 5: POLITICAL AND LEGAL CONTEXT

The WFD sets the fundamental waste management principles applicable in the EU. Over its lifetime, the WFD has evolved to address the changing way waste is perceived by society, away from a significant focus on disposal to one that gives greater priority to prevention and obtaining value from waste as a resource. In addition, it has considered how waste policy interacts with other environmental policies as explained below.

The WFD includes the basic concepts and definitions related to waste management, including definitions of waste, recycling and recovery. It requires waste to be managed without endangering human health and harming the environment, without risk to water, air, soil, plants or animals, without causing a nuisance through noise or odours and without adversely affecting the countryside or places of special interest. EU waste management is based on the five-step "waste hierarchy", which establishes an order of preference for managing and disposing of waste: prevention first (including reuse) followed by waste management operations: preparing for reuse, recycling, recovery and last disposal.

Figure 9 – The waste hierarchy

The WFD tasks Member States to take measures to limit waste generation, regulate and monitor waste treatment operations and operators, set up separate collection of waste to facilitate recovery of waste and attain preparing for reuse and recycling targets for municipal waste. It also implements the polluter pays principle by setting general requirements for extended producer responsibility (EPR) schemes to strengthen reuse, waste prevention, recycling and other recovery of waste. The Directive also mandates the Member States to adopt waste prevention programmes, including dedicated food waste prevention programmes, and waste management plans to define their strategic planning in waste management aiming to decouple waste generation from economic growth and the transition towards a circular economy.

In 2015, the European Commission adopted its first CEAP[62]. It included measures to help stimulate Europe's transition towards a circular economy, boost global competitiveness, foster sustainable economic growth and generate new jobs.

Together with that action plan, the Commission adopted a legislative proposal on waste, which resulted in the 2018 waste package (described below). The '2018 waste package' introduced a significant number of changes to the EU waste management rules. The most important changes are listed below some details of the provisions is provided in the order of the WFD articles.

- Clarified key concepts such as the definitions of waste, recovery and disposal.
- Increased preparing for reuse and recycling targets for municipal waste and packaging waste.
- Set a target on the maximum amount of municipal waste that can be landfilled.
- Harmonised and simplified the legal framework on by-products and end-of-waste status.
- Tasked EU Member States to take measures to limit waste generation.
- Introduced general requirements for Extended Producer Responsibility schemes.
- Introduced an EWR as a compliance promotion tool.
- Introduced a whole life cycle approach of products and materials and not only the waste phase.
- Focused on reducing the environmental impacts of waste generation and waste management.
- Simplified and streamlined reporting obligations.
- Aligned the legislation to Articles 290 and 291 TFEU on delegated and implementing acts.
- Specific provisions of the WFD and the 2018 revision are detailed below.

In December 2019, the European Commission adopted the Communication on a EGD which sets out an ambitious roadmap to transform the EU into a **modern, resource-efficient and competitive economy**. One of the objectives of the Green Deal is "mobilising industry for a clean and circular economy". This initiative is part of the Commission's current ambition to bring about a Green Transition in the EU and is one of several initiatives in the area of waste.

A major component of the Green Deal is the new CEAP, adopted in March 2020. Managing waste in an environmentally sound manner and making use of secondary raw materials are key elements of this plan. The CEAP calls for the Commission to put forward waste prevention measures, including waste reduction targets for specific streams. It also calls for the Commission to enhance the implementation of extended producer responsibility schemes and to provide incentives and encourage sharing of information and good practices in waste recycling.

The European Commission's 2020 industrial strategy for Europe [63] sets out the EU's overarching ambition to foster a 'twin transition' to climate neutrality and digital leadership. It echoes the European Green Deal in highlighting the leading role that Europe's industry must play in this, by reducing its carbon and material footprint and embedding circularity across the economy. It underlines the need to move away from traditional models, and revolutionise the way we design, make, use and dispose of products. In 2021, the Commission published an update to the industrial strategy, [64] which reinforces the main messages of the 2020 strategy and provides a range of additional implementation tools.

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[62] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Closing the loop - An EU action plan for the Circular Economy, COM(2015) 614 final, EUR-Lex - 52015DC0614 - EN - EUR-Lex (europa.eu).

[63] Communication from the Commission A New Industrial Strategy for Europe, 2020, COM(2020) 102 final, EUR-Lex - 52020DC0102 - EN - EUR-Lex (europa.eu).

[64] European Commission, A Europe fit for the digital age, European industrial strategy, European industrial strategy | European Commission (europa.eu).

The EU Textiles Strategy sets out the vision and concrete actions to ensure that by 2030 textile products placed on the EU market are long-lived and recyclable, made as much as possible of recycled fibres, free of hazardous substances and produced in respect of social rights and the environment. It indicates urgent action is needed across the entire lifecycle of textile products since that ecosystem is the fourth highest-pressure category for the use of primary raw materials and water and fifth for GHG emissions. It calls for a sustainable product policy and circularity to retain value of textiles is retained in the economy for as long as possible through reuse, repair and recycling to reduce dependencies on virgin raw materials. The proposed specific measures include eco-design requirements for textiles, clearer information, a Digital Product Passport and harmonising EU EPR rules. To address fast fashion, the Strategy also calls on companies to reduce the number of collections per year, take responsibility and act to minimise their carbon and environmental footprints, and on Member States to adopt favourable taxation measures for the reuse and repair sector. Design requirements for an extended lifetime and durability of textiles, EPR schemes, collection, preparation for reuse and recycling operations are currently partially implemented or mandated in Members States.

Article 4a of the WFD established definition of food waste – as all food (in the meaning of General Food Law), which has become a waste.

Article 6 of the WFD specifies that Member States must take appropriate measures to ensure that waste which has undergone a recycling or other recovery operation is considered to have ceased to be waste if it complies with specific conditions outlines in the article. End-of-waste criteria specify when certain waste ceases to be waste and becomes a product (non-waste). According to Article 6 (1) and (2) of the Waste Framework Directive, certain specified waste ceases to be waste when it has undergone a recovery operation (including recycling) and complies with specific criteria, when:

- The substance or object is commonly used for specific purposes.
- There is an existing market or demand for the substance or object.
- The use is lawful (substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products).
- The use will not lead to overall adverse environmental or human health impacts.

Relevant product legislation, in particular Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) [65], Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures (CLP) [66]and requirements specific to textile products apply to textiles recovered from waste. As in the case of other relevant waste streams, the presence of forbidden hazardous chemicals in textiles, the use of which may have been previously allowed, can have a detrimental effect on the safety and quality of the recovered textile material, be it recycled fibres or textile articles for reuse. The presence, nature and amount of such substances may also have an impact on the amount of textile material than can be prepared for reuse or recycled. REACH already imposes restrictions on certain substances in

[65] Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC *(OJ L 396, 30.12.2006, p. 1–849)*, EUR-Lex - 32006R1907 - EN - EUR-Lex (europa.eu).

[66] Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 *(OJ L 353, 31.12.2008, p. 1–1355)*, EUR-Lex - 32008R1272 - EN - EUR-Lex (europa.eu)

textiles, contained in its Annex XVII. This includes a restriction on certain azocolorants and azodyes (entry 43 and appendices 8 and 9), nonylphenol ethoxylates (entry 46a), hexavalent chromium (restriction entry 47) and on a list of 67 specific CMR[67] substances (entry 72 and appendix 12). The Commission is currently working on the preparation of a further restriction under REACH, on skin sensitising substances in textiles[68], based on an opinion of the European Chemicals Agency. Limit values in Annex I of Regulation (EU) 2019/1021 on Protecting health and the environment from persistent organic pollutants[69] are also relevant to the placing on the market of recycled fibres. Furthermore, the recently published Regulation (EU) 2022/2400[70], has introduced limit values relevant to the waste management of textile waste containing certain persistent organic pollutants (POPs), particularly PFOA, PFHxS and their salts and related compounds. The relevance of these restrictions depends on their precise scope, the limit values defined for the different substances and on the concentrations found of the relevant substances in recycled fibres, in textile waste prepared for reuse and in non-waste articles destined for reuse. It should be noted that some of the referred restrictions specifically exclude from their scope second-hand articles.

Article 8a of the WFD sets the general minimum requirements for all extended producer responsibility (EPR) schemes set up within the EU. The Directive does not propose specific rules on EPR for textiles. The OECD indicated that EPR "is a policy approach under which producers are given a significant responsibility – financial and/or physical – for the treatment or disposal of post-consumer products. Assigning such responsibility could in principle provide incentives to prevent wastes at the source, promote product design for the environment and support the achievement of public recycling and materials management goals. Within the OECD the trend is towards the extension of EPR to new products, product groups and waste streams such as electrical appliances and electronics." [71] Indeed, the EU, EPR is mandatory within the context of the WEEE and ELV Directives as well as the Batteries Regulation and PPWD. Additional waste streams have been most identified for an EPR scheme within the EU, including tyres, waste oil, paper and card, and construction and demolition waste. In addition, a much broader range of waste streams are subject to obligatory or voluntary producer responsibility systems in some Member States, including farm plastics, medicines and medical waste, plastic bags, photo-chemicals and chemicals, newspapers, refrigerants, pesticides and herbicides, textiles, mattresses, and lamps, light bulbs and fittings.

Article 9 of the WFD requires Member States to "encourages the reuse of products and the setting up of systems promoting repair and reuse activities" for textiles, and it cites in recitals that specific end-of-waste criteria should be considered for textiles. It furthermore requires Member States to take measures to:

- Promote and support sustainable production and consumption models.
- Encourage the design, manufacturing and use of products that are resource efficient, durable, reparable, reusable and capable of being upgraded.
- Target products containing critical raw materials to prevent those materials becoming waste.
- Encourage the reuse of products and the setting up of systems promoting repair and reuse activities.

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[67] Carcinogenic, mutagenic, toxic for reproduction.
[68] ECHA, Registry of restriction intentions until outcome, https://echa.europa.eu/registry-of-restriction-intentions/-/dislist/details/0b0236e182446136.
[69] Regulation (EU) 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants (recast) (*OJ L 169, 25.6.2019, p. 45–77*), Regulation (EU) 2019/1021 of the European Parliament and of ... - EUR-Lex (europa.eu).
[70] Regulation (EU) 2022/2400 of the European Parliament and of the Council of 23 November 2022 amending Annexes IV and V to Regulation (EU) 2019/1021 on persistent organic pollutants *(OJ L 317, 9.12.2022, p. 24–31)*, EUR-Lex - 32022R2400 - EN - EUR-Lex (europa.eu).
[71] Extended producer responsibility - OECD

- Promote the reduction of the content of hazardous substances in materials and products.
- Stop the generation of marine litter.

Article 9 requires the Commission, by 31 December 2024, to examine data provided by Member States and consider the feasibility of measures to encourage the reuse of products, including the setting of quantitative targets as well as other waste prevention measures. In 2020, the Commission adopted an implementing act with a common methodology to measure and report on product reuse. The first reporting year is 2021 and Member States will report on reference year 2021 in June 2023.

Article 9 sets a general requirement to reduce food-waste generation as a contribution to the United Nations Sustainable Development Goal Target 12.3 by 2030. It establishes a hierarchy of food waste prevention operations (ADD) and requires measuring the levels of food waste on the basis of the methodology established by the delegated act referred to in Article 9(8). On the basis of that data, the WFD calls the Commission, by 31 December 2023, to examine the data with a view to considering the feasibility of establishing Union-wide food waste reduction target to be met by 2030.

Article 10 of the WFD requires Member States to take the necessary measures to ensure that waste undergoes preparing for reuse, recycling or other recovery operations. Where necessary to facilitate or improve preparing for reuse, recycling and other recovery operations, waste shall be subject to separate collection and shall not be mixed with other waste or other materials with different properties. The Green Deal calls on the Commission to propose an EU model for separate waste collection and CEAP specifies some of the elements to be considered: the most effective combinations of separate collection models, the density and accessibility of separate collection points, common bin colours, harmonised symbols for key waste types, product labels, information campaigns and economic instruments, and the standardisation and use of quality management for collection systems.

Article 11 of the WFD specifies that Member States shall take measures to promote high-quality recycling and, to this end, requires Member States to set up separate collection for at least for paper, metal, plastic and glass, and, by 1 January 2025, for textiles. It also sets preparing for reuse and recycling targets (by weight) for municipal waste to 55% by 2025, 60% by 2030 and 65% by 2035. In addition, Article 11 calls for the Commission to consider by 31 December 2024, the setting of targets for (preparing for) reuse and for recycling of separately collected textiles.

Article 21 of the WFD requires Member States to ensure collection and treatment of waste oils (WO). It also indicates a priority for regeneration (here used synonymously with ‘recycled’) as regenerated lubricant oil reduces the demand for virgin fossil resources. Combustion for energy recovery is another option, but less desirable than regeneration according to the EU’s waste hierarchy. The WFD requires the Commission, by 31 December 2022, to examine information on WO provided by Member States and to consider the feasibility of adopting measures, including quantitative targets and other measures to promote the regeneration of WLO.

Article 22 of the WFD requires Member States to ensure that, by 31 December 2023, bio-waste is either separated and recycled at source, or is collected separately and is not mixed with other types of waste.

Article 29 of the WFD mandates Member States to establish waste prevention programs, including food waste prevention, that describe existing and planned instruments and measures and their contributions to decoupling waste generation from economic growth. It also requires them to monitor and assess the implementation of their food waste prevention measures by measuring the levels of food waste on the basis of the methodology established by the delegated act referred to in Article 9(8) (i.e., 2019/1597/EC), as of reference year 2020.

This initiative will assess whether Member States are on track to meet the separate collection obligation for textiles and amongst other measures, whether specific EPR rules are needed for textiles

products in addition to the general minimum requirements in Article 8a and address the review clause for waste oils in Article 21

1- Textiles

The Waste Statistics Regulation (WStatR) [72] provides for data collected biennially. Textile waste is included under W076 'Textile Waste' and it is measured in tonnes. Textile waste comprises two entries in separately collected municipal waste fractions (20 01 10 clothes, and 20 01 11 textiles).

In addition, the '2018 waste package' introduced a new definition of municipal waste that includes textiles in the list of mixed waste and separately collected waste from households, this will be reported annually from reference year 2020 (in June 2022).

According to the guidance prepared by Eurostat, countries should estimate waste generation by material breakdown (including a specific class for textiles) by applying waste composition analysis to the different waste streams. In the light of the data received, 14 countries out of 22 seem not to have applied such waste composition analysis. For those countries, the municipal textile waste generation reported is very low, and comparing it with recycling is not meaningful. The table below shows the breakdown of waste generation by material as reported by Member States.

[72] Regulation (EC) No 2150/2002 of the European Parliament and of the Council of 25 November 2002 on waste statistics *(OJ L 332, 9.12.2002, p. 1–36),* EUR-Lex - 32002R2150 - EN - EUR-Lex (europa.eu).

Table 22 – Breakdown of waste generation by material

	AT	BE	BG	CZ	DE	DK	EE	FI	FR	HR	HU	IT	LT	LU	LV	MT	NL	PT	RO	SE	SI	SK
Metals	11.00%	2.00%	4.50%	5.40%	0.70%	3.50%	3.80%	3.90%	3.10%	2.30%	3.90%	2.40%	9.90%	1.60%	0.90%	0.60%	0.80%	0.10%	3.70%	4.30%	9.90%	14.80%
Metals separated after incineration of waste	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Glass	5.50%	4.80%	0.60%	3.00%	4.90%	3.20%	8.20%	2.40%	8.50%	2.60%	1.00%	8.00%	4.30%	6.60%	4.90%	2.10%	4.00%	3.70%	6.40%	6.10%	4.20%	3.10%
Paper and cardboard	20.50%	14.70%	4.90%	7.60%	12.90%	11.70%	24.70%	16.10%	9.10%	11.80%	8.40%	21.70%	9.80%	22.00%	12.70%	5.90%	8.30%	4.00%	13.50%	14.10%	19.60%	8.30%
Plastic	6.60%	2.90%	1.50%	3.20%	1.70%	2.10%	15.20%	3.20%	6.70%	3.90%	0.70%	12.60%	4.10%	8.70%	1.60%	0.80%	0.40%	0.20%	13.70%	7.50%	10.40%	3.00%
Wood	6.20%	10.40%	0.40%	1.30%	2.70%	4.70%	1.50%	3.40%	3.30%	1.40%	0.40%	3.40%	1.10%	3.00%	5.70%	2.70%	4.80%	0.60%	2.10%	3.60%	6.40%	1.60%
Textiles	1.90%	1.00%	0.00%	0.70%	0.40%	0.10%	4.10%	0.00%	2.40%	0.20%	0.00%	3.60%	0.30%	1.90%	0.10%	0.40%	1.00%	0.10%	1.00%	1.40%	0.20%	0.90%
Electrical and electronic equipment	2.00%	1.40%	2.40%	1.60%	1.50%	1.90%	2.20%	2.30%	2.10%	2.20%	1.30%	0.00%	1.20%	1.50%	0.60%	0.90%	2.10%	0.10%	0.90%	3.60%	1.30%	1.10%
Batteries	0.10%	0.00%	0.00%	0.00%	0.00%	0.20%	0.10%	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%	0.40%	0.00%	0.30%
Bio-waste	31.80%	15.20%	1.60%	15.10%	22.00%	26.50%	24.70%	16.90%	28.10%	7.00%	10.50%	34.50%	21.40%	27.70%	4.40%	9.80%	27.80%	3.30%	56.80%	36.70%	15.40%	12.60%
Bio-waste separated and recycled at source	0.00%	7.30%	0.00%	0.00%	4.80%	0.00%	0.00%	0.00%	4.70%	0.00%	0.00%	1.00%	0.00%	3.90%	0.00%	0.00%	0.00%	0.00%	0.00%	0.70%	0.00%	0.00%
Mixed waste	8.20%	34.90%	78.50%	47.90%	40.90%	34.50%	12.60%	45.90%	8.10%	59.20%	67.30%	12.70%	39.60%	14.80%	64.70%	53.90%	34.20%	82.10%	0.00%	12.00%	25.90%	45.60%
Bulky waste[(6)]	5.00%	4.10%	3.50%	12.20%	5.60%	8.50%	2.80%	0.30%	12.50%	7.80%	5.30%	0.00%	3.60%	3.50%	4.30%	20.60%	6.20%	4.00%	0.80%	8.90%	5.70%	7.60%
Other	1.20%	1.30%	2.10%	2.10%	2.00%	3.10%	0.30%	5.50%	11.20%	1.60%	1.10%	0.00%	4.80%	4.90%	0.00%	2.10%	10.50%	1.80%	1.00%	0.70%	0.90%	1.10%

There is a lack of reliable data on textile waste generation and how much it represents of total municipal solid waste but from several sources it seems that a reasonable estimate is 3-4%. In the best performing Member States, about a third of it is separately collected and about two thirds end up in the mixed waste bin.

Regulation (EC) No 1013/2006 on shipments of waste [73] (Waste Shipments Regulation or 'WSR') applies to shipments of waste:

- Between EU countries within the EU borders or transiting via non-EU countries;
- Imported into the EU from non-EU countries;
- Exported from the EU to non-EU countries;
- In transit through the EU, on the way from or to non-EU countries.

There are two control procedures for the shipment of waste:

1. General information requirements apply to shipments for recovery of wastes, listed in Annex III ('green' listed wastes - non-hazardous, such as paper or plastics) or IIIA; and
2. Prior written notification and consent applies to other types of shipments of wastes, including:
   a. shipments of wastes listed in Annex IV ('amber' listed wastes containing both hazardous and non-hazardous parts) or in Part 2 of Annex V (EWC Codes (European Waste Codes) [74], e.g., wastes from mining, quarrying and physical and chemical treatment of minerals); and
   b. shipments for disposal of wastes listed in Annex III ('green' listed wastes).

The Regulation aims to protect the environment and public health from the adverse effects of the shipments of waste and its subsequent treatment. It requires that waste is managed in an environmentally sound manner, respecting EU and international rules, throughout the shipment process and when it is recovered or disposed of.

Coherence Analysis

Links with other EU policies

The following initiatives, adopted or planned in the Commission work programme, will have an impact on the themes being investigated. They are summarised in the Table below and more details are provided after the table.

Table 23 – Mapping of the main links to WFD

Policy area	WFD contribution and relevance
The 8th Environment Action Programme (8th EAP)[75]	Speed up the transition to a climate-neutral, sustainable, non-toxic, resource-efficient, renewable energy-based, resilient and

[73] OJ L 190, 12.7.2006, p.1.
[74] 2000/532/EC: Commission Decision of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste (notified under document number C(2000) 1147), EUR-Lex - 32000D0532 - EN - EUR-Lex (europa.eu).
[75] EUR-Lex - 32022D0591 - EN - EUR-Lex (europa.eu).

	competitive circular economy to attain the EU's 2050 vision of living within planetary boundaries.
Circular Economy Action Plan (CEAP)	Increase circularity of resource intensive sectors, such as textiles and food[76] for people, regions and cities. Prevent or reduce waste generation. Enhance the implementation of the polluter pays principle. Strengthened markets for secondary raw materials and more circularity. Reduce environmental impacts through waste management.
Bioeconomy Strategy[77]	It calls for actions for the reuse, reduction and recycling of waste streams of a biological nature. Principles such as the circular economy, cascading use of biomass and the waste hierarchy are at its core.
Ecodesign for Sustainable Products Regulation (ESPR)[78]	Make sustainable products the norm in the EU by setting minimum requirements to improve their circularity, energy performance, promote/support sustainable production and consumption models and stimulate re-use, repair and recycling.
EU Strategy for Sustainable and Circular Textiles' (EU Textiles Strategy)	Calls for urgent action across the entire lifecycle of textile products to ensure sustainable textile products and circularity to retain textiles' value in the economy for as long as possible and to reduce dependencies on virgin raw materials.
Farm to Fork Strategy	Reduce food waste levels. Establish a baseline for food waste levels, considering new data measured by Member States and propose legally binding targets to reduce food waste across the EU by 2023.
Commission analysis of the drivers of food security[79]	Food waste is one of the main drivers affecting food security from both the supply and demand sides. Food waste reduces productivity and can reduce food availability. Moreover, reducing food waste could contribute to food price decreases, thereby potentially improving economic access to food.
Proposal for a legislative Framework for a Union Sustainable Food System ('FSFS') – (planned for Q3 2023).	Food waste reduction will be part and parcel of the future legislative proposal establishing a framework for a Union Sustainable Food System. There will be a cross-fertilisation between the two initiatives. For instance, when Member States implement national food waste prevention programmes to meet the set targets, they would need to take into account the general principles of FSFS where applicable and relevant.
Food Information to Consumers - revision of EU rules on date marking	Clarify wording of 'use by' and 'best before' dates in order to prevent food waste linked to the misunderstanding and/or misuse of these dates.
REPowerEU[80]	Increasing production from 3,5 (2021) to 35 (2030) bcm of biomethane from sustainably sourced feedstock, including food waste, to strengthen security of energy supply and reduce dependence on imported Russian natural gas. While food waste reduction is not expected to contribute to this target, indirect effects (e.g., freeing land for non-food uses) may have limited impact.

[76] https://single-market-economy.ec.europa.eu/industry/transition-pathways_en.
[77] A sustainable bioeconomy for Europe - Publications Office of the EU (europa.eu).
[78] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52022PC0142
[79] *Drivers of food security. SWD(2023) 4 final,* Analysis of main drivers on food security (europa.eu).
[80] EUR-Lex - 52022DC0108 - EN - EUR-Lex (europa.eu)

Social Economy Action Plan[81]	Sets waste management rules to provide opportunities for social enterprises and circular business models.
Chemicals Strategy for Sustainability[82]	Protect citizens and the environment from harmful chemicals, ensuring all chemicals are used more safely and sustainably and prioritising innovation for substituting substances of concern across sectors, such as textiles, construction materials, etc.
Zero pollution	Mandate that waste is managed without endangering human health and harming the environment. Promote waste hierarchy to reduce pollution.

- The EU Textiles Strategy addresses the production and consumption of textiles, whilst recognising the importance of the textiles sector. It presents the Commission's 2030 Vision for Textiles. Particularly relevant for waste management is that it announced harmonised EU rules on extended producer responsibility for textiles, and economic incentives to make products more sustainable ("eco-modulation of fees"). Furthermore, it highlighted the Commission's aim to address the challenges related to halting the export of textile waste. In alignment with the Strategy, Measure 2.9 presented in this assessment addresses extended producer responsibility for textiles.
- The revision of the PPWD will aim to reduce waste generation of packaging waste. Together this initiative and the PPWD initiative will tackle over 65% of all municipal waste generated (packaging, food waste and textile waste) therefore contributing to the overarching objective of the WFD and the EGD/CEAP policy objectives of minimising waste. Textile waste packaging is specifically excluded from this assessment so as to eliminate any possible incoherence.
- The Commission proposal for the Waste Shipments Regulation was proposed on 17 November 2021. It aims to ensure that the EU does not export its waste challenges to third countries and to facilitate shipments for recycling, while discouraging shipments to disposal. Measures include criteria to better distinguish between mixed and non-mixed waste, as well as between used vs waste goods, that may be established for textiles. Also, a stricter export regime to non-OECD third countries is proposed, as well as an obligation to audit the performance of recovery facilities in third countries. Finally, measures are proposed to step up the efforts on enforcement of the waste shipment rules, including for textile waste. The impacts of the WSR proposal are factored into the assessment performed. Furthermore, the measures that address shipments of materials (measures 2.6 and 2.9) distinguish textiles that are for reuse and no longer waste (and, therefore, not subject to the WSR) and those that are waste for which the measures in the proposal are referred to directly.
- The proposal for a Regulation on a Single Market for Digital Services (Digital Services Act) aims at improving consumer protection and their fundamental rights online and to ensure transparency and accountability of online platforms. The new rules foster innovation, growth and competitiveness, and facilitate the scaling up of smaller platforms, SMEs and start-ups. The responsibilities of users, platforms, and public authorities are rebalanced according to European values, placing citizens at the centre.

[81] Communication form the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Building an economy that works for people: an action plan for the social economy, COM(2021) 778 final, EUR-Lex - 52021DC0778 - EN - EUR-Lex (europa.eu).
[82] Communication form the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Chemicals Strategy for Sustainability Towards a Toxic-Free Environment, COM(2020) 667 final, EUR-Lex - 52020DC0667 - EN - EUR-Lex (europa.eu).

Specifically in relation to measure 2.9 on extended producer responsibility the impacts and measures foreseen under the Digital Services Act are explicitly referred to.

- The General Product Safety Directive mandates the producer to place only safe products on the market. While this legislation does not cover EPR compliance, this obligation is consistent with the current requirements under the waste legislation to take back products already used or their waste under the EPR. Indeed, both legal instruments require the relevant actors to organise collection and treatment of the product.
- The Commission proposal to review the Industrial Emissions Directive[83] increases the focus on the circular performance of industrial installations in terms of requirements on resource efficiency and waste prevention. Furthermore, under this proposal operators are required to have an environmental management system in place, addressing the management and substitution of hazardous chemicals and, from 2030, would require the inclusion of a transformation plan towards a clean, circular and climate neutral industry.
- The Commission adopted a proposal for a directive on sustainability due diligence[84] aimed at supporting EU companies' sustainability transition. It introduces a horizontal framework requiring businesses across all sectors of the economy to respect human rights and the environment in their own operations, their subsidiaries and through their value chains. The due diligence duty is aligned with internationally recognised human rights and labour standards as well as international environmental commitments. The proposal covers large companies based in EU but also non-EU companies generating a significant turnover on the EU market and excludes SMEs. The textiles sector is identified as one of the high impact sectors. The Commission may issue guidance on the topic as additional support to companies.
- The Zero Pollution Action Plan[85] (ZPAP) provides a compass for including pollution prevention in all relevant EU policies, maximising synergies in an effective and proportionate way, stepping up implementation and identifying possible gaps or trade-offs. It also provides a vision according to which by 2050, air, water and soil pollution is reduced to levels no longer considered harmful to health and natural ecosystems and that respect the boundaries our planet can cope with. As also reflected in the CEAP, the ZPAP addresses the ambition for a more environmentally friendly production and consumption where waste generation and pollution are minimised, also as regards impacts beyond EU borders. The ZPAP includes targets for 2030 for preventing and better managing waste, calling for significant reductions in waste generation and halving the amount of residual municipal waste generated in the EU.
- The Chemicals Strategy for Sustainability[86] states that in order to move towards toxic-free material cycles and clean recycling it is necessary to ensure that substances of

[83] Proposal for a Directive of the European Parliament and of the Council amending Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) and Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste, COM(2022) 156 final, https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM%3A2022%3A156%3AFIN.

[84] Proposal for a Directive of the European Parliament and of the Council on Corporate Sustainability Due Diligence and amending Directive (EU) 2019/1937, COM(2022) 71 final, EUR-Lex - 52022PC0071 - EN - EUR-Lex (europa.eu).

[85] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions The path to a healthy planet for all EU Action Plan: 'Zero pollution for air, water and soil', 2021, COM(2021) 400 final, EUR-Lex - 52021DC0400 - EN - EUR-Lex (europa.eu).

[86] Chemicals Strategy for Sustainability Towards a Toxic-Free Environment. Chemicals strategy (europa.eu).

concern in products and recycled materials are minimized and that, as a principle, the same limit values for hazardous substances should apply to both virgin and recycled materials, except in exceptional circumstances, subject to case-by-case analysis, where derogation from this principle may be necessary and under the condition that the use of the recycled material is limited to clearly defined applications and there are no negative impacts to human health and the environment. The REACH Regulation is the overarching chemicals legislation in the EU and provides the means to ensure the safe use of chemicals.

- The ecodesign for Sustainable Products Regulation (ESPR)[87] sets a framework to set ecodesign requirements for specific product groups to significantly improve their circularity, energy performance and other environmental sustainability aspects. Ecodesign requirements can be of key importance for waste prevention and high-quality recycling, as they can improve product durability, reparability, recyclability and recycled content. The development of such requirements can also serve as a basis for the setting of harmonized financial contributions to Extended Producer Responsibility Schemes. Ecodesign requirements for textiles are expected to be in place by 2025 or 2026. In addition to the introduction of ecodesign requirements, ESPR introduces measures to counter the destruction of unsold consumer products. Firstly, it introduces a requirement for large enterprises to publicly disclose information on the number and types of unsold consumer products they discard. This measure is intended to function as a reputational dis-incentive for this practice while it is also envisaged to create an improved evidence base on the extent to which the destruction of unsold consumer products takes place. Secondly, ESPR includes an empowerment to adopt delegated acts prohibiting the destruction of specific groups of unsold consumer products, such as textiles, taking into account the information from the general disclosure obligation.
- The recently adopted Proposal for a Directive on empowering consumers for the green transition and annex | European Commission (europa.eu) will be complemented with the upcoming legislative proposal to substantiate Green claims, which sets minimum requirements on substantiation and communication of voluntary green claims on products and organisations. This proposal incentivises the use of Product Environmental Footprint methods (add reference) as the method will be compliant with the rules on minimum criteria for substantiation of claims). This is relevant for textiles, because the industry (supported by the Commission) is finalising PEF category rules for apparel and footwear (planned by end of 2023). These rules will standardise the measurements of impacts of apparel and footwear, allowing for a comparison of products. The rules can feed into other policy developments in the field of textiles. For instance, in the preparation of the Delegated act for the ESPR and in the context of the revision of Regulation (EU) No 1007/2011[88] (Textiles Labelling Regulation). The proposal also indicates that the Commission will monitor the evolution on the substantiation of claims so that following a review it can decide to change/reinforce the use of PEF.
- The Commission is finalising an initiative to reduce the release of microplastics on the environment, including textiles. The preparatory work of the initiative has shown that there is a need to develop a standardised methodology to quantify microplastics releases

[87] See footnote 32

[88] European Commission (2018). Regulation (EU) No 1007/2011 on textile fibre names and related labelling and marking of the fibre composition of textile products *(OJ L 272 18.10.2011, p. 1),* https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02011R1007-20180215

from textiles. This standardised methodology would allow to introduce ecodesign requirements in the context of the upcoming delegated act of the ESPR and could be used to include microplastic releases as part of the modulation of fees in the Extended Producer Responsibility Scheme proposed in this impact assessment.

- The Social Economy Action Plan[89] aims to raise the social economy's visibility and create an environment that enables the social economy to thrive and grow. These organisations create and retain quality jobs and contribute to social and labour market inclusion. They drive sustainable economic development, promote the active participation of citizens, and play an important role in Europe's welfare systems.

As regards implementation of the ESPR framework, Delegated Acts will be developed for product groups and horizontal measures following a dedicated Working Plan. In preparation of such Working Plan, a JRC Report[90] is providing a preliminary proposal of product groups and horizontal measures that should be considered as a priority for the ESPR framework. The product groups and horizontal measures identified in the Report should be considered in addition to the ones already identified in the Ecodesign and Energy Labelling Working Plan 2022-2024.

Textiles have been confirmed as a priority product following the stakeholder consultation[91], and the technical work supporting the Delegated Act on textiles under the ESPR is underway. It is estimated that the Delegated Act would be adopted in 2024/25 which coincides broadly with the possible adoption and entry into force of the Waste Framework Directive rules on Extended Producer Responsibility considered in this assessment. Therefore, full alignment is possible both at the policy development and implementation stage. Full alignment between the two legislations in terms of scope and standards (e.g. on the design factors and measurement tools) is a top priority for the Commission. In practice, it is important to ensure that fee modulation under EPR is fully consistent with the ESPR sustainability criteria and their measurement standards. This will provide the clearest policy signal and prevent unnecessary administrative burdens. This approach is also strongly supported by the textiles industry.

The nature of that ESPR legislation would be determined following an Impact Assessment in line with the Commission's Better Regulation Guidelines, and hence it is too early to specify its nature. However, it would have a clear impact on textiles and would be complementary to the WFD revision. For example, it could:

- Reduce the amount of textiles waste by improving durability and repairability,
- Improve the recyclability of textiles waste and increase recycled content,
- Identify characteristics that could be used for EPR fee modulation.

This would complement the separate collection requirements that come into force in 2025, ensuring that textile waste once collected is easier to reuse and recycle.

The methodology followed in the JRC report selected product groups based on three steps: the products' environmental impacts, market relevance and policy coverage. The identified product groups are then evaluated based on criteria such as environmental impacts,

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[89] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Building an economy that works for people: an action plan for the social economy, 2021, COM(2021) 778 final, EUR-Lex - 52021DC0778 - EN - EUR-Lex (europa.eu).

[90] Product groups documents | Product Bureau (europa.eu)

[91] Have your say, Published initiatives, New product priorities for Ecodesign for Sustainable Products, New product priorities for Ecodesign for Sustainable Products (europa.eu).

improvement potential, policy gaps and proportionality of costs related to the improvement potential identified, to propose a preliminary ranking. A quantification of the potential environmental impacts of the identified product groups is provided based on the improvement scenarios.

From an initial list of 34 product groups referenced in recent policy documents, 20 products (12 end-use and 8 intermediary products) were first shortlisted based on environmental, market and policy considerations. The 20 shortlisted product groups are then assessed in terms of environmental relevance (i.e., impacts and improvement potential) for ten impact categories addressing the main climate, environmental and energy objectives of the EU (see Figure I): water effects; air effects; soil effects; biodiversity effects; waste generation and management; climate change; life-cycle energy consumption; human toxicity; material efficiency; and lifetime extension.

Horizontal measures are proposed on the basis of main product aspects (see Article 5 of ESPR legal proposal) for groupings of products that demonstrate sufficient technical similarity and can be subject to the same set of potential provisions. As a result, five horizontal measures are proposed: “Durability”, “Recyclability”, “Lightweight design”, “Post-consumer recycled content”, and “Sustainable sourcing” (see Table III), each covering a specific set of proposed product groups and each accompanied by an analysis of the proposed provisions. The provisions proposed are intended at this stage to be applicable to a set of proposed product groups, albeit with proportional adjustment in the level of ambition per product group. Many of the horizontal measures could be applied to textiles, although this would depend on whether the considered aspects are already addressed in a delegated act specifically for textiles rather than a horizontal measure.

Several potential horizontal provisions relating to the “durability” measure include textiles in their potential product coverage. Provisions could for instance relate resistance to stresses or ageing mechanisms, the minimum durability of function, the introduction of a reparability scoring index/label, the availability of repair (+ upgrade) information and maintenance instructions to independent operators and/or end-users, spare part availability and delivery time, disassembly generally or related to Tools, Fasteners, Working Environment and Skill Level, number of materials and components used and modularity, transformability, detachable elements, adjustable sizing. The potential horizontal provision relating to the “Recyclability” measure that could be applied to textiles is the ability to easily separate the product into different materials. Last, the potential horizontal provision relating to the “post-consumer recycled content” measure that could be applied to textiles is the provisions on minimum content of post-consumer recycled material expressed either as a fraction of the total material input (in %) or in absolute numbers.

Article 16(1) of the ESPR proposal lists the criteria that should be taken into account by the Commission when prioritising the products to be covered by ecodesign requirements. These include the products’ potential contribution to achieving the European Union’s climate, environmental and energy efficiency objectives, the potential for improving products’ circularity and environmental impacts, the absence or insufficiency of EU law, and the volume of sales and trade.

A public consultation and targeted thematic consultations are held to involve relevant stakeholders at European and international level. The objective of the ongoing consultations is to gather further information on the environmental and circularity characteristics of the proposed priorities, as well as to improve the understanding of how their value chains work and what the potential for improvements is. Based on the feedback received from stakeholders,

and building on further work and analyses, the Commission aims to adopt the first ESPR Working Plan after the final adoption of the ESPR by legislators.

The top scoring product group according to the assessment methodology used by the JRC [92] for scoring was, by far, Textiles and footwear, which obtained a total environmental score of 43 points, 13 points higher than the second highest -scoring product group. Textiles obtained the highest score in water effects, waste generation, climate change, energy consumption, material efficiency and lifetime extension, due to the large impacts caused by sourcing, producing, using and discarding materials, but also due to the large improvement potential in all these aspects, especially in terms of circularity, which is still largely untapped. Indeed, reuse and recycling of used textiles could bring significant savings in terms of water use and pollution, biodiversity, climate change and energy use, in addition to reducing waste generation of course. This represents a significant improvement potential since textiles' current value chain include little or no reuse and recycling[93]. Solutions towards increased recycling include reducing the complexity of materials used to produce textiles and textile products, adopting product passports and materials labelling at the design stage (Ellen MacArthur Foundation, 2017), and harmonised collection systems across the EU (EC, 2020; Palm et al., 2014). Also, measures that ensure and increase the durability of the items and the resistance to shrinkage/weather could double the average product life, which was estimated to save 44% of GHG emissions (Ellen MacArthur Foundation, 2017). Finally, large improvement potential could also be identified in substituting polluting compounds with biodegradable and less toxic alternatives, sustainable sourcing of primary materials (especially cotton), and energy efficiency measures.

While it can be expected that an ESPR Delegated Acts cannot address, for example, all textiles, and while the impacts and improvement potential of a cotton t-shirt are different to those of a wool sweater, the scoring results can still be considered representative of the whole product group. Further work on prioritised products will establish the adequate granularity for each prioritised product group. The regulated aspects of textiles are emissions during production, fibre names and labelling, separate collection of textiles waste, EU Ecolabel criteria (voluntary) and GPP criteria (voluntary), while some improvement potential aspects not currently regulated in the EU are improved reuse, recyclability and recycled content, on demand production, lending, renting, repair, use of alternative materials, energy efficiency measures, less frequent and low temperature washing and drying, durability measures, substituting toxic compounds with biodegradable and less toxic alternatives, sustainable sourcing of materials, water conservation programs during production and switching to renewable energy.

The production of textiles, clothing, and footwear has one of the most complex global value chains, with most products on the internal EU market manufactured outside the EU, often in countries with lower labour and environmental standards[94]. In the EU, the level of emissions from the textile industry is regulated via the Industrial Emission Directive (IED), which is however only addressing EU installations. Non-EU production, which is expected to cover most textile products, is not covered by the IED. The EU also lays down European standards relating to textiles and clothing, relating to performance for certain types of textile products and to self-declared environmental claims [95]. Currently, there are no recycling targets for textile

[92] JRC, Individual product group assessment for textiles, preliminary.
[93] European Environment Agency, *Textiles in Europe's circular economy,* 2019, Textiles in Europe's circular economy — European Environment Agency.
[94] European Parliamentary Research Service, 2019.
[95] CEN/TS 16822:2015

waste. The EU has also a voluntary EU ecolabel for textiles, establishing criteria such as limited use of substances harmful to health and environment, reduction in water and air pollution, extension of the lifetime of clothes (e.g., resistance to shrinking during washing and drying and colour resistance to perspiration, washing, wet and dry rubbing and light exposure)[96]. Finally, the EU GPP criteria for textiles facilitate the inclusion of green requirements in public tender documents that MS and public authorities can implement to the extent to which they themselves wish[97].

Water conservation and reuse programs can have large benefits through decreased costs of purchased water and reduced costs for treatment of wastewaters, leading to short pay-back periods[98]. Measures to reduce the usage of water and chemicals during dyeing have been found to have a pay-back period of about 2-3.5 years[99] and estimated cost savings of nearly 500 000 USD[100]. A case study on 33 factories found that with an up-front investment of 17.3 million USD, resulted on average in 9% of water saved and 6% of energy saved, with a payback time for the whole program of only 14 months[101]. On the other hand, certification and monitoring of organic crop cultivation is a costly procedure, which may ultimately offset the economic benefits due to less use of chemicals and higher returns from organic crop sales[102]. Estimations identified that a circular economy for fashion can address the 500 000 million USD of value lost annually due to clothing underutilisation and the lack of recycling, while supporting the creation of safe, healthy conditions for textile workers and users[103]. Finally, textile-to-textile recycling can be worth more than 100 000 million USD[104].

Both the Council [105,106] and European Parliament [107,108] called for and welcomed the Commission's comprehensive approach to improve the sustainability and the circularity of the textiles sector, in particular, expressing their expectations in relation to a strong sustainable product policy, prioritising waste prevention, introduction of EPR, stimulating recycling and high-quality recycling technologies and capacities in the EU and demand for recycled textiles, adopting EU end-of-waste criteria for textiles and increasing the resilience and socially just value chain, including calling on the Commission to consider sector-specific legislation. The

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[96] EU Ecolabel, online page, https://environment.ec.europa.eu/topics/circular-economy/eu-ecolabel-home/product-groups-and-criteria/clothing-and-textiles_en, (accessed 26.09.2022).
[97] European Commission, *EU green public procurement criteria for textiles products and services*, SWD(2017) 231 final, 2017.
[98] Shaikh, M.A., *Water conservation in textile industry*, College of Textile Engineering SFDAC, 2009, https://sswm.info/sites/default/files/reference_attachments/SHAKIH%202009%20Water%20conservation%20in%20the%20textile%20industry.pdf.
[99] Beton, A., Perwueltz, A., Desaxce, M., et al., edited by: Cordella M., Kougoulis J., Wolf O., Dodd N., Joint Research Centre, Institute for Prospective Technological Studies, 2014.
[100] NRDC, *Encourage Textile Manufacturers to Reduce Pollution*, 2022.
[101] Greer, L., Keane, S., Lin, C., Zhou, A., Yiliqi Tong, T., *The Textile Industry Leaps Forward with Clean by Design: less environmental impact with bigger profits,* Natural Resources Defense Council, 2015.
[102] See footnote 87
[103] Ellen MacArthur Foundation, and Boston Consulting Group, *Circular business models – Redefining growth for a thriving fashion industry,* 2021.
[104] Ellen MacArthur Foundation, 2021.
[105] Council of the European Union, *More circularity - Transition to a sustainable society - Council conclusions,* 2019, https://www.consilium.europa.eu/media/40928/st12791-en19.pdf.
[106] Council of the European Union, *Draft Council conclusions on Making the Recovery Circular and Green - Approval,* 2020, https://data.consilium.europa.eu/doc/document/ST-13852-2020-INIT/en/pdf.
[107] European Parliament resolution of 27 April 2017 on the EU flagship initiative on the garment sector, https://www.europarl.europa.eu/doceo/document/TA-8-2017-0196_EN.html?redirect.
[108] European Parliament resolution of 10 February 2021 on the New Circular Economy Action Plan, https://www.europarl.europa.eu/doceo/document/TA-9-2021-0040_EN.html.

European Parliament is preparing an own initiative report on EU Strategy for Sustainable and Circular Textiles due in Spring 2023 (May). The Report endorses the vision of the Textiles Strategy for the sector and calls for swift implementation of its actions, among those the possibility of setting harmonised EPR schemes for textiles.

2- Food Waste

Political context

Before 2015, food waste was not a dedicated subject of EU legislation but was addressed as a part of biodegradable municipal waste or, since 2008, as a part of bio-waste.

In 2011 in the Communication on Roadmap to a Resource Efficient Europe (COM(2011) 571 final) the Commission proposed several actions to reduce environmental impacts of food production and consumption as well as of treatment of food waste. The Communication included a milestone that, by 2020, disposal of edible food waste should have been halved in the EU. Further assessment on how best to limit waste throughout the food supply chain and consider ways to lower the environmental impact of food production and consumption patterns was to be done in a Communication on sustainable food foreseen in 2013. The Communication was cancelled and, instead, a voluntary target on prevention of food waste was proposed, in 2014, as part of a proposal to revise the Waste Framework Directive (COM/2014/0397 final).

The 2014 proposal aimed to establish the framework for Member States to collect and report levels of food waste across all sectors in a comparable way, and request developing national food waste prevention plans aimed at meeting an aspirational objective of reducing food waste by 30 % by 2025.

The 2014 proposal has been further withdrawn in March 2015 as part of a package of 73 proposals. The Commission declared that it will continue work to prepare more a ambitious proposal concerning the Waste Package, by the end of 2015, to promote Circular Economy. The proposal was published, together with the Circular Economy Action Plan (CEAP), in December 2015, and was adopted in May 2018.

The Commission's approach was reinforced by global efforts. In September 2015, as part of the 2030 Sustainable Development Goals, the United Nations General Assembly adopted a target of halving per capita food waste at the retail and consumer level and reducing food losses along production and supply chains (SDG Target 12.3). The EU and its Member States have committed to meeting this target.

Food waste prevention measures in CEAP 2015

The CEAP named food waste as one of four priority areas for action and, in parallel to development of the WFD, envisaged series of non-legislative actions at EU level aimed at supporting the achievement of SDG Target 12.3 on food waste and to maximise the contribution of actors in the food supply chain. The actions were as follows:

- Establishment of the EU Platform on Food Losses and Food Waste, involving Member States and stakeholders in order to support the achievement of the SDG Target 12.3 through the sharing of best practice and the evaluation of progress made over time. The

Platform has a status of informal Commission's expert group[109]. The first meeting of the Platform took place in November 2016 and, in 2021, its mandate has been extended until end 2026;

- Adoption of a guidance document clarifying how relevant provisions in EU legislation (e.g., food hygiene, food information to consumers) apply to food donation – EU guidelines on food donation (2017/C 361/01);
- Adoption of a guidance document on the use of former foodstuffs to feed animals – EU guidelines on the feed use of food no longer intended for human consumption (2018/C 133/02);
- Examination of ways of improving the use of date marking by actors in the food chain and its understanding by consumers, in particular the "best before" label. The Commission is currently considering the most efficient ways to facilitate the understanding and use of date marking (i.e., 'best before' and 'use by' dates) aiming to prevent food waste without jeopardising food safety;
- An indicator on the amount of food waste generated has been included in the Circular Economy Monitoring Framework.

Food waste in the WFD

The WFD includes the following regulatory measures:

- Definition (Art 4)
  'food waste' means all food as defined in Article 2 of Regulation (EC) No 178/2002 of the European Parliament and of the Council (3) that has become waste;
- general provisions on prevention including the food use hierarchy (Art 9)
  Member States shall take measures to prevent waste generation. Those measures shall, at least
  (g) reduce the generation of food waste in primary production, in processing and manufacturing, in retail and other distribution of food, in restaurants and food services as well as in households as a contribution to the United Nations Sustainable Development Goal to reduce by 50 % the per capita global food waste at the retail and consumer levels and to reduce food losses along production and supply chains by 2030;
  (h) encourage food donation and other redistribution for human consumption, prioritising human use over animal feed and the reprocessing into non-food products;
- planning (Art 29)
  2a. Member States shall adopt specific food waste prevention programmes within their waste prevention programmes.
- setting up monitoring framework (art 9)
  Member States shall monitor and assess the implementation of their food waste prevention measures by measuring the levels of food waste on the basis of the methodology established by the delegated act (…).
  The data are to be reported every year. The detailed provisions are included in the related secondary legislation:

[109] https://ec.europa.eu/transparency/expert-groups-register/screen/expert-groups/consult?lang=en&do=groupDetail.groupDetail&groupID=3189

- The Delegated Decision establishing a common EU methodology to measure food waste – EU(2019)1957
- Implementing Decision laying down a format and quality check report for reporting the data on the levels of food waste generated in Member States – EU(2019)2000.

Downstream management of food waste

The collection and treatment of food waste is already well regulated on EU level.

If food waste cannot be prevented, treatment of food waste should be subject to further steps in the waste hierarchy: recycling (e.g. composting, anaerobic digestion with use of digestate) and, to a less extent, energy recovery and disposal (landfilling).

The landfilling of food waste (as part of biodegradable municipal waste) is discouraged since 1999 by virtue of the Landfill Directive. Due to high water content, food waste is not a particularly efficient source of energy during incineration with energy recovery, hence it is only treated this way as part of mixed waste.

Biological treatment is the most effective way of dealing with food waste, allowing the return organic matter and nutrients back to soil. Food waste can be composted directly but can also be subject to anaerobic digestion in order to produce biogas and still use digestate for fertilizing purposes.

In order not to contaminate soil, efforts are made to ensure that recycled food waste is free from contaminants both hazardous (e.g. heavy metals) and non-hazardous (e.g. pieces of plastics or glass). To this end, the WFD introduced the obligation for Member States to introduce separate collection of bio-waste from 31 December 2023 (see Art 22). The compost/digestate which meet quality requirements (so called *end-of-waste criteria*) are regarded as new products and can be freely traded.

The technical criteria of food waste treatment operations are set in the Industrial Emissions Directive (2010/75/EU, to be modified by COM/2022/156 final/3). This Directive also includes best available techniques references documents (BREFs) which set up the conditions for operating of industrial plants, including methods to reduce arising waste. The latest Best Available Techniques (BAT) Reference Document for the Food, Drink and Milk Industries was published in 2019. [110]

The European Parliament has called for the reduction of food waste and advocated setting specific food waste prevention targets: at least 30 % and 50% reductions by 2025 and 2030 respectively. [111, 112, 113, 114] In 2016[115], the Council called on Member States to confirm their

[110] European Commission, European IPPC Bureau, Food, Drink and Milk Industries, https://eippcb.jrc.ec.europa.eu/reference/food-drink-and-milk-industries.
[111] European Parliament resolution of 19 January 2012 on how to avoid food wastage: strategies for a more efficient food chain in the EU, https://www.europarl.europa.eu/doceo/document/TA-7-2012-0014_EN.html?redirect.
[112] European Parliament resolution of 9 July 2015 on resource efficiency: moving towards a circular economy, https://www.europarl.europa.eu/doceo/document/TA-8-2015-0266_EN.html?redirect.
[113] European Parliament resolution of 15 January 2020 on the European Green Deal, https://www.europarl.europa.eu/doceo/document/TA-9-2020-0005_EN.pdf.
[114] European Parliament resolution of 16 May 2017 on initiative on resource efficiency: reducing food waste, improving food safety, https://www.europarl.europa.eu/doceo/document/TA-8-2017-0207_EN.html?redirect.
[115] Council conclusions on Food losses and food waste, adopted on 28 June 2016 (10730/16).

commitment to the achievement of SDG 12.3 through a range of initiatives, supported by the European Commission in key areas such as food waste monitoring. Subsequent updates on progress made in Member States were adopted through Council Conclusions in 2018 and 2020[116].

[116] European Council, *Timeline - Food loss and food waste*, https://www.consilium.europa.eu/en/policies/food-losses-waste/timeline-food-loss-and-food-waste/.

ANNEX 6: FACTS AND FIGURES

1- Textiles

Terminology

As per the Textiles Labelling Regulation, 'textile product' means any raw, semi-worked, worked, semi-manufactured, manufactured, semi-made-up or made-up product which is composed at for least 80% of textile fibres, regardless of the mixing or assembly process employed. Three main categories of textile applications can be discerned:

- Clothing and footwear (trousers, t-shirts, sweaters, coats, footwear, dresses, apparel accessories such as scarves, handkerchiefs, etc.).
- Household textiles (other textiles used in households, curtains, bed linen, carpets, etc.).
- Technical textiles, any textile product manufactured for non-aesthetic purpose, where function is the primary design criterion for industrial applications (automotive applications, medical textiles, agricultural textiles, protective equipment, etc.).

Some textiles are used for household, commercial and industrial applications (e.g., cleaning articles), and available data often does not enable to clearly differentiate between final consumers.

Waste is generated at different stages in the life cycle of textiles, and is defined as:

- Post-industrial waste: Waste generated during the manufacturing of textile products and their precursors.
- Pre-consumer waste: Waste generated at retail stages (e.g., unsold textiles).
- Post-consumer waste: Textiles that have been disposed of after consumption and use by the citizen or end-users of commercial and industrial activities (hotel, hospitals, schools, etc.), commonly referred to household and commercial post-consumer textile waste.

Post-industrial, pre-consumer, and post-consumer (household and commercial) waste, representing an estimated 11%, 3% and 87% respectively[117].

The textile market

The textile market is highly globalised and involves millions of producers and billions of consumers across the world. The global textile market is worth USD 3 trillion, accounts for about 2 % of the world's GDP and employs more than 75 million people, primarily in developing nations[118] [119]. It relies on agriculture for raw materials. The global production of

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[117] European Commission, Joint Research Centre. *Techno-scientific assessment of the management options for used and waste textiles*. 2023 (under development)

[118] Migiro, G., *Top 10 Textile Importing Countries In The World*, WorldAtlas, in Economics, 2020, "https://www.worldatlas.com/articles/top-10-textile-importing-countries-in-the-world.html."https://www.worldatlas.com/articles/top-10-textile-importing-countries-in-the-world.html.

[119] OECD, *Germany supports sustainable textile production,* Development co-operation tips tools insights practices in practice, 20222, HYPERLINK "https://www.oecd.org/development-cooperation-learning/practices/dynamic/dcd-best-practices/89276a44/pdf/germany-supports-sustainable-textile-production.pdf"Germany supports sustainable textile production - OECD.

textile fibres (mostly virgin and synthetic[120]) has almost tripled since 1975[121] and doubled from 2000 to 2015. The market contracted during the COVID-19 crisis with the shutdown of retail outlets and disruptions in the logistics sector. However, it made a fundamental contribution to its management by supplying protective and medical equipment (face masks, gowns and nonwoven raw materials for medical use). [122]

The largest producer by value of textiles and clothing exports is China, followed by the European Union. In 2020, manufacturers in Asia-Pacific accounted for almost 50% of the global textile and apparel exports value. The value of Chinese textile exports increased drastically through the COVID-19 pandemic as medical masks and other medical textile products were in high demand worldwide. [123] The labour-intensive clothing and textile industry is highly dependent on the wide availability of cheap labour as the market is highly competitive[124].

The EU textiles, wearing apparel and leather manufacturing market consists of around 226 600 companies in 2021, over 99% of which are SMEs[125], and employed around 1.7 million people[126]. In 2021, the EU textile and clothing sector had a turnover of 191 billion EUR[127].While the industry is an essential part of EU manufacturing, its share of value (in USD) of the global market has been decreasing with the EU exports' share going from 33% in 2000 to 18% in 2020[128]. These are primarily comprised of intermediate textile products, such as technical fibres and high-quality fabrics. This decrease is mainly driven by increasing demand in emerging economies that due to the cost advantages of production is mainly satisfied regionally[129]. The imports into the EU have also decreased in terms of their share of global value (in USD) from 30% in 2000 to 24% in 2020[130].

The European textile sector has undergone a profound transformation over the past two decades. Since 2004, the EU textile sector has increased its productivity by 36%. Mass low value-added production, standard fibres, textiles, and clothing are no longer being produced in Europe, which has resulted in a reduction in total turnover and employment on the one hand and an improvement in the competitiveness of the industry on the other[131].

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[120] Ellen MacArthur Foundation (EMF), A New Textiles Economy: Redesigning fashion's future, 2017.
[121] Atkar, A., Pabba, M., Sekhar, S.C., Sridhar S., *Current limitations and challenges in the global textile sector,* Fundam Nat Fibres Text, pp. 741-764, 2021.
[122] European Commission, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, Data on the EU textile ecosystem and its competitiveness : final report, Publications Office of the European Union, 2021, https://data.europa.eu/doi/10.2873/23948
[123] Statistics on extra-EU trade are calculated as the sum of trade of each of the 27 EU Member States with countries outside the EU.
[124] Scheffer, M.R., 'Shishoo, R. (ed.). The global textile and clothing industry Technological advances and future challenges', *Trends in textile markets and their implications for textile products and processes,* Cambridge: Woodhead Publishing Ltd, 2012, pp. 8– 28.
[125] The European Commission defines SMEs as having less than 250 persons employed. They should also have an annual turnover of up to EUR 50 million, or a balance sheet total of no more than EUR 43 million (Commission Recommendation of 6 May 2003).
[126] Eurostat data set 'Enterprise statistics by size class and NACE Rev.2 activity' (SBS_SC_OVW), combing NACE codes C13, C14 and C15.
[127] Ibidem.
[128] World Trade Statistical Review 2021. Calculations by the Commission services.
[129] World Trade Statistical Review, 2021.
[130] World Trade Statistical Review 2021. Calculations by the Commission services.
[131] ETP, *Towards a 4th Industrial Revolution of Textiles and Clothing,* Brussels, 2016, 6.

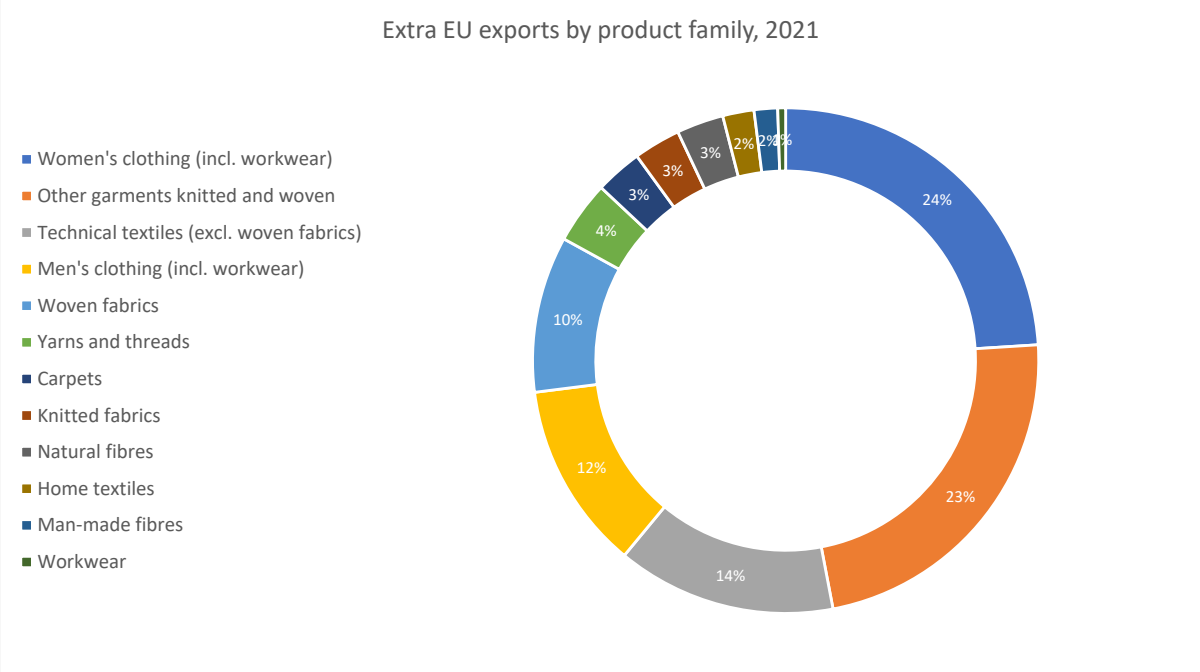
The EU textile ecosystem has seen a recovery during the second quarter of 2021, with a rebound in exports, turnover and retail sales. The textiles turnover increased by 3.3% in Q2 2021. Similarly, the business activity in the clothing sector expanded by 7%. Compared to the pre-pandemic levels, EU turnover is up 3.6% in textiles, whilst it is down 11.5% in clothing[132].

Most production of the textiles consumed in the EU-27 takes place in third countries, mainly in Asia[133]. Consequently, most of the environmental pressures of the European consumption of textiles occur in third countries (see Annex 7. ***Error! Reference source not found.***).

Textiles are highly globalised, with Europe being a significant importer and exporter.

It has been estimated that in 2019 EU imported 13.5 Mt of fibres, yarns, fabrics and particularly finished products from third countries[134].

According to Euratex, women's clothing and other knitted and woven garments are the main exported textile products from the EU to third countries, accounting for 24% and 23% of total exports from the EU in 2021[135]. The values for all exports by product family presented by Euratex are shown below.



Source: Euratex, 2022

Euratex considers that European clothing (i.e. trousers, overcoats, pullovers, skirts and dresses) is the most attractive product category for customers worldwide. Switzerland, the UK, USA and to a lesser extent China are the main destinations of EU textile exports accounting for 46% of total EU textile exports. This is an important consideration in relation to the impacts of

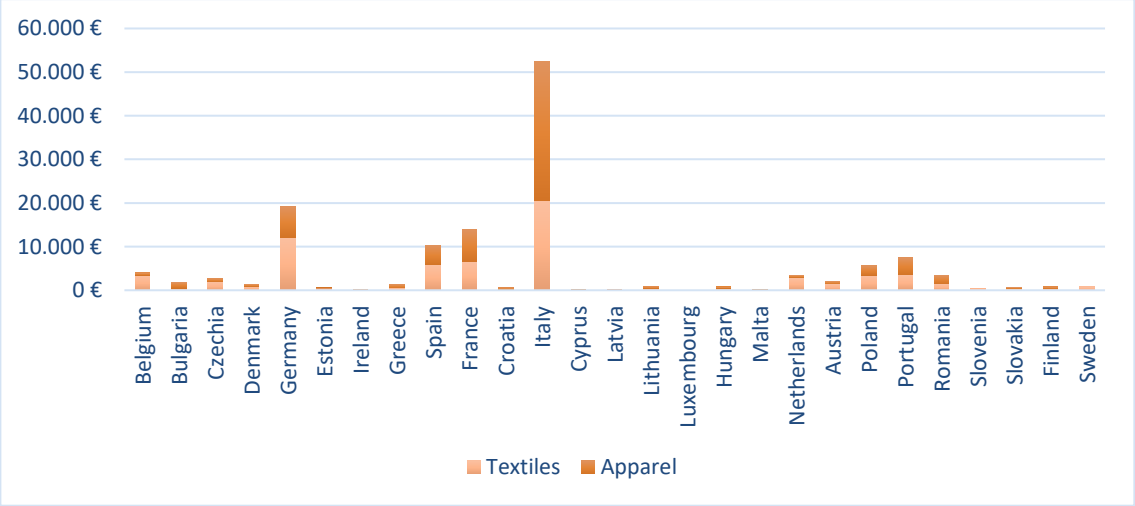
[132] Euratex Economic Update 2Q2021.
[133] Textiles and the environment: the role of design in Europe's circular economy. Available at: https://www.eea.europa.eu/publications/textiles-and-the-environment-the.
[134] European Commission, Joint Research Centre. *Techno-scientific assessment of the management options for used and waste textiles*. 2023 (under development)
[135] Euratex, 2022/ Facts & Figures 2022

possible measures on the costs of EU textile products with the destination markets unlikely to be affected by small increases in product costs due to the high quality products, especially in high-end fashion and technical textiles, that are key facets of the EU textile sector[136] for which consumers in third countries are willing to pay higher prices.

Manufacturing Hubs

The highly competitive and cost-oriented market structure of the EU textiles market plays an essential part in the creation of local jobs and business opportunities with Italy, Germany, France, Spain, Portugal, Poland, Romania, Netherlands, Austria and Belgium representing the most important Member States in terms of textile and apparel production in the EU. Further, textile production is frequently clustered in manufacturing hubs that are concentrated in Italy, Poland, France, Germany, Romania, Sweden and Spain. The industries that compose this ecosystem have a strong territorial component, being organised around clusters and industrial districts and contributing to regional development. The clusters are found in Milano, Biella and Prato (IT), Terrassa, Arnedo and Ontinyent (ES), Zileonki/Krakow (PL), Chemnitz and Frankfurt am Main (DE), Boras (SE), Savinesti (RO), Ecully and Aix-en-Provence (FR)[137]. Southern European States tend to focus on clothing, and technological intensive textile industries are mainly located in Germany, Italy and Austria. The turnover is concentrated in Italy and Germany as their manufacturers are focused on high-end and luxury goods. Italy is specialised on the production of luxury textiles and clothing sold with price premiums resulting in high production values (Figure 9).

Figure 10 – Production value of textile and apparel, 2019 in EUR million



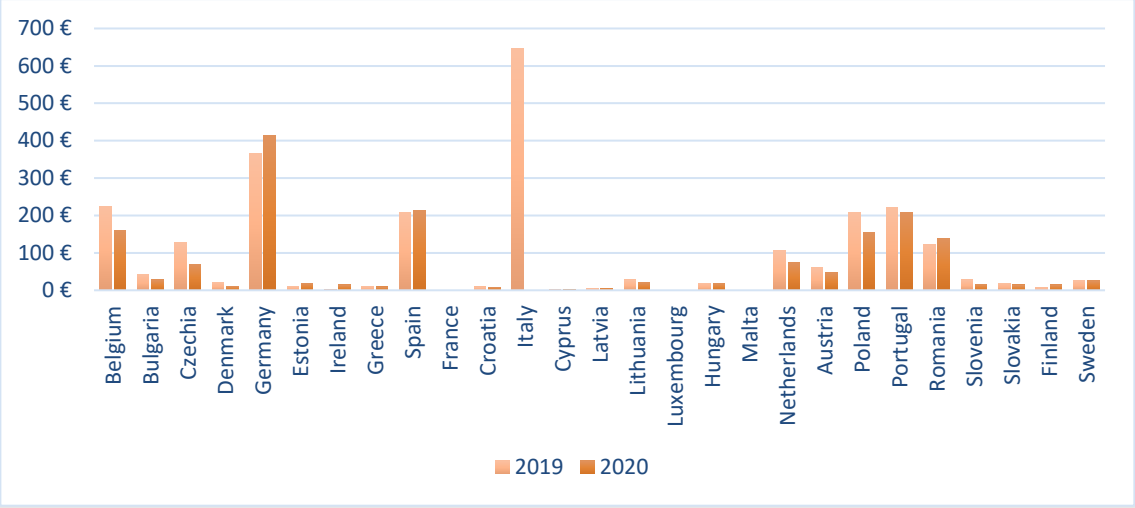
Source: Eurostat. Calculations by the author.

The high income stemming from the value of the produced goods also correlates with the gross investments in the textile sector, which is again focused on Germany and Italy (10). As both countries are specialised on producing high-tech fibres and materials high investments are necessary to ensure competitiveness.

Figure 11 – Gross investment of textile manufacturers, 2019 in EUR million

136 https://single-market-economy.ec.europa.eu/sectors/fashion/textiles-and-clothing-industries/textiles-and-clothing-eu_en

137 ECCP Visual Reporting Site (clustercollaboration.eu)



Source: Eurostat. Calculations by the author.

The textiles manufacturing employees are concentrated in Italy, Poland, Romania, Portugal and Germany. Italy employs the largest absolute workforce (320 000 FTEs) while the percentage working in textiles compared to overall FTEs is especially high in Bulgaria (3%), Portugal (2.9%), Lithuania (2%), and Romania (1.9%), predominantly because of cheaper labour and production costs.

The Role of SMEs

SMEs are at the core of the EU industry, representing 99.7% of the 226 600 enterprises as shown in Table 24[138]. The large number of SMEs in the sector has benefits and disadvantages. On one hand, high numbers of enterprises ensure a competitive market, create jobs, especially for women and are essential for local economies. On the other hand, SMEs often lack the necessary investment capacity to ensure competitiveness and have low bargaining power regarding materials. EURATEX representing the European apparel and textile industry, has confirmed that their members' composition is similar to the market's with over 98% SMEs.

Table 24 – Company sizes in the EU textile sector, 2021

Size of Companies (number of employees)	Share (%)
Small and Medium sized Enterprises [0 – 249]	99.7%
Large > 250	0.3%

Source: Eurostat. Calculations by the Commission services.

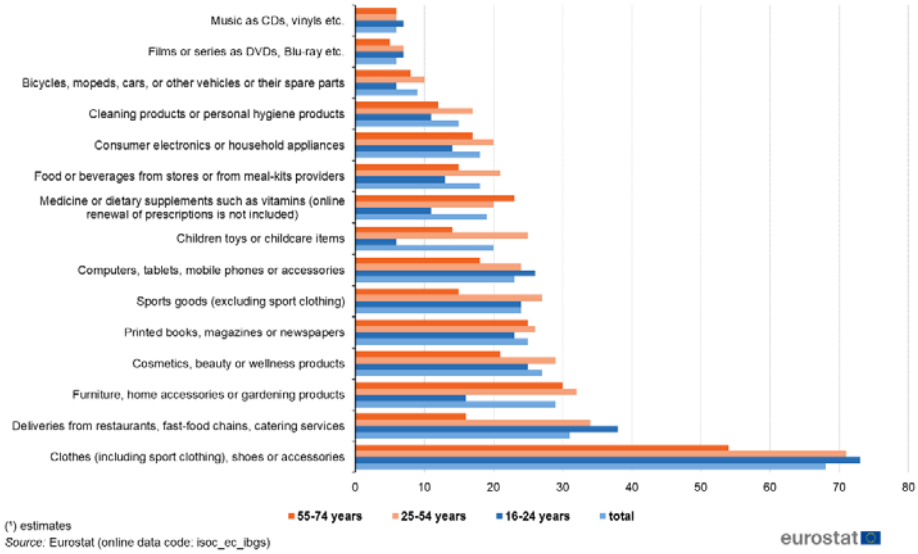
E-commerce

Given the shift in consumer behaviour towards increased digital shopping, the effects of e-commerce on the textiles sector have become increasingly important. Turnover generated by e-sales has more than doubled since 2009 driven mainly by apparel and clothing. Over 70% of

[138] Eurostat data set 'Enterprise statistics by size class and NACE Rev.2 activity' (SBS_SC_OVW), combing NACE codes C13, C14 and C15.

young e-buyers bought clothes online, making it the most popular purchase of online goods in the EU in 2021 (Figure 12).

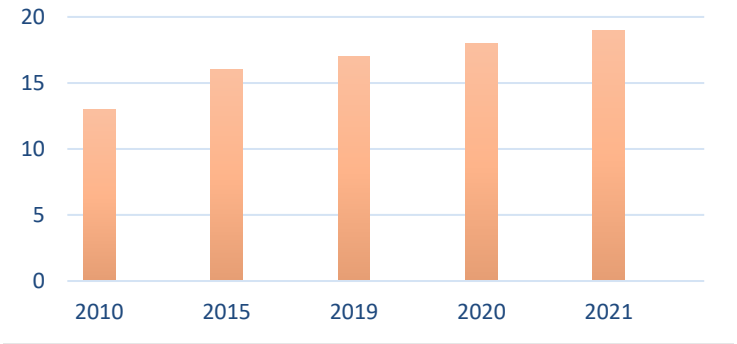
Figure 12 – *Online purchases of goods in the EU, 2021*
(% of individuals who bought or ordered goods or services for private use in the previous 3 months)



Source: Eurostat. URL: E-commerce statistics for individuals (europa.eu)[139].

This is also reflected in the increase of e-commerce sales in the EU, as shown in Figure 12. This increased demand is primarily driven by young internet users and consumer groups and in parts of the COVID-19 pandemic and the restrictions of in-person shopping[140]. The additional rise of pay-per-use or subscription models will accelerate the shift of the T&A sector to new digital business and consumption models that brings both challenges and opportunities for the industry and policymakers.

Figure 13 – *Enterprises in the EU with e-commerce sales in percentage*



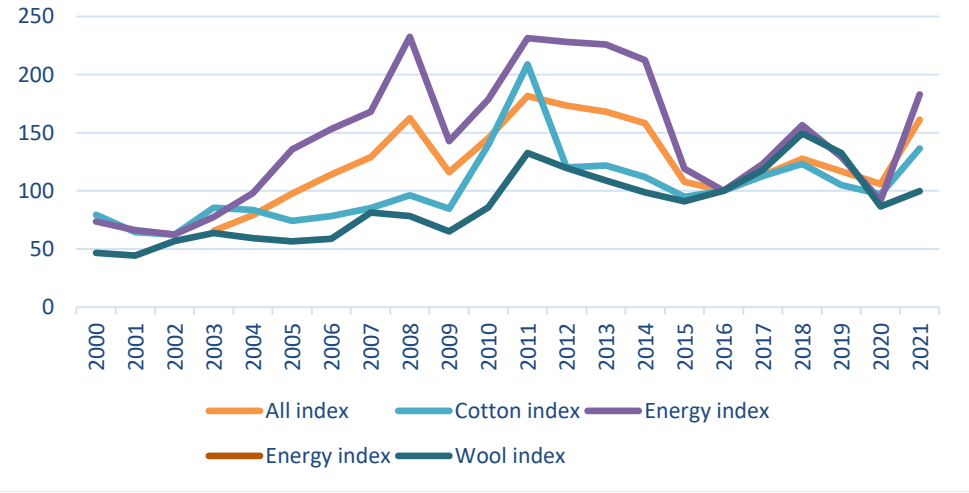
Source: Eurostat. Calculations by the Commission services.

Dependency on raw materials

[139] EUROSTAT, E-commerce statistics for individuals, 2022, E-commerce statistics for individuals - Statistics Explained (europa.eu).
[140] EURATEX, 2022, EURATEX Facts & Key Figures of the European Textile and Clothing Industry 2022.

Raw materials are the major cost component in manufacturing process and make manufacturers dependent on imports of cotton, wool, raw silk and energy. [141] As Figure 14 shows, the overall commodity prices are fluctuating, but overall – especially energy prices and prices of certain raw materials like wool, have seen price spikes.

Figure 14 – *Primary commodity prices (2016 = 100)* [142]



Source: IMF. URL: Source: Primary Commodity Price System – IMF Data.

According to the EEA, most of the pressures and impacts related to the consumption of clothing, footwear and household textiles in Europe occur in other regions of the world.

This is the case for 80% of the primary raw materials use, 88% of the water use, 92 % of the land use and 73 % of the greenhouse gas emissions in the production of the textiles and footwear consumed in EU-27 in 2020[143]. This highlights the importance of recycling and implementing circular business models that will reduce import dependencies and lower the use of new materials with its negative environmental consequences.

Textile reporting

There are a number of reporting obligations for Member States in relation to waste (or textile waste) as listed below.

- Regulation (EC) No 2150/2002[144] on waste statistics that addresses the gathering of regular and comparable data on waste statistics that are transmitted to Eurostat reporting on waste generation as well as recovery and disposal by waste category, economic activity and waste management operation (Waste Statistics Regulation).
- The WFD requires reporting by Member States on prevention of waste by monitoring reuse (Article 9 (4)), and on the attainment of targets of preparation for reuse and recycling for municipal wastes (Articles 11 (2) (a), (c), (d) and (e), and Article 11 (3)),

[141] See footnote 109, p. 78.
[142] Benchmark prices are representative of the global market and determined by the largest import markets of a given commodity.
[143] Textiles and the environment: the role of design in Europe's circular economy. Available at: https://www.eea.europa.eu/publications/textiles-and-the-environment-the.
[144] Regulation (EC) No 2150/2002 on waste statistics *(OJ L 332, 9.12.2002, p. 1–36)*, EUR-Lex - 32002R2150 - EN - EUR-Lex (europa.eu).

as specified under Article 37. The WFD has been supplemented by the following Commission Implementing Decisions:

- Commission Implementing Decision 2019/1004 that specifies how to calculate municipal waste prepared for reuse, recycled municipal waste, recycled municipal bio-waste and recycled metals separated after incineration of municipal waste.
- Commission Implementing Decision 2019/1885 that specifies how to calculate municipal waste reported as landfilled.
- Commission Implementing Decision 2021/19[145] laying down a common methodology and a format for reporting on reuse.
- Commission Implementing Decision 2011/753/EU (until 2025) that specifies how to calculate municipal waste and construction and demolition waste.

Two problems arise with these reporting data: (i) there is no consistent and generally applicable definition of "textile waste" laid down in EU legislation, and (ii) Member States are free to decide on the data collection methods (e.g., surveys, administrative sources, statistical estimations or some combination of methods). This leads to inconsistencies and incomplete datasets on textile waste. This is explained in more detail in Annex 7.

Consumption trends

All the evidence shows that volumes of textile consumption and waste generation are increasing. Global textiles production almost doubled between 2000 and 2015, and the consumption of clothing and footwear is expected to increase by 63% by 2030 compared to 2019, from 62 million tonnes now to 102 million tonnes in 2030.

'Fast fashion' is characterised by increased number of collections per year and often replicates new higher end fashion trends. Where brands once had two fashion seasons a year, many now produce 52 micro-seasons, flooding the market with new styles[146]. This **leads to making textiles and accessories with low labour costs to achieve low prices for new products**. These low prices do not consider the environmental externalities of the textile ecosystem[147]. The low prices are an incentive for customers to replace or increase the clothes they purchase[148]. Consumers replace goods much more rapidly than in the past, not only for functional reasons but also for fashion and novelty. This results in more intensive disposal of textile products as their reuse and recycling potential reduces due to their lower quality[149].

Practices by industry and retailers like instore collection with discount coupon in exchange of take-back, green/sustainable or recycled collections (ex. Use of recycling fibre from pet bottles instead of recycled textiles) lead to even more consumption[150]. The Covid-19 pandemic has led to a decrease in the consumed textile goods, negatively affecting the sector. Statista data on

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[145] Commission Implementing Decision (EU) 2021/19 of 18 December 2020 laying down a common methodology and a format for reporting on reuse in accordance with Directive 2008/98/EC of the European Parliament and of the Council (notified under document C(2020) 8976) *(OJ C(2020) 8976)*, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021D0019.

[146] Lai, O., *What is fast fashion,* Earth.org, 2021, https://earth.org/what-is-fast-fashion.

[147] Stakeholder workshop.

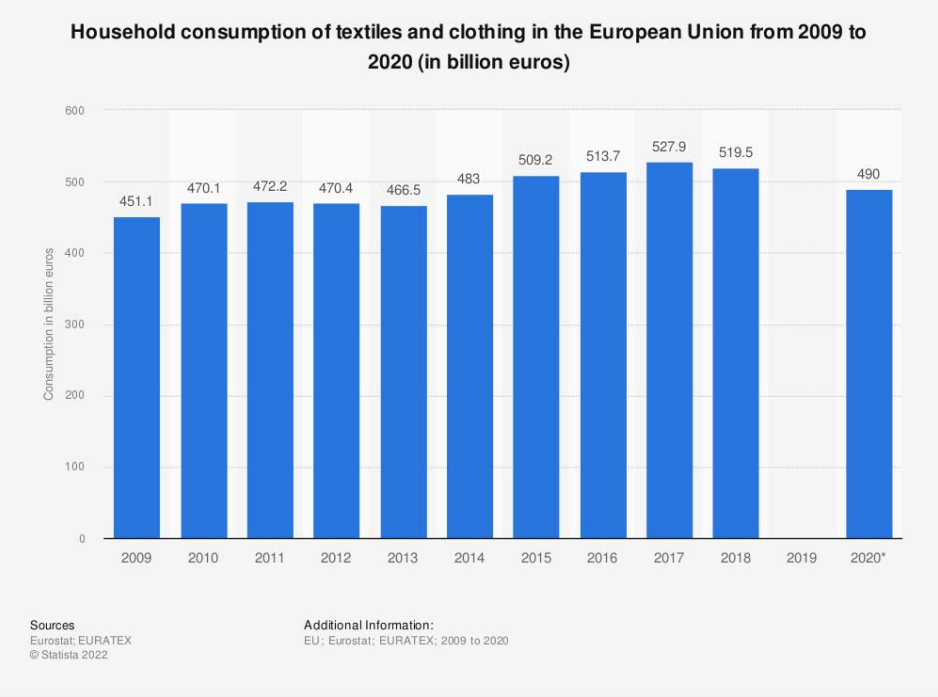
[148] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144

[149] ABC News, 2021, Dead white man's clothes: How fast fashion is turning parts of Ghana into toxic landfill - ABC News

[150] Stakeholder workshop

consumption of textiles and clothing in euro in Figure 14 below shows that spending increased by about 15% from 2009 to 2018[151]. In combination with the fact that the price of clothes has fallen relative to inflation, this means that quantities consumed are increasing[152].

Figure 15 – *Household consumption of textiles and clothing, billion tonnes, 2009-2020*



The **increasing consumption of textile in the EU leads to increasing volumes of textile waste.** However, there are highly variable quantitative estimates on textile consumption and textile waste generation between countries in the EU, depending on the data source and on what is included in the scope of textiles.

Textile flows in the EU for the 2019 reference year (baseline)

Since the publication of the 2019 EEA study and the emphasis of textiles as one of the key products associated to a high environmental footprint, different studies have further explored the textile mass flows in the EU. Due to differences in the scope of these studies in terms of textile products covered, reference years, data sources used, and geographical scope, reported study outcomes vary somewhat in their absolute numbers presented. This report presents the results of an ongoing JRC study[153]. For that further builds upon the previous studies and brings forward results and conclusions that are largely aligned to previous works, particularly in terms of relevant conclusions and take-away messages reasons of simplifications, averages or reasonably small confidence ranges have been presented in the document, acknowledging uncertainties for specific flows.

[151] STATISTA, *Household consumption of textiles and clothing in the European Union from 2009 to 2020,* 2022, Textile & clothing EU household consumption 2009-2020 | Statista.
[152] See footnote 83, p. 72.
[153] Joint Research Centre. 2023. "*Techno-scientific assessment of the management options for used and waste textiles - Preparatory study for the possible setting of preparation for re-use and recycling targets*" (unpublished work)

At the JRC analysis, 'textiles' is defined as apparel and home textiles (e.g. bedlinen, towels, tablecloths, curtains etc.) consumed by households, and similar products consumed by government and business (e.g. uniforms and workwear used by all public and private sectors, bedlinen and towels etc. consumed by hotels, restaurants, healthcare services etc.) as well as footwear and technical textiles (such as truck covers). It excludes products for which textiles are not the dominant component (e.g. upholstery textiles, carpets mainly made of plastics, duvets, pillows) and leather.

Textile production

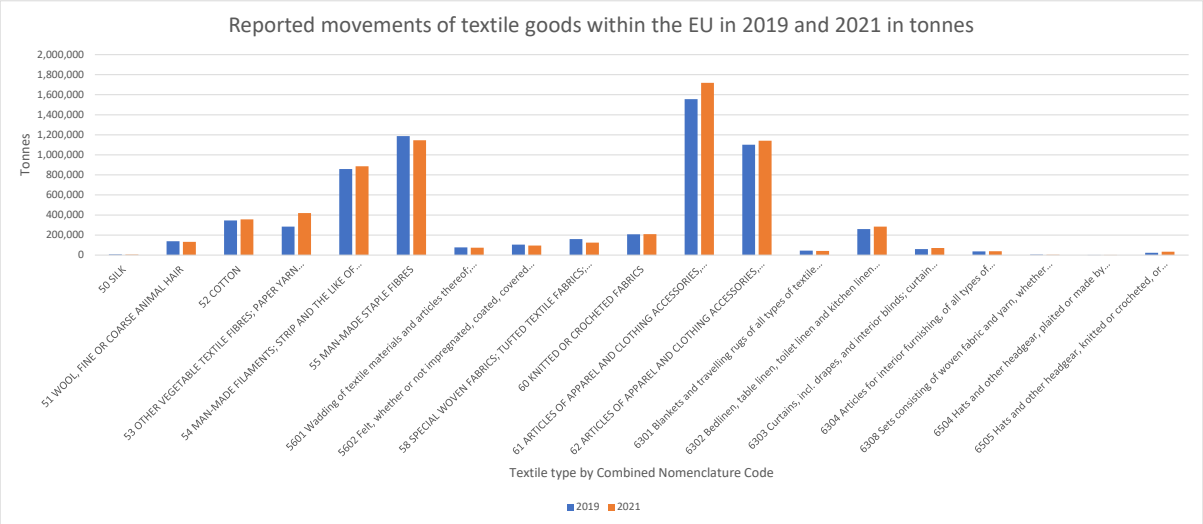
The JRC estimates[154] the apparent consumption of textiles[155] for the reference year 2019 to be around 12 Mt[156], composed of the flow coming from the net production of finished textiles (3.0 Mt) and from imported textiles (9.0 Mt). This flow includes the production of all textiles, including apparel, household textiles, and textiles used for technical and industrial applications.

Intra-EU movements of textile goods

As a producer and importer of textiles from third countries the EU overall undertakes a significant amount of intra-EU movements of textiles and textile products. This, in turn, frequently means that producers of textiles and textile products in one Member State will ship those products to one or more other Member States. This reflects the somewhat fragmented supply chain for such goods but also the fact that textile goods are generally traded over national borders.

The figure below looks at intra-EU movements of a selection of textiles in 2019 as well as in 2021 (given that this was the most recent data available at the time of conducting the assessment) using data from Eurostat[157].

Figure 16 Reported movements of textile goods within the EU in 2019 and 2021 in tonnes



In total 6.45 million tonnes of textiles goods moved within the EU in 2019 increasing to 6.79 million tonnes in 2021. Of that total Articles of clothing and apparel represent 41% of

[154] Joint Research Centre. 2023. "Techno-scientific assessment of the management options for used and waste textiles - Preparatory study for the possible setting of preparation for re-use and recycling targets" (unpublished work)

[155] Import of finished textiles + finished textiles produced in the EU – finished textiles produced in the EU that are exported.

[156] Flows are represented as tonnes, and refer to annual mass units

[157] EU trade since 1988 by HS2-4-6 and CN8 (DS-045409)

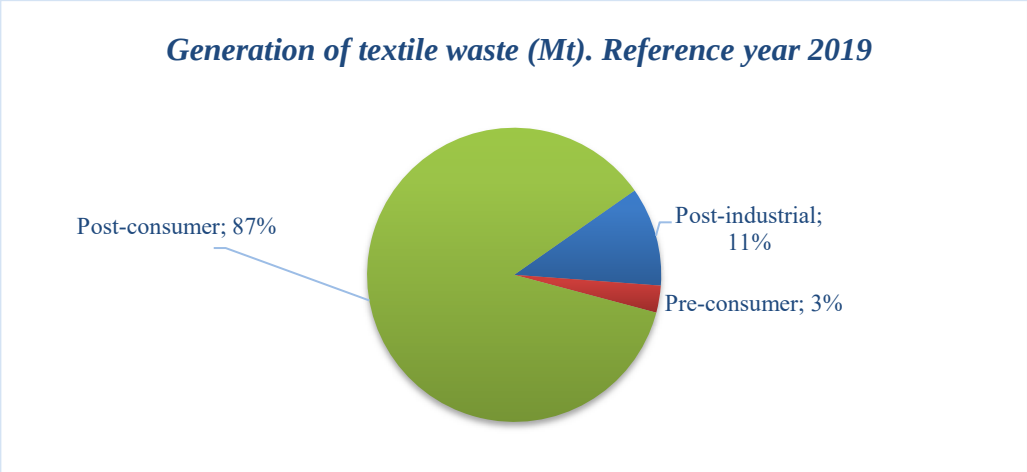
movements in 2019 (2.66 million tonnes) and 42% in 2021 (2.86 million tonnes) of all goods that moved between one Member State and another and man-made filaments and fibres accounting for 31% in 2019 (2.05 million tonnes) and 30% in 2021 (2.03 million tonnes) of such movements. The remaining product types account for 6% or less of all movements in both years. This cross-border movement is an important consideration in both the challenges that exist in relation to textile waste management as well as the possible measures that may address such waste management in terms of consistency of approaches between Member States.

Generation of textile waste

Summary overview

For 2019, **textile waste generated** in EU is estimated at **12.6 Mt**[158], including fractions that are discarded during textile production (post-industrial waste), discarded at the retail stage (pre-consumer waste), deposited and discarded by households and commercial entities (post-consumer waste). Post-production and pre-consumer waste are estimated to be a relatively small share of the total textile waste (~11% and 3% respectively). **Post-consumer textiles waste generated** amounted to **10.9 Mt** (87% of total waste generated) but only clothing and household textiles as well as footwear in some Member States are covered by the collection systems in Member States. This is a preliminary estimation and that may change as the JRC work progresses[159]

Figure 17. Generation of textile waste in the EU at different stages of textile life cycle.



Around 8.5 million tonnes of waste generated is currently being disposed.

Post-production waste and pre-consumer textile waste

Data for production plants located outside the EU indicate that the total amount of residues generated during the manufacturing processes (post-production waste) of textiles is estimated

[158] Flows are represented as tonnes, and refer to annual mass units
[159] European Commission, Joint Research Centre. *Techno-scientific assessment of the management options for used and waste textiles*. 2023 (not published)

at 41%, where 8%, 13% and 20% are attributed to the production of yarns, fabrics and finished textiles productions, respectively[160]. The manufacturing of other textile articles (e.g., non-wovens, and certain household textiles) is likely associated to lower post-production losses. Limited data on residue generated from plants located in the EU is available, and the shares indicated above could be overestimated due to greater inefficiencies at plants located outside the EU. In addition, not all post-production residues are waste and can be reused or recycled. Some residues are already recycled on-site or used as input materials for other production processes and can therefore classify as a by-product (e.g., as stuffing or insulation material, following mechanical treatment). Based on a limited data set reported by EU plants, it is indicated that solid waste generation from the finishing of textiles is lower in the EU compared to the number reported above[161]. In line with these observations, actual post-production waste going to landfill and/or incineration has been estimated at 10% of the total textile production in the EU, or at about 0.6 million tonnes (Mt) per year.

JRC estimates the post-industrial waste flow in EU at 1.34 Mt for the reference year 2019, accounting for 11% of all textile waste generated[162].

Pre-consumer waste generated at the retail stage (e.g., unsellable overstock of producers, brands, distributors, or retailers) is estimated at 0.33 Mt per year (3% of the textile waste generated). The exact fate of this fractions remains unknown, but likely involves disposal as a main route[163]. To improve the available information, the Commission proposed a transparency obligation under the revision of the Ecodesign for Sustainable Products Regulation[164] for companies to disclose the number of products they discard and destroy, including textiles and their further treatment in terms of preparing for reuse, recycling, incineration or landfilling. No similar provisions exist for post-industrial waste. According to McKinsey brands and retailers generally collect their overstock with around 70 percent of overstock expected to be retained to be sold at a lower price either by the original retailer or a professional counterpart in Europe i.e., through a discount store. The share of retail volumes that is relevant for textile recycling is only the volumes that are truly unsellable due to defects that is estimated to be between 3 and 5 percent of total pre-consumer volumes[165].

The DG GROW study[166] indicates that, in comparison to post-consumer waste pre-consumer and post-industrial waste is likely to consist of a smaller variety of fibre types and material blends with the identification of the material composition simpler in relation to post-consumer waste Additionally, post-industrial and pre-consumer textile wastes are generally not contaminated by soiling and are less likely to contain disruptors such as buttons and zips. This means that the waste materials generated are more suitable for recycling than post-consumer

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[160] Sadowski, M. I. C. H. A. E. L., L. E. W. I. S. Perkins, and E. M. I. L. Y. Mcgarvey. "Roadmap to net zero: delivering science-based targets in the apparel sector." World Resources Institute. https://doi. org/10.46830/wriwp 20 (2021).

[161] European Commission. 2022. Best Available Techniques (BAT) Reference Document for the Textiles Industry. Pages 311-318.

[162] Joint Research Centre. 2023. "Techno-scientific assessment of the management options for used and waste textiles - Preparatory study for the possible setting of preparation for re-use and recycling targets". (unpublished work).

[163] Hedda Roberts, Leonidas Milios, Oksana Mont, Carl Dalhammar. 2023. Product destruction: Exploring unsustainable production-consumption systems and appropriate policy responses, Sustainable Production and Consumption, 35, 300-312.

[164] See footnote 32

[165] See footnote 46, p. 47.

[166] See footnote 7

textiles and that is why some recycling technologies limit themselves to processing these wastes or pre-consumer textile waste streams[167]. This makes these types of waste a valuable input to supporting the development of recycling infrastructure across the EU.

Post-consumer textile waste

When discounting pre-consumer waste, JRC report[168] estimates the apparent consumption for 2019 at 11.7 Mt. Based on historic data of apparent textile consumption and expected lifespan of the textile products that make up the consumption, it is estimated that 0.6 Mt are stored by consumers, leading to a post-consumer textile waste flow of 10.9 Mt tonnes generated in 2019. An uncertainty range of 10.2-11.5 Mt is associated with these flows due to the variations in textile lifespans.

The post-consumer waste is estimated to consist mostly of clothing, footwear, and household textiles, with lower shares of technical textiles and articles that have multiple uses (e.g., non-wovens).

Table 25 –Estimated composition of flows at category and subcategory level of the estimated post-consumer textile waste

Category	**Subcategory**	**Post-consumer waste**	
		Category share	Subcategory share
Clothing and footwear	Jackets and coats	48.2%	9.7%
	Sweaters and midlayers		7.6%
	Pants and shorts		6.4%
	T-shirts		4.8%
	Closed-toed shoes		4.6%
	Apparel accessories		3.4%
	Shirts and blouses		3.1%
	Leggings, stockings, tights and socks		2.8%
	Dresses, skirts and jumpsuits		2.2%
	Boots		2.0%
	Underwear		0.9%
	Swimwear		0.8%
Home textiles	Carpets	15.7%	7.2%
	Bedding		4.3%

[167] Elander, M., *Automated feeding equipment for textile waste: experiences from the FITS-project*, Mistra Future Fashion, 2019.
[168] Joint Research Centre (2023). "Techno-scientific assessment of the management options for used and waste textiles - Preparatory study for the possible setting of preparation for re-use and recycling targets" (unpublished work).

Category	Subcategory	Post-consumer waste	
		Category share	Subcategory share
	Toilet and kitchen linen and towels		1.8%
	Curtains		0.9%
	Blankets		0.6%
	Table linen		0.4%
	Furnishing		0.2%
	Other personal care		0.1%
	Sleeping bags		0.0%
Technical textiles households	Non-woven articles		7.8%
	Cleaning articles	20.8%	7.0%
	Sacks and bags		6.0%
Technical textiles professional use	Non-wove articles	15.1%	7.5%
	Mixed technical articles		3.5%
	Cleaning articles		2.6%
	Workwear and protective clothing		0.9%
	Carpets		0.5%
Total		**100%**	

Separate collection schemes for textiles

Separate collection of textile waste in the EU

Summary overview

Separate collection systems for textiles vary from country to country but also regionally and even locally between cities. They mainly target post-consumer clothing and household textiles and avoided the other categories of textiles.

It is estimated that, at present, **an average of 57%** of the total amount **of the post-consumer textile waste generated** (~6.2 Mt) are **covered under the established collection schemes** of Member States, and around **38% of the textile wastes subject to separate collection schemes are effectively collected in EU.**

A significant share of the post-consumer textile waste generated in the EU, including textiles that have applications in households and industry (e.g., woven cleaning articles, non-

wovens), **is not separately collected (~78%, or ~ 8.5 Mt**[169]). Together with supplementary fractions of post-production and pre-consumer waste, > 9.7 Mt textile waste are being disposed of, through incineration (58%, >5.6 Mt) or landfilling (42%, >4 Mt) in EU[170].

Separate collection systems for post-industrial, pre-consumer and post-consumer textile waste.

Separate collection of textiles is different to many other waste streams because the textiles have a very high reuse potential and environmental benefit and therefore same collection and subsequent sorting systems are used for reuse and recycling purposes.

Their best method of treatment against the waste hierarchy (that is the reusability and recyclability of material collected) can only effectively be assessed after collection, at the sorting stage, either through manual or automatised sorting. The primary driver for single collection points is emphasised by studies that have shown that consumers are not able to determine whether a textile is suitable for reuse or not, which leads to reusable textile being discarded as waste and non-reusable textile to be considered as reusable, requiring additional sorting by professionals.

The different ways of management for post-consumer household textiles waste encompass reuse by informal C2C channels (donating, exchanging or selling the clothes to someone else physically or through online platforms) or through C2B channels (charities, social enterprises or businesses active in the reuse sector), deposit at separate collection points or disposal in the mixed fraction of municipal waste. The collection of post-consumer household textiles engages municipalities, social and commercial enterprises.

Post-industrial, pre-consumer and post-consumer commercial textiles waste is typically collected by waste collectors based on commercial contracts. These types of wastes that are generally excluded from the household separate collection schemes defined by Member States. They account for 15-30% of textile waste generated but address a complex value chain consisting of many production stages and involving many companies spread across the globe.[171],[172] (see *Figure 18. Overview of the textile ecosystem*)

Separate collection systems for textiles vary from country to country but also regionally and even locally between cities. The factors of these differences between geographical areas are mainly: cultural differences, policy measures, intensity of charities activities and density of collection points. How Member States classify and manage post-industrial, pre-consumer and post-consumer commercial textile waste under national law is unclear under national provisions. Additionally, the obligations under the existing WFD and how they apply to these three categories of wastes appears to be subject to disagreement by Member States who have mainly targeted post-consumer clothing and household textiles and avoided the other categories of textiles.

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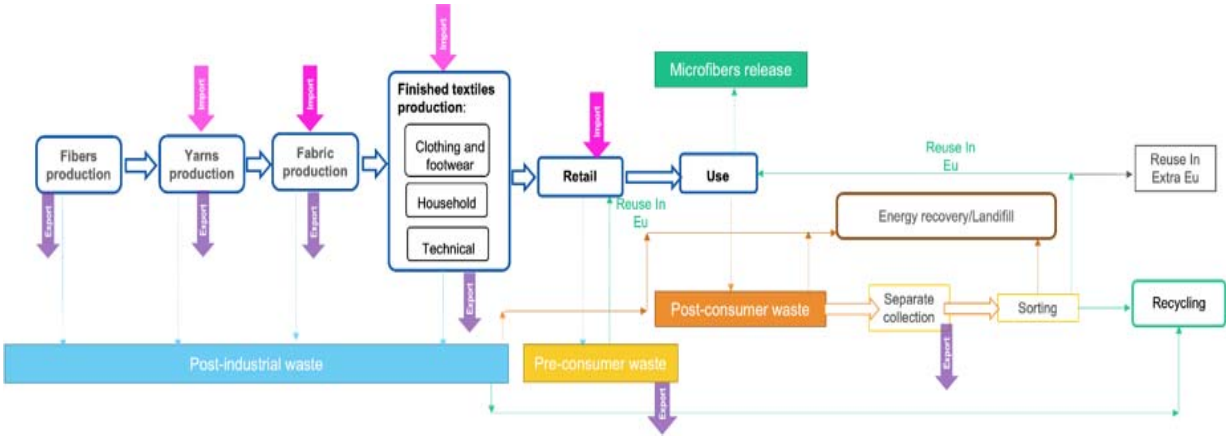
[169] Flows are represented as tonnes, and refer to annual mass units.

[170] Joint Research Centre. 2023. "Techno-scientific assessment of the management options for used and waste textiles - Preparatory study for the possible setting of preparation for re-use and recycling targets" (unpublished work).

[171] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144

[172] See footnote 46, p. 47.

Figure 18. Overview of the textile ecosystem



Source: JRC (2023)

Scope of separate collection schemes for post-consumer textile waste in the EU Member States

Several Member States collect post-consumer textiles waste separately.

Member States were asked about the scope of textiles addressed within their implementation of the WFD. Information was available for 11 Member States and is summarised in *Table* 26.

Based on the information collected from Member States, most collection schemes focus on the collection of small textile items from households. Many have a scope of textiles that covers clothing and household textiles with professional textiles covered in Greece. Several Member States include shoes in this scope of textiles and one Member State includes carpets and textile floor coverings. For the remaining Member States for which information is not, the picture is unclear albeit in the two stakeholder workshops that considered the scope of textiles the focus of discussions tended to be in relation to clothing and, to a lesser extent, other household textiles.

Additional to textiles, leather clothing and apparel are frequently collected alongside textile goods. However, leather goods themselves are not textiles and are not addressed in the textile labelling Regulation.

Two important product categories containing for textiles recycling are mattresses and carpets.

Up to 30 million mattresses reach their end of life in the EU each year and given the average mattress weight of 20kg that means that up to 600 000 tonnes of mattress waste is generated across the EU per year. Of that, according to the JRC, about 25% is a textile component amounting to about 150 000 tonnes per year. In addition, there are an estimated 1.6 million tonnes of carpets that are disposed of in the EU annually.

Mattresses, carpets and other similar bulky materials (~10-15% of the total waste) containing textiles are typically collected kerbside or in civic amenity sites.

Member States have generally not addressed mattresses as textile waste for the purpose of their textile waste management schemes. They are rather classified as furniture/bulky waste. For mattresses, scoping studies are being done by Greece and Croatia while BE and FR already apply EPR to mattresses. However, it is apparent that the method of collection and recycling

of mattresses, as well as other bulky complex products containing fractions of textiles (e.g., furniture) varies from that applied to other textiles including post-industrial, pre-consumer and post-consumer commercial textile waste, clothing, household textiles or similar as well as shoes.

Rugs and floor covers are a broad category that includes both floor covers generally collected and treated as part of construction and demolition waste and commercial waste and rugs that are collected as bulky waste or manages as commercial waste as well as small rugs (e.g., bathmats similar to towels) that may likely be disposed of by citizens as part of the household linens. Information provided by the NL authorities, with the NL being one of the largest producers of carpets, made clear that carpets are excluded from national textile waste management systems because they are considered to belong to a completely different sector both at the front of the chain (production and sales) and at the back (collection, sorting, recycling). Carpet does not go into textile bins, is not handled by textile sorters and is not addressed in the Dutch textiles monitoring and reporting.

Textiles such as tents and awnings as well as umbrellas appear to be excluded from the scope of textiles for all Member States. As is the case with mattresses, Member States have generally not addressed carpets as textile waste for the purpose of their textile waste management schemes.

Table 26 – Scope of separate collection schemes in the EU Member States, 2022

Member State	Scope of textiles
BE	Flanders: Clothing and accessories (belts, bags, shoes per pair) – Bedding (pillows, sleeping bags, sheets, blankets and duvets) – Kitchen and bathroom textiles – Home textiles (tablecloths, curtains, seat covers) – Cuddlies – Clean rags, textiles with small defects. Brussels: clothing, household textile, footwear, bedlinen, towels.
BG	EPR: textile and footwear.
CZ	Clothing, household textile, footwear
DE	Separate collection: clothing, household textiles and footwear
DK	Separate collection on textile waste: clothing and other household textile waste that is not suitable for reuse. Footwear is not included.
EL	Clothing, household textiles, professional clothing and textiles. Also, an EPR for mattresses under study.
FI	Clothing, textiles
FR	Clothing, household textiles and footwear
HR	Clothing, household textile, professional clothing and textiles. Also, an EPR for mattresses under study.
HU	Currently: clothing, shoes. Planned EPR: clothing, household textiles, curtains, carpets and textile floor coverings.

NL	Clothing, household textiles, shoes. EPR: clothing

It is estimated that, at present, **an average of 57% of the total amount of the post-consumer textile waste generated** (~6.2 Mt) consist of small items from households that **are covered under the established collection schemes of Member States** (clothes, footwear, household textiles, plus some additional shares of non-woven textiles and cleaning articles) [173]

Separate collection rates for textile wastes in the EU-Member States

It has been calculated that **an average of 38%[174]-39% of the textile wastes subject to separate collection schemes are effectively collected in EU**.

The collection rates vary widely across the EU with some Member States collecting a significant share of textile waste (for example DE collects approximately 62% of all textile waste generated with SE (62%), BE (55%), FI (47%), NL (46%), DK (42%) and FR (39%) also showing good rates of collection) and others collecting small proportions (LV, SI and SK currently collect only approximately 12% of textile wastes). In addition, also a large share of the technical textiles is separately collected, though these actions may involve using a different collection scheme. Based on these numbers, that is effectively collected is estimated at about 2.0-2.4 million tonnes[175].

According to information collected from the JRC, McKinsey & Company, Member State reports and a specific questionnaire table sent to Member States as part of this study, separate collection of clothing and household textiles currently stands as specified in the table below.

Table 27 – Textile waste generation and collection in Member States, tonnes and collection rate

Note: only textile waste that is commonly subject to separate collection schemes have been considered into "waste generation" to calculate the share of collection.

[173] European Commission, Joint Research Centre. *Techno-scientific assessment of the management options for used and waste textiles*. 2023 (under development

[174] Joint Research Centre. 2023. "Techno-scientific assessment of the management options for used and waste textiles - Preparatory study for the possible setting of preparation for re-use and recycling targets" (unpublished work).

[175] Joint Research Centre. 2023. "*Techno-scientific assessment of the management options for used and waste textiles - Preparatory study for the possible setting of preparation for re-use and recycling targets*" (unpublished work)

Member State	Waste generation (tonnes)	Waste collected (tonnes)	Waste collection percentage
AT	146 000	43 120	30%
BE	213 000	116 100	55%
BG	33 000	6 000	18%
CY	3 000	600	20%
CZ	78 000	14 100	18%
DE	1 267 000	784 640	62%
DK	85 460	36 000	42%
EE	22 400	3 900	17%
EL	98 000	17 850	18%
ES	451 000	95 160	21%
FI	85 500	40 000	47%
FR	517 000	204 000	39%
HR	53 000	10 200	19%
HU	79 000	14 400	18%
IE	167 500	57 500	34%
IT	615 000	242 200	39%
LT	45 000	14 000	31%
LU	4 000	1 000	25%
LV	20 000	2 400	12%
MT	2 000	750	38%
NL	305 100	136 100	45%
PL	362 000	65 700	18%
PT	144 000	20 880	15%
RO	149 000	27 000	18%
SE	62 000	38 300	62%
SI	14 000	1 700	12%
SK	44 000	5 300	12%
Total	5 064 960	1 998 900	39%

Collection methods for post-consumer textile waste in the EU-Member States

The different collection methods for post-consumer textiles include the following[176]:

- **Bring banks:** citizens bring textiles to containers in streets, in residential or office/public buildings or at civic amenity sites. The main actors involved in bring banks are citizens, charities and waste collection companies.
- **Deposit directly in charity premises** (drop-off): citizens bring textiles directly to charity premises (shops or sorting centres (often a first screening is done, and only reusable textiles are accepted). The main actors are citizens and charities.
- **Deposit directly in stores** (retailer drop-off): citizens bring textiles (typically of all brands) directly to retailer shops that have this type of scheme. The main actors are citizens and retailers.

[176] See footnote 108, p. 78.

- **Door-to-door collection**: some charities collect textiles directly from citizens' homes. The main actors are citizens and charities.
- **Brand mail-back**: consumers send their textiles (of that brand) back to brands by mail. The main actors are citizens and retailers.
- **Kerbside collection**: households separate out textiles and deposit it at the kerbside.
- **Mixed municipal waste**: non-reusable textile wastes are typically collected by municipal actors in mixed municipal waste that is frequently incinerated or landfilled. Separate collection for the sole purpose of recycling is undertaken in no Member State according to the information identified as part of this study.

Collection via bring banks is reported to be the dominant form of used textile collection in all countries with data. Kerbside collection is significantly less prevalent, in part due to higher costs but also due to risk of theft[177].

Different actors are responsible for the separate collection:

- **Municipalities and public or privately owned waste management companies** began to collect textile waste separately in recent years.
- **Charities** have carried out used textile collection for decades, typically sorting and selling them. Any surplus that the operations of charities generate, often goes to a specific non-profit-making purposes, in EU or abroad.
- **Commercial collectors** (social reuse organisations, second-hand shops and retailers, etc.) can collect used textile with the economic objective of reselling them. In the case of social enterprises, the surplus that the operations of charities generate goes to non-profit-making purposes like social integration or training.
- **Clothing brands or retailers:** can ask their customers to bring back, by mail or directly to shops their unwanted textiles (especially clothes) in return for a discount.

Data on the breakdown of textiles collected by actor is limited within the EU. In all countries with mapping studies, the major share of used textile collection is currently carried out by charitable and commercial collectors. In Denmark, Finland, Latvia and Sweden, the collection is dominated by charitable organisations. In Lithuania, commercial collectors are responsible for 54 % of collection.[178] In France, Germany and the Netherlands, commercial collectors also have a reportedly high share of the market, though there are no concrete figures on how big this share is.[179] Municipal waste companies play an increasing role in used textile collection in many countries. In Estonia, due to legal obligations, municipalities carry out 37 % of all collection, and in Lithuania they have a 30 % share.[180] Collection by municipal waste companies in Denmark, Netherlands and Sweden are thought to be lower. In Denmark for example municipalities had a share of 5 % in all collection in 2017, but this is increasing over time.[181]

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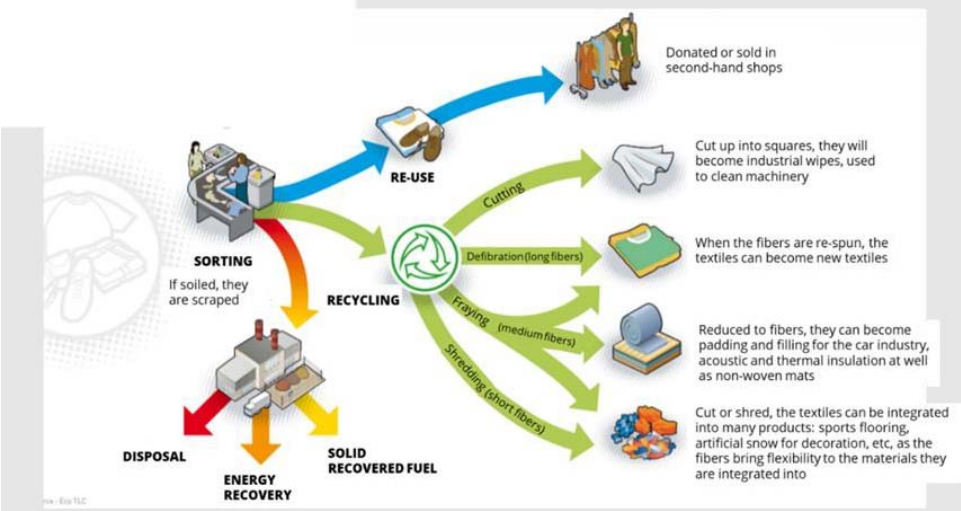
[177] EcoTLC, *Annual Report 2018*, 2019.
[178] Watson, D., Kant Hvass, K., Moora, H., Martin, K.; Nausėdė, V., Gurauskiene, I., & Akule, D., *Textile circularity in the Baltic countries: current status and recommendations for the future,* Nordic Council of Ministers TemaNord Report, 2020b.
[179] Watson, D., Trzepacz, S., Kiørboe, N., Elander, M., Ljungkvist Nordin, H., Lander Svendsen, N., & Wittus Skottfelt, S, *Towards 2025: Separate Collection and Treatment of Used Textiles in 6 EU countries*, 2020a.
[180] Watson, D., Kant Hvass, K., Moora, H., Martin, K.; Nausėdė, V., Gurauskiene, I., & Akule, D, 2020b.
[181] Watson, D., Aare, A. K., Trzepacz, S. and Dahl Petersen, C., *Used Textile Collection in European Cities,* Study commissioned by Rijkswaterstaat under the European Clothing Action Plan (ECAP), 2018a.

Separate collection schemes of clothing and household textiles have existed for many years for reusable used textiles with charities initially running second-hand shops to provide the poor with affordable clothes (for example, the salvation army in the 19th century[182]). While the end-of-life management of textile waste is not currently addressed by specific EU legislation, a small number Member States have established their own national regulations with regards to the management of used and waste textiles, placing physical and financial responsibility on manufacturers and distributors to collect and process textile waste and reduce the share of textile waste sent to incineration or landfill. The regulation of charitable organisations is not of the same nature – it does not oblige charities to collected textiles but rather takes the form of registration of charities to enable them to operate within a particular territory. There is a wide variety of practices in the EU depending on the existence (or not) of an EPR scheme, on legal requirements for separate collection of textile waste or on its voluntary practice.

Sorting of separately collected waste in the EU

Sorting is the process that immediately follows the separate collection of used textiles and textile waste.[183] Collected textiles are transported to sorting facilities, often crossing country borders. **Textiles need to be sorted after collection to separate the reusable and the recyclable fractions**.

Figure 19 – Textiles sorting process



Source: Refashion, 2022[184]

The reusable part is sorted into suitable for the EU market versus for the global market. In addition, the recyclable fractions need to be separated in terms of composition for different types of recycling and non-textile pieces such as zippers, need to be removed according to the relevant input requirements of the specific recycling technology to be used. The sorting facilities are typically owned by social enterprises of private companies and the sorted textiles

[182] https://www.salvationarmytrading.org.uk/about/our-history.
[183] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144
[184] https://refashion.fr/en

are sold in bales. Data on exactly what is being sorted and the volumes that are sorted, is not available across the EU, which is partially due to the fragmented nature of the textile sorting market in the EU. McKinsey reports in fact that around 40 to 50 percent of textile sorting is done by small companies who process less than 25 000 tonnes annually[185].There is significant uncertainty in relation to the sorting capacity of separately collected textiles within the EU – even more so than in relation to collection rates. Estimates based on reported data by Member States and the JRC study[186] point to **a sorting capacity of about 1.8 Mt**. However, data collected directly from Member States is deemed more reliable than a value that indicates an EU sorting capacity at 100% of collected, which would not explain why textiles are being exported unsorted.

This implies that **a significant share of the separately collected textiles (~0.5-1.0 Mt) is exported as unsorted textile waste**. The actual level of sorting of this material remains unknown.

Following sorting, the majority is **reused in EU (8%) and outside the EU (38%). Of the sorted separately collected waste, 32% is converted into low value products** such as wipers/cleaning cloth/insulation materials by means of mechanical recycling**; 7% is incinerated, 5% is landfilled** and only **2% is recycled into higher value applications** as textile fibres to make new garments.

Within the EU national **sorting capacity is not solely dedicated to sorting of domestic textile** waste – **some textiles are imported from other EU Member States** and subsequently sorted.

While there are also imports of textiles **from outside of the EU**, most textile movement is **intra-EU**.

Data on shipments of used textiles in Comext[187] does not distinguish between used textiles that are waste and used textiles that are not categorised as waste. It is impossible to state, therefore, for the quantities reported how much in total is considered as waste and how much is not. The display of flows of used textiles presented in this study needs to be read with this shortcoming in mind. However, it is apparent in relation to both collection rates and sorting capacity data from Member States that movements of collected textiles for sorting in both non-EU and EU Member State countries takes place, meaning that the handling of textile wastes is not restricted to the country of generation only but has potentially significant transboundary impacts. This is supported by the JRC[188] that states that manual sorting of textiles is currently not evenly spread across Europe but is clustered in a number of countries that specialise in sorting and wholesale activities including France, Germany, Poland, the Netherlands, Belgium, Romania, Hungary and Spain. Fashion for Good[189] notes a similar trend with sorting capacity not always fully utilised for textiles collected domestically providing examples of the Netherlands where 55% of collected textiles are sorted abroad, and most of the local sorting capacity being used to sort textiles from Germany. Fashion for Good considers that these current intra-EU trade dynamics may be explained due to lower costs of purchasing collected textiles from other countries as a result of differences in the fees paid for collecting textiles in each geography. Consequently,

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[185] See footnote 46, p. 47.
[186] European Commission, Joint Research Centre. *Techno-scientific assessment of the management options for used and waste textiles*. 2023 (under development)
[187] EU trade since 1988 by HS2-4-6 and CN8 (DS-045409)
[188] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144
[189] Fashion for Good, *Sorting for Circularity Europe. An evaluation and commercial assessment of textile waste across Europe*, 2022.

they consider that for sorting facilities in countries where collected textiles are more expensive to buy, collected textiles from neighbouring countries are attractive feedstock for their operations.

Table 28. Import and export of used textiles from and to third countries for EU Member States in 2020

This table shows the nature of imports and exports to third countries from the EU according to Eurostat in 2020 in tonnes of worn clothing and clothing accessories, blankets and travelling rugs, household linen and articles for interior furnishing, of all types of textile materials, incl. all types of footwear and headgear, showing signs of appreciable wear and presented in bulk or in bales, sacks or similar packings (excl. carpets, other floor coverings and tapestries).

Member State	IMPORT tonnes	EXPORT tonnes
AT	13,152	1,776
BE	6,017	194,697
BG	10,611	24,564
CY	7	2,661
CZ	1,332	12,984
DE	8,023	202,535
DK	46	1,971
EE	792	4,201
ES	3,229	95,164
FI	39	5,815
FR	1,456	94,086
EL	397	9,821
HR	7	615
HU	12,344	32,955
IE	62	8,518
IT	9,992	143,244
LT	11,826	41,524
LU	0	247
LV	7,819	8,514
MT	6	533
NL	6,676	100,204
PL	29,813	173,225
PT	184	23,180
RO	2,026	2,774
SE	12,368	6,221
SI	7	3,399
SK	1,390	13,322
Total	139,623	1,208,750

JRC estimates a higher share **(0.3 Mt)** for the amount of separately collected **textile fractions imported from outside** EU mainly the UK and Turkey, for further sorting and processing at EU facilities, or to be sent to recycling operators. in 2019[190] and at **1,83 Mt** the total amount of textile waste exported in the reference year 2019[191].

[190] Joint Research Centre. 2023. "Techno-scientific assessment of the management options for used and waste textiles - Preparatory study for the possible setting of preparation for re-use and recycling targets"(unpublished work).

[191] Joint Research Centre. 2023. "Techno-scientific assessment of the management options for used and waste textiles - Preparatory study for the possible setting of preparation for re-use and recycling targets" (unpublished work)

In relation to **intra-EU shipments** of the same worn clothing and used textiles using the same Eurostat dataset it is clear that a significant amount of internal movements took place in 2021 totalling almost 555 000 tonnes. However, such imports are not distribute equally with NL accounting for over 25% of received used clothing and textiles, followed by PL, HU, RO and IT.

Table 29. Imports of used textiles from within the EU by Member States in 2021.

Member State	Value in tonnes
AT	3,945
BE	29,166
BG	38,813
CY	0
CZ	13,153
DE	26,260
DK	73
EE	5,034
ES	7,876
FI	60
FR	1,862
EL	1,534
HR	1,082
HU	49,373
IE	0
IT	43,593
LT	39,221
LU	30
LV	9,650
MT	0
NL	140,928
PL	57,617
PT	3,474
RO	48,104
SE	60
SI	112
SK	33,896
Total	554,916

Types of sorting

The sorting process can potentially be an important component of economic and environmental costs of the recycling process, as the better the textiles are sorted into pure fractions (e.g., 100 % cotton), the bigger the chance of selling the textiles to a recycling facility where it can be recycled whereas the lower the quality of sorting the more likely that reusable and recyclable textiles will be 'lost' and environmental costs will result. Manual sorting is time-consuming and costly, but essential to sort out textiles for reuse.

The JRC[192] suggests that the sorting of textiles falls into three general types:

- Manual sorting
- Manual sorting with sophisticated aiding techniques
- Automated sorting

As noted by the JRC, manual sorting is not a technology as such given that it is performed by humans and usually done without technological aids apart from conveyor belts and other textile feeding technologies.[193] It is the most widespread textile sorting approach used in Europe with hundreds of sorting facilities sorting hundreds of thousands of tonnes of used textiles. Indeed, as indicated by the EuRIC[194], **manual sorting is essential to separate the reusable fraction of post-consumer textiles and is very often required even for the recyclable fraction**.[195] The JRC also notes that manual sorting is often more expensive than automated sorting due to the higher labour costs, it is primarily used for sorting of textiles with an expected high percentage of reusable textiles that are sellable on global reuse markets.[196] Indeed, sorters indicated that their business is profitable when maximum 20% of the received textiles are waste.

Manual sorting with sophisticated aiding techniques is also often referred to as semi-automated sorting. It operates the same way as manual sorting but includes some automation for assisting in the actual sorting of fibre types and grades for reuse and recycling. For example, hand-held scanners can be used by the manual sorters to assist them in determining material content, but these scanners only detect the surface material so full composition is difficult to detect. The main advantage of assisted manual sorting compared to fully automated sorting of non-reusable textiles is that the sorting for high-quality recycling can be carried out at the same time as sorting for reuse rather than requiring a new facility and processing stage.

Automated systems are generally used to sort non-reusable textiles and to identify those that are suitable for recycling. Automated sorting can fasten the sorting process and thus processing higher volumes of waste. As noted in a European Commission technical study[197] the quality of the output of all recycling processes is highly dependent on the quality of the input material. Consequently, sorting textiles according to their material content is an important pre-treatment step in the recycling process.[198] This is especially the case for post-consumer textile waste that often consists of a larger variety of fibre types and material blends than industrial or pre-consumer waste.[199] The study also notes that there are various methods available for the accurate determination of textile material contents, but they often require sample preparation

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[192] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144

[193] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144

[194] The European Recycling Industries' Confederation (EuRIC) is the umbrella organisation for European Recycling Industries.

[195] See footnote 7

[196] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144

[197] See footnote 7

[198] Cura, Kirsti, Rintala, N., Kamppuri, T., Saarimäki, E., and Heikkilä, P., *"Textile Recognition and Sorting for Recycling at an Automated Line Using Near Infrared Spectroscopy."*, 2021.

[199] See footnote 145, p. 87.

and are too time-consuming for automation.[200] The study also identifies near infrared spectroscopy (NIR) as an interesting technique already widely for different applications, including automated sorting of paper and plastics.[201] Indeed, as part of the Swedish Innovation Platform for Textile Sorting (SIPTex) government-funded project, a sorting facility using NIR technology for textile sorting was put into operation in Malmö.[202]

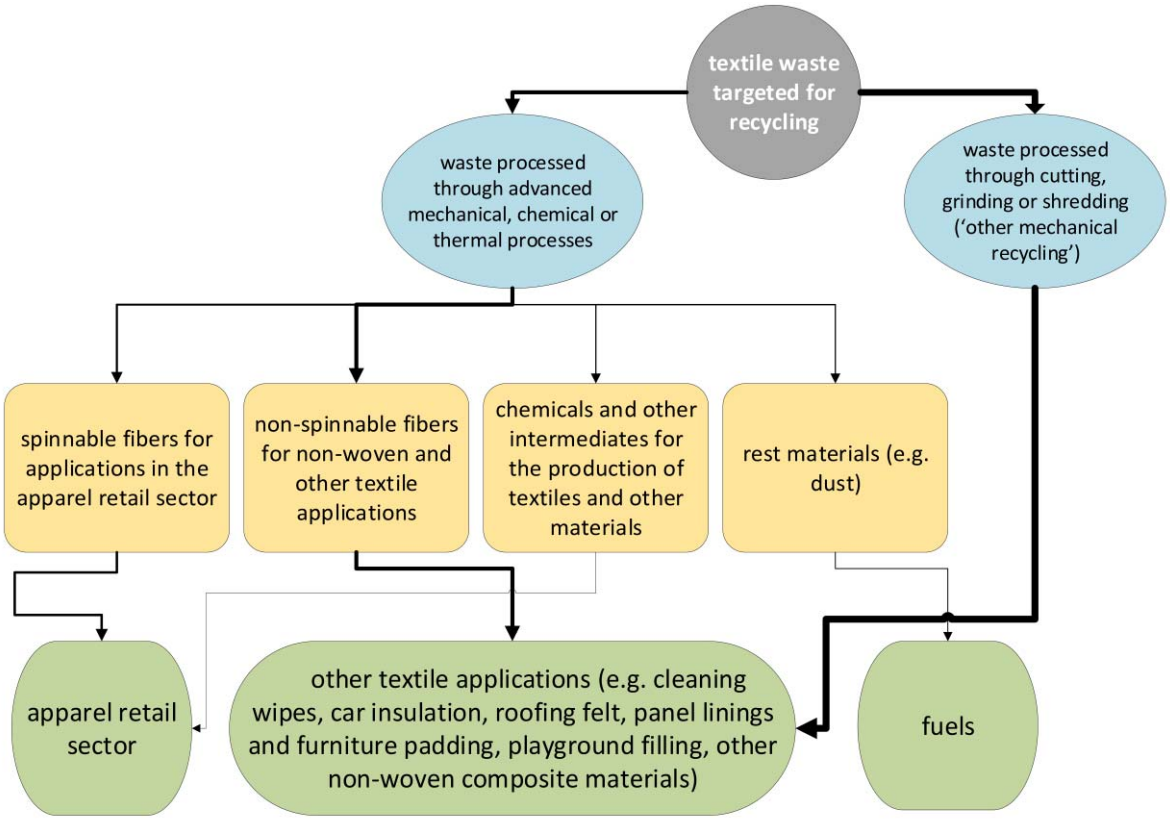
Fully automated sorting has the potential to provide accurate, low-cost sorting of non-reusable textile wastes by material compositions. Many such technologies are in development phase but experience difficulties to develop at industrial scale. Sorting for recycling can also integrate a step to remove hard or metallic accessories (zippers, etc.) or buttons to facilitate recycling. This removes the need for these contaminants to be addressed by the recyclers themselves.

Sorting in relation to mattresses is different than for clothes and other household textiles because the sorting and removing of contaminants for mattresses is typically undertaken by the recyclers themselves. Steel and polyurethane foam are generally both the main contributors to the weight of the materials recovered, as well as to the revenues from selling the materials to their existing end markets, as they have a positive market value. They are followed by textile fibres which are usually grouped together, as they are difficult to separate into the different materials due to the construction of the mattress and are sold on to mixed textiles markets as low-quality fibres (short fibre length), often in the form of shredded mixture[203].

Figure 20 was developed by the JRC and displays the recycling techniques in the EU[204].

Figure 20 - Recycling techniques in the EU

[200] See footnote 7
[201] Cura, Kirsti, Rintala, N., Kamppuri, T., Saarimäki, E., and Heikkilä, P., 2021.
[202] Recycling Magazine, *World's first fully automated textile sorting plant in Malmö*, 2021, World's first fully automated textile sorting plant in Malmö - RECYCLING magazine (recycling-magazine.com).
[203] JRC, *Best Environmental Management Practice – Treatment of mattresses for improved recycling of materials*, 2016.
[204] Joint Research Centre. 2023. "Techno-scientific assessment of the management options for used and waste textiles - Preparatory study for the possible setting of preparation for re-use and recycling targets.



Sorting capacity in the EU

According to information collected from the JRC, McKinsey & Company, EURIC, Member State reports and a specific questionnaire table sent to Member States as part of this study, separate collection of clothing and household textiles as well as textiles, sorting capacity stands around 1.52 Mt/year, as specified in the table below.

In his recent study, JRC has recently calculated a higher share, estimating at **1.77 the sorting capacity for textile waste in the EU**[205]

Table 30 – Textile waste sorting capacity compared to collection in Member States, tonnes

[205] Joint Research Centre. 2023. "Techno-scientific assessment of the management options for used and waste textiles - Preparatory study for the possible setting of preparation for re-use and recycling targets" (unpublished work)

Member State	Waste collected (tonnes)	Sorting capacity (tonnes)
AT	43 120	21 000
BE	116 100	120 000
BG	6 000	35 000
CY	600	
CZ	14 100	27 889
DE	784 640	190 500
DK	36 000	10 600
EE	3 900	15 000
EL	17 850	
ES	95 160	95 400
FI	40 000	40 000
FR	204 000	200 000
HR	10 200	
HU	14 400	100 000
IE	57 500	57 500
IT	242 200	155 464
LT	14 000	40 000
LU	1 000	
LV	2 400	10 454
MT	750	
NL	136 100	155 200
PL	65 700	118 383
PT	20 880	25 000
RO	27 000	66 928
SE	38 300	10 000
SI	1 700	
SK	5 300	30 000
Total	1 998 900	1 524321

Source: JRC, McKinsey & Company, EURIC, Member State reports

Reused textiles

Textile reuse refers to various means for prolonging the life span of textile products by transferring them to new owners[206], with or without prior modification (e.g., mending). This can for example be done through renting, trading, swapping, borrowing and inheriting, facilitated by, for example, second-hand shops, flea markets, garage sales, online marketplaces, charities and clothing libraries. In the academic literature, various forms of reuse have been

[206] Fortuna and Diyamandoglu, 2017 in Gustav Sandin and Peters G. M., "Environmental impact of textile reuse and recycling – A review", *Journal of Cleaner Production,* Vol. 184, 2018 https://www.sciencedirect.com/science/article/pii/S0959652618305985#bib21.

conceptualised in terms such as collaborative consumption, product-service systems, commercial sharing systems and access-based consumption.[207]

There are variations in the assessment of reusability of discarded textiles, particularly focussing on clothing and household textiles – with values of 45%[208], 50 to 60%[209] and 65%[210] quoted. A JRC study[211] reports that **reuse shares of separately collected textiles typically range between 50 % and 75 % depending on the country** where the textiles were collected. It is useful to consider that Commission Implementing Decision (EU) 2021/19 of 18 December 2020 lays down a common methodology and a format for reporting on reuse. This will provide data on reuse activities and subsequently allow the effects of reuse activities on waste reduction to be assessed.

The reuse textiles sector is highly competitive as it is the most profitable use of used textiles. Different actors are involved in this step:

- **Charities**: sort and sell used textiles for non-profit-making purposes. On average, a social enterprise creates 20-35 jobs per 1 000 tonnes of collected textiles with a view to reuse[212].
- **Direct reuse companies** (reuse organisations, second-hand shops and retailers, etc.) sell used textiles for profit making purposes.
- **Indirect reuse companies**: online marketplaces such as Vinted or Vestiaire Collective facilitate peer-to-peer purchases, sales and exchange of used clothing and shoes.

Some organisations have been set-up to promote the interests of reuse actors. RREUSE, for example, is the international network representing social enterprises active in reuse, repair and recycling products, including textiles[213]. Many researchers are also contributing to the improvement of textile waste recycling and its reuse[214].

The formal reuse sector, mainly dominated by social enterprises, is currently the most active in the separate collection and manual sorting of textiles mainly for the purpose of reuse. The textiles collected need to be in a good enough state to be reused (and this will depend on their initial quality) but also need to be clean, dry and marketable, i.e., meeting the demand in a particular receiving market. The reuse sector's business model is based on the sale of the best quality textiles, the so called 'crème'.

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[207] Sandin G. and Peters G. M., 2018, https://www.sciencedirect.com/science/article/pii/S0959652618305985#bib21.
[208] Alcin-Enis I., Kucukali-Ozturk M., Sezgin H., "Risks and Management of Textile Waste". In: Gothandam K., Ranjan S., Dasgupta N., Lichtfouse E. (eds) *Nanoscience and Biotechnology for Environmental Applications. Environmental Chemistry for a Sustainable World*, vol 22. Springer, Cham, 2019. https://doi.org/10.1007/978-3-319-97922-9_2.
[209] EURATEX, *ReHubs: A joint initiative for industrial upcycling of textile waste streams & circular materials,* 2020. ReHubs - EURATEX.
[210] Tojo, N., Kogg B., Kiørboe N., Kjær B. and Aalto K., *Prevention of Textile Waste. Material flows of textiles in three Nordic countries and suggestions on policy instruments*, NORDEN, 2013, http://dx.doi.org/10.6027/TN2012-545.
[211] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144
[212] RREUSE, *Job creation in the reuse sector: data insights from social enterprises,* 2021.
[213] RREUSE website: https://rreuse.org/.https://rreuse.org
[214] MDPI, *A Systematic Literature Review for the Recycling and Reuse of Wasted Clothing*, 2021, https://www.mdpi.com/2071-1050/13/24/13732/pdf.

It is worth noting that while **second-hand purchases where traditionally primarily driven by the buyers' financial situation, motivations have evolved into more complex choices driven by different factors**. These include economic motivations (income, household situation, frugality and prices), psychology motivations (values, image, nostalgia, desire for uniqueness[215], authenticity and originality, as well as peer pressure) and situational motivations (customers, sellers and general dimensions such as cultural and ethnic ideology, the image of second-hand clothes, shops and sales staff and environmental awareness)[216]. Indeed, non-second-hand clothing consumers are mainly concerned with quality, cleanliness, style, and social image[217].

Recycling

Textile recycling is the action of reprocessing pre- or post-consumer textile waste to obtain a recycled material. Recycled materials from non-textile products such as polyethylene terephthalate from bottles for example, can also be added in new textile products[218]. The process of **recycling** converts a material into something of roughly the same value as it originally was. If the quality or the value of the recycled material is lower than the original product, the recycling route is called **downcycling**. Most textiles recycling routes are downcycling because fibres are damaged by wear and laundry. If it is the opposite and if the new product from recycled material has a similar or higher value or quality than the original product, the recycling route is called **upcycling**[219]. Recyclability is affected by the products characteristics, the presence of hard and soft parts, coatings and colours, fabric constructions, and oil stains[220].

There are three types of recycling technologies.

Mechanical recycling is a process based on physical forces which may be used in isolation for fabric or fibre recycling or as pre-processing for chemical or biochemical recycling. Mechanical recycling consists in cutting, rearing and needling textiles and leads mainly to lower quality textiles which are used as wipes, padding, filling, insulation and non-woven mats. Mechanical recycling can address all types of fibres, as the material composition of the textile waste will become the composition of the recycled product. Mechanical recycling is currently at Technology Readiness Level 9 (TRL 9) and is an established technology. The survey conducted by DG GROW among technology holders revealed a wide range in production capacities, going from 5 000 to 10 000 tonnes/year to as much as 36 000 tonnes per year. Small shares of textile waste (<1%-2%) are fibre-to-fibre recycled following mechanical recycling, because the current capacity for these processes as well as Technology Readiness Level of such process is very limited[221].

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[215] The Conversation, 2022, Do you shop for second-hand clothes? You're likely to be more stylish (theconversation.com).
[216] Herjanto, H. & Scheller-Sampson, J. & Erickson, E., "the increasing phenomenon of second-hand clothes purchase: insights from the literature", *Jurnal Manajemen dan Kewirausahaan*, 18. 10.9744/jmk.18.1.1-15, 2019.
[217] Hur, E., "Rebirth Fashion: Secondhand clothing consumption values and perceived risks", *Journal of Cleaner Production*, Vol. 273, p.122951, 2020, https://doi.org/10.1016/j.jclepro.2020.122951.
[218] See footnote 7;
Sandin, G. and M. Peters, G., *Environmental impact of textile reuse and recycling – A review*, 2018, https://www.sciencedirect.com/science/article/pii/S0959652618305985#bib21.
[219] https://www.sciencedirect.com/science/article/pii/S0959652618305985#bib5 ; see footnote 7
[220] See footnote 46, p. 47.
[221] See footnote 46, p. 47.

Chemical recycling is a process using chemical dissolution or chemical reactions that is employed in polymer recycling (system for disassembling used fibres, extracting polymers and re-spinning them for new uses) or monomer recycling (system for breaking down polymeric textile materials into their constituent monomers and rebuilding polymeric fibres for new uses). It can process manmade cellulosic fibres into a pulp used to produce other fibres, polyester and polycotton fibres into PET, and polyester and polyamide into fibres at monomer level. Chemical recycling uses fibre-to-fibre recycling techniques possibly resulting in re-spun fibres, yarns and textiles that can be remade into high quality finished textile products. The technologies to process closed-loop recycling currently require minimum levels of fibre purity to operate and are at a very early development stage. [222] Chemical recycling can be realised with different processes, but three major technologies have been identified as described below.

- **Polymer recycling of cotton via a pulping process** is a process that generates cellulosic pulp which can be obtained via different types of pulping processes. This process can recycle cellulose from different sources (e.g., wood, cotton, viscose, cardboard) but as they differ in chemical structure and viscosity, most technology holders indicated that changing the source would require adaptations to the pulping process or pre-treatment. Most technologies have already reached a high TRL of 7 to 9, at least for pure cotton textiles as input material. The TRL 7-8 technologies are expected to reach TRL 9 by 2025 at the latest. **Process capacities range from 10 kg/day to thousands of tonnes per year**.
- **Monomer recycling of PA6 and PET (biochemical recycling)** is a depolymerisation process where the polymer chains are broken down into monomers. Chemical recycling of PA6 textiles via depolymerisation is already an established technology with TRL 9. For PET textiles, the TRL-levels vary from 4 to 7, with **500 tonnes/year** being the largest available production capacity to date. The first technologies are expected to reach TRL 9 by 2023 as an industrial production line is currently being built.
- **Recycling of polycotton blends** can be done via different methods as several technologies (can) focus on recycling of both cotton and PET from polycotton blends. For example, a method applies solvent-based dissolution and filtration processes to separate different materials and extract the desired components (polymer recycling). This technology is currently at TRL 5 and is expected to reach TRL 6 in 2022 and TRL 9 in 2024/2025. Sorting of textiles waste is required as knowledge of the composition is required for a good process efficiency. Current process **capacities range from 15 to 2800 tonnes/year**.

Thermal recycling is a process based on heating with the aim to recover either polymers or low molecular weight building blocks. There are two thermal recycling technologies as detailed below.

- **Thermo-mechanical recycling** is a process used in a recycling system that melts a polymer. It is used to recycle thermoplastic textiles, e.g., polyester, polyamide, polypropylene, etc. by melting them into a regranulate and/or new fibres. This recycling process is particularly interesting for the recycling of post-industrial waste and some specific post-consumer waste that has been collected in specialised centres. However, the addition of virgin material is required and only a limited amount of recycled material will be present in the final fibre. TRL 9 is expected to be reached by 2022/2023, with still a limited percentage of recycled content and the same input material limitations.

[222] ReHubs, 2020.

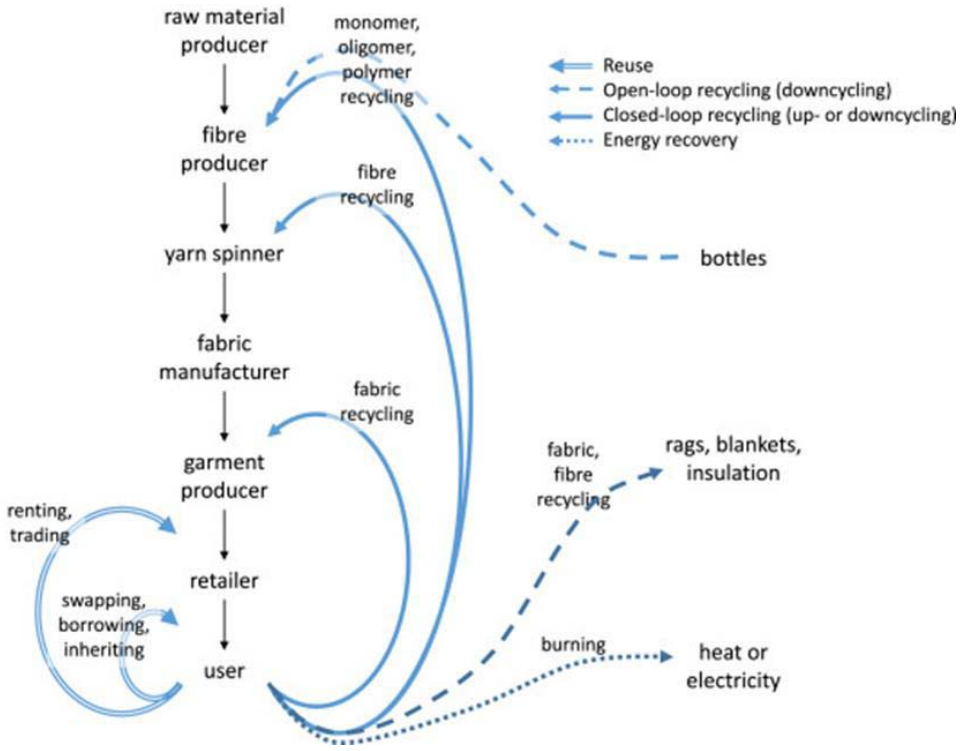
- **Thermo-chemical recycling** is a process using partial oxidation reaction of polymers to produce low molar mass components or heat to degrade polymers to monomers that can be used as feedstock for the chemical industry, with the exclusion of fuels used for energy production or other combustion or energy recovery processes. It is considered a mature technology, although developments to allow the production of raw materials for the chemical industry (as opposed to energy recovery or fuel production) are very recent. Not many waste gasification processes had been piloted and tested in 2021 but a few had already been implemented as industrial plants (TRL 9) processing actual waste.

Recycling routes are often made up of a mix of these three processes. For instance, before chemical depolymerisation (chemical recycling), textile material is often treated mechanically. [223] Recycling can be defined by the type of routes used and technologies (mechanical, chemical or thermal) but also by the type of recovered materials: **fabric recycling** (material reuse), **fibre recycling** (if the original fibres are preserved), **polymer/oligomer recycling** (if polymers are preserved) or monomer recycling. [224]

Another classification for recycling routes is into **closed- or open-loop recycling**. Closed-loop recycling refers to when the material from a product is recycled and used in a (more or less) identical product, whereas open-loop recycling (also called cascade recycling) refers to processes in which the material from a product is recycled and used in another product. [225] The support study estimated that around 51 thousand tonnes were recycled closed-loop in 2021 and over 460 thousand were recycled open-loop.

Figure 21 – *Classification of textile reuse and recycling routes*

[223] https://www.sciencedirect.com/science/article/pii/S0959652618305985#bib5 .https://www.sciencedirect.com/science/article/pii/S0959652618305985#bib5 . See footnote 7
[224] See footnote 7; Sandin, G. and M. Peters, G., 2018, https://www.sciencedirect.com/science/article/pii/S0959652618305985#bib21.
[225] See footnote 7; Sandin, G. and M. Peters G., 2018, https://www.sciencedirect.com/science/article/pii/S0959652618305985#bib21.

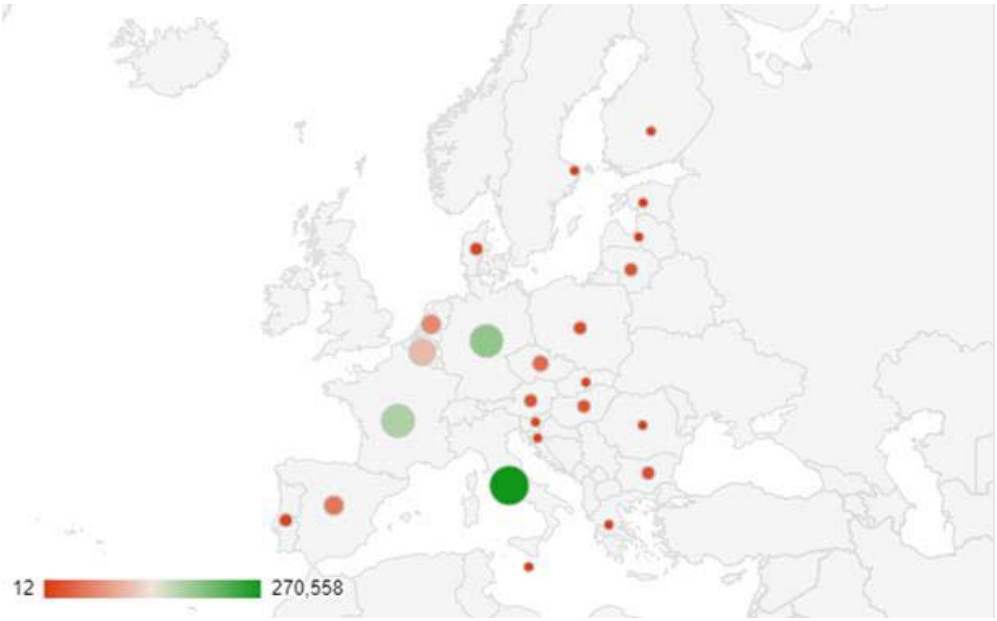


Source: Sandin, G. and M. Peters, G., 2018,
https://www.sciencedirect.com/science/article/pii/S0959652618305985#bib21

The recycling capacity of Member States is based on data published by Eurostat[226]. It should be noted that the volumes indicated are the actual volumes of textiles reported as recycled in 2020 which are likely overestimated, as under Waste Statistics Regulation these volumes include also textiles prepared for re-use. Moreover, the documented "landfill" and "incineration" are likely underestimating the real values. Additionally, as a result of the types of textiles that are captured under this dataset leather and other wastes from textile production are included that accounts for the higher volumes reported to Eurostat than the volumes of clothing and household textiles that are recycled within the EU at present. However, the figure gives an idea of the scale of recycling at present.

Figure 22 – Map of textile recycling in 2020

[226] Eurostat, *Waste generation and treatment* (ENV_WASTRT), 2023.



Source: Eurostat 2023.

As noted above, most of the textile recycling undertaken at present is open-loop recycling. Four Member States recycled 100 000 tonnes of more of textiles in 2020 (BE 100k tonnes, FR 173k tonnes, DE 191k tonnes and IT 271k tonnes) comprising 72% of all textiles recycling in the EU.

Recycling mainly focuses on cotton-rich products. Currently, there is no significant recycling of synthetic textiles and the limited fibre-to-fibre recycling that does occur is mainly mechanical recycling of 100 % cotton products[227]. Mechanical recycling technologies, where the waste textile is physically manipulated to recover materials, fibres or fabrics, are currently the most prevalent. [228] The market value for these materials is indicated in Annex 4.

Table 31 – Recycling processes for major fibres/recycling[229]

[227] EEA, *Plastic in textiles: potentials for circularity and reduced environmental and climate impacts,* 2021.
[228] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144
[229] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144

Material	Mechanical recycling	Chemical recycling
Polyester	Sorting by type and colour, washing and chopping. Extrusion into yarn	Depolymerisation, repolymerisation and extrusion into chips
Nylon /polyamide	Cleaning and pelletisation (for homogenous flows only)	Depolymerisation and repolymerisation to make new yarn
Cotton	Separation by colour, shredding and re-spinning	Promising innovative development
Wool	Separation by colour, pulling the garment back into a fibrous state	Not available
Polycotton	Small scale processes for producing insulation materials and other lower grade applications	Requires pre-separation into cotton and polyester. Still in pilot phase

Source: Rengel (2017)

Textile recycling companies (small, medium and large companies) involved in recycling and trade of textile resource stream are key actors for the industrial uptake of textile fibre recycling technologies. Recyclers are gathered in federations that represent their interests at the international, European, and national levels:

EuRIC (European Recycling Industries Confederation), textiles branch, is the Confederation representing the interests of the European recycling industries at EU level.

- The **Bureau of International Recycling (BIR)**[230] is the only global recycling industry federation representing more than 30 000 companies around the globe.
- The **European Recycling Industries Confederation (EuRIC**)[231], textiles branch, is the Confederation representing the interests of the European recycling industries at EU level.
- Each country has **one or several associations**, for instance: Association of Recyclers and Traders of Second-Hand Clothes in Bulgaria, Assorecuperi in Italy, FEDEREC in France, Textrade in Hungary, Trasborg in Denmark, etc.

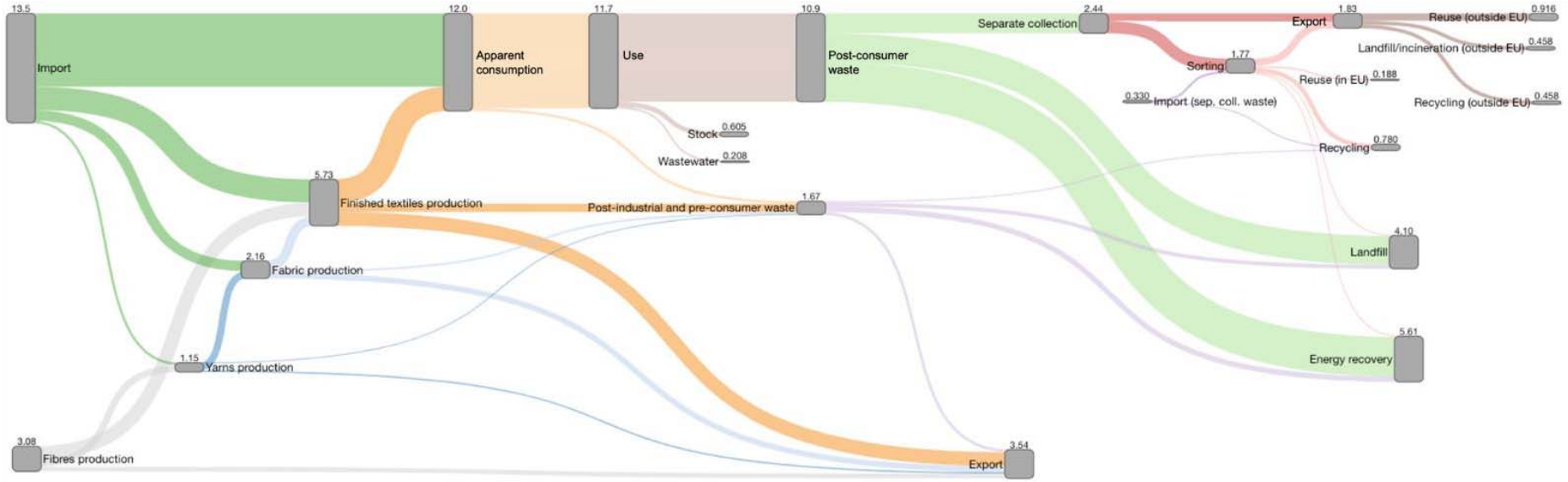
In 2021, the French PRO, Refashion, as part of its mission to accelerate the recycling of textiles and footwear, created a digital platform to connect recycling actors. This free networking tool is for recycling professionals and presents a mapping of the materials available after recycling of textile and footwear. It aims to promote transformation processes and incorporation of the recycled materials into new products by connecting the different actors[232]. In November 2022, 280 stakeholders were registered and provided 52 recycling solutions in France and in Europe.[233]

Figure 23 summarises the mass flows analysis for textile generation and waste management in the EU-27 (for the reference year 2019) that has been detailed within this section. It rests on the results of an ongoing JRC study[234] for the reference year 2019, which covers all kinds of

[230] BIR website: https://www.bir.org/the-industry/textiles.
[231] EuRIC textiles website: https://www.euric-aisbl.eu/branches/eurictextiles.
[232] Refashion press release, *Lauch of RECYCLE by Refashion,* 2021, https://refashion.fr/pro/en/press-releases ; https://www.textile.fr/actualite/recycle-plateforme-digitale-de-mise-en-relation-des-acteurs-du-recyclage-de-refashion.
[233] RECYCLE platform by Refashion: https://recycle.refashion.fr/en/.
[234] European Commission, Joint Research Centre. *Techno-scientific assessment of the management options for used and waste textiles*. 2023 (under development)

textiles along the whole value chain, starting from fibres production to the end-of-life of textile products.

Figure 23– Mass flow analysis for textile generation and waste management in the EU-27 (for the status quo reference year 2019) The mass flows in each node are expressed in Mt/year. The mass flows in each node are expressed in Mt/year



EPR schemes for textiles

The Netherlands (from summer 2023) and **France** (from 2008) have established mandatory EPR schemes for textiles. The French scheme was implemented to increase collected amounts of both reusable and waste textiles, to support the sustainable development of the sector and to respect the polluter-pays principle for the management of end-of-life textile.

In the context of the EPR, textile waste is subject to separate collection, through the four main channels of voluntary collection points (VCP) listed below.

1. Over the counter collection in reuse shops or other organisations' premises.
2. Via containers/bring banks, located in private or public spaces.
3. Via take-back systems in stores.
4. Via occasional collection campaigns (e.g., during events, garage sales, door-to-door).

Refashion is the sole French producer responsibility organisation (PRO) for textiles and the following EPR and modulated fees for textiles apply. Local authorities are also involved in the French EPR. They are responsible for household waste collection and receive financial support from Refashion to raise awareness amongst citizens on how to give/discard textiles and not to throw them in household mixed waste. In 2020, 535 local authorities had committed to working with Refashion in a nationwide drive towards greater recovery rates for used textiles. The sorting centres contracted by the PRO, are partly financed through the EPR fees. The collection points can be managed by businesses, associations or social enterprises active in the reuse market. In most cases the collection points are located on public ground, hence the local authority is the responsible party. A particular priority of the French scheme is to create jobs to reintegrate people in the labour market, and the system is designed so that most of the sorting takes place in France. The higher costs of domestic sorting means that in France only small funds can be dedicated to research and development of new recycling technologies.

While the French EPR model is seen under many aspects as a forerunner, underlying difficulties have been experienced:

- Free riding, especially by "ultra-fast fashion" online brands.
- Enforcement difficulties to bring actors to pay their eco-fees (some producers refuse to submit to the EPR scheme).
- Growing but still relatively limited collection rates.

Several EU Member States (i.e., Sweden, Germany, Bulgaria, Belgium, Italy, Spain and Slovakia) are planning to adopt EPR schemes within the next years. These schemes mainly intend to include clothing and household textiles, while some of the proposals also include other textiles such as professional textiles or footwear. The specific features of the EPR schemes that each country envisages are different. Some Member States are focusing on stimulating textile to textile recycling and reuse through targets for textiles prepared for reuse and recycled, some on the separate collection for reuse and recycling, some are imposing obligations for producers and other stakeholders, others are considering to set a minimum financial guarantee which will be required from each producer responsibility organization at the start of its operations, while others have set up voluntary systems to facilitate waste prevention, separate collection, sorting and valorisation of pre-consumer and post-consumer textile flows or organisation-based initiatives. On the contrary, Finland has proceeded with the implementation of the separate collection organisation through

municipal services which would become effective by 2023. However, none have yet been implemented and the information on their impacts is, therefore, unavailable. A summary of the available details is provided below. Little information is available at this stage on other countries and their perspectives on EPR schemes which is also in part due to the uncertainty linked to the announcement by the Commission that it is assessing the feasibility of mandating EPR at EU level.

In comparison to other jurisdictions, the EU can be considered a frontrunner in the textile waste management with regard to the collection and subsequent re-use and treatment practices and scale. Parts of USA[235], Nordic countries, including Norway,[236] and UK[237] are also considering measures to scale up re-use and recycling and the introduction of an extended producer responsibility.

EU funded projects on sustainable management of textiles

Different EU resources were used to fund related projects:

- For recycling activities alone, in the period 2014-2020 LIFE financed a total of 86 projects with an overall investment of around 350 million euro. LIFE contribution was around 160 million euro.
- If we include reuse operations, the number of projects increases to 113 with an overall investment of 410 million euro and our contribution being approximately 190 million euro.
- Finally, if we include projects that contribute to resource efficiency (reducing resource usage and thus waste), we have a total of 144 projects with a global investment of almost 0.5 billion euro and an EU contribution of approximately 230 million euro.
- In 2014-2020, Horizon 2020 financed 1737 projects dedicated to circular waste management. Up to 2018, 1.4 billion euro from Horizon 2020 was targeted towards areas such as sustainable process industries, waste and resource management, closed loop manufacturing systems or the circular bio-economy.
- In 2016-2020, over 7 billion euro from **Cohesion policy** have been used towards the transition to circular economy, of which 1.8 billion euro for uptake of eco-innovative technologies among SMEs and 5.3 billion euro to support the implementation of the EU waste legislation. The new programming period under the Cohesion policy (2021-2027) also envisages significant financial resources for the improvements in waste management practices, including textiles, namely, for the improvements in separate collection and waste treatment capacity expansion with focus on preparation for re-use and recycling as well as promotion and use of recycled materials. Textiles sector figures in the national programmes for several countries such as Latvia, Lithuania, Croatia.
- Financing for waste management improvement and specifically for the collection, sorting and recycling and reuse of textiles is also covered by **the Recovery and Resilience Facility** regulation. Four countries (Denmark, Italy, Portugal and Hungary) have identified projects

[235] The Responsible Textile Recovery Act of 2023 proposed in California State.

[236] More recycling and reuse of textiles in the Nordics benefits the environment and the economy (norden.org)

[237] "Our Waste, Our Resources, A Strategy for England 2018" strategy.

for investing in the development of separate collection network as well as in research to develop sustainable solutions for resource productivity, waste reduction and use of reusable materials in the textile value chain.

- Financing facilities such as **the European Fund for Strategic Investments and Innovfin** granted 2.1 billion euro towards the transition to circular economy.

More specifically, the LIFE programme financed the following three (3) projects with regard to textile waste:

- Project LIFE ECOTEX (LIFE20 ENV/FR/000596)[238], with reference to EU WFD, concerning the recycling of polyester of footwear waste into new textile products using glycolysis technology. The project took place in 2015 with a total budget of 1 246 048 euro, the EU contribution to it being 735 827 euro.
- Project LIFE CYCLE OF PET (LIFE20 ENV/FR/000596)[239], with reference to EU PPWD, regarding the way towards a true circular economy of PET plastics and textiles thanks to enzymatic recycling of waste. The project was launched in 2020, with a total budget of 10 316 239 euro, the EU contribution to it being 3 300 000 euro.
- Project LIFE RE: NEWTEXTILE (LIFE18 ENV/SE/000489)[240], with reference to EU legislative text on Landfill of waste, concerning an innovative process for sustainable recycling and reuse of cellulosic textile waste. The project was held on 2018, with a total budget of 4 242 210 euro, the EU contribution to it being 1 719 943 euro.

As regards the **Horizon Programme**, a few projects have already been funded by Horizon 2020, while other projects will now be funded under Horizon Europe through both the Work Programme 2021/2022 and Work Programme 2023/2024.

On **Horizon 2020**, the following projects have already been funded by the EU.

- Project RESYNTEX[241] (2014-2015) relating to a new circular economy concept: from textile waste towards chemical and textile industries feedstock. Its specific topic is: "WASTE-1-2014 – Moving towards a circular economy through industrial symbiosis" and its total budget 11 478 761.97 euro the EU contribution to it being 8 787 749.25 €.
- Project Trash-2-Cash[242] (2014-2015) concerning the designed high-value products from zero-value waste textiles and fibres via design driven technologies. Its specific topic is: "NMP-18-2014 – Materials solutions for use in the creative industry sector", while its total budget is 8 890 559.80 euro the EU contribution to it being 7 933 461 euro.
- Project REACT REcycling of waste ACrylicTextiles[243] (2018-2019-2020) with the following topic: "CE-SC5-01-2018 – Methods to remove hazardous substances and

[238] LIFE 3.0 - LIFE Project Public Page (europa.eu)
[239] LIFE 3.0 - LIFE Project Public Page (europa.eu)
[240] LIFE 3.0 - LIFE Project Public Page (europa.eu)
[241] RESYNTEX - Quantis
[242] Trash-2-Cash-Trash-2-Cash HOME page (trash2cashproject.eu)
[243] REcycling of waste ACrylic Textiles | REACT Project | Fact Sheet | H2020 | CORDIS | European Commission (europa.eu)

contaminants from secondary raw materials". The project's total budget is 3 267 696.25 euro and the EU contribution is 3 267 696.25 euro.

- Project ECWRTI ECOLORO[244] (2014-2015) concerning the reuse of wastewater from the Textile Industry with the following topic: "WATER-1a-2014 – First application and market replication". The project's total budget is 4 822 849.63 euro and the EU contribution to it is 3 748 967.50 euro.
- Project New Cotton[245] (2020) regarding the demonstration and launch of high performance, biodegradable, regenerated textiles to consumer markets through an innovative, circular supply chain using Infinited Fiber technology. This project's topic is: "CE-FNR-14-2020 – Innovative textiles – reinventing fashion" and its total budget: 8 886 912.50 euro, while the EU contribution to it: 6 745 801.25 euro.

Regarding **Horizon Europe**, under the Work Programme 2021/2022 there was a 2021 topic dedicated to "Increasing the circularity on textiles, plastics and/or electronic value chains for proposals". In this context, one of the proposed projects, under the name T-REX : Textile Recycling Excellence[246], focuses on the recycling of household textile waste. It will also highlight feasible business models and will be including players such as Adidas, BASF and Veolia. Total budget of the project will be 8 422 410 euro, while the EU Contribution to it will be 6 390 674 euro. Another relevant project that has recently been funded by the Horizon Europe Work Programme 2021/2022 is extended: Knowledge based framework for extended textile circulation. The project will aim at reducing textile waste by 80% by within industrial-urbal symbiosis developing and demonstrating effective textile recovery, waste valorisation and recycling processes combined with digital tools, sensing systems and data-driven solutions to support sustainable circularity of textiles. The total budget for this project is 14 860 675.25 euro, with an EU contribution of 12 345 596 euro.

Finally, there will be very promising opportunities for funding under the Horizon Europe Work Programme 2023/2024, particularly through a topic on "Circular solutions for textile value chains through innovative sorting, recycling, and design for recycling". The total indicative budget for this topic is 15 million euro.

The Work Programme was published on 6 December 2022 and, since this is a call for 2024, applicants will be able to submit their proposals by October 2023. More details on the topic are expected once the WP has been published.

[244] HORIZON2020 - European Consortium to Demonstrate EColoRO Concept for Wastewater Reuse in the Textile Industry (europa.eu)
[245] Demonstration and launch of high performance, biodegradable, regenerated New Cotton textiles to consumer markets through an innovative, circular supply chain using Infinited Fiber technology | New Cotton Project | Fact Sheet | H2020 | CORDIS | European Commission (europa.eu)
[246] Driving textile recycling excellence - T-REX Project (trexproject.eu)

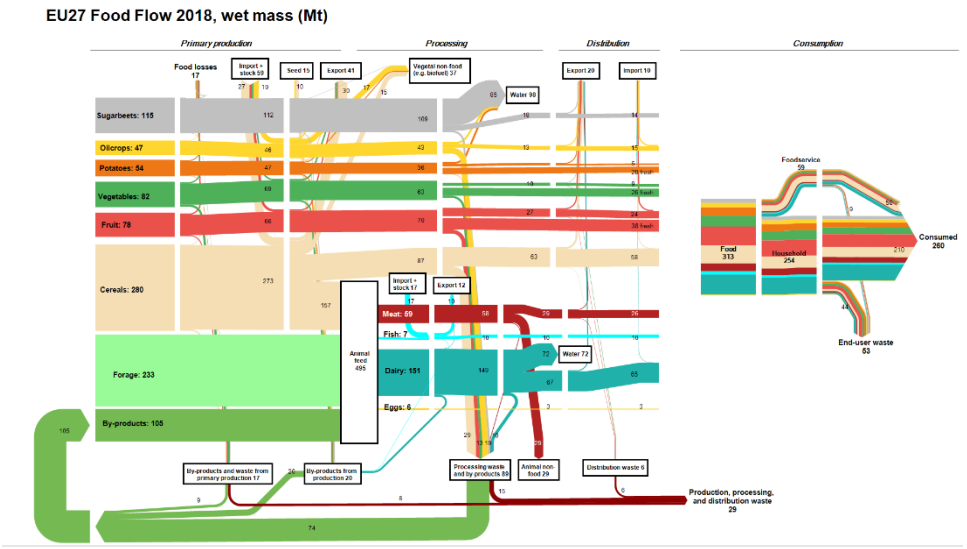
2- Food Waste

Food waste is one of the largest sources of inefficiency in the agri-food chain and depletes limited natural resources, such as land, water and biodiversity, on which the food system depends. FAO's Food Loss Index (FLI) estimates that globally, around **14 percent of all food produced** is lost from post-harvest up to, but not including the retail level[247].

Around 931 million tonnes of food waste were generated in 2019 – 61% of which came from households, 26% from food service and 13% from retail – suggesting **that 17% of global food production may be wasted** at these stages of the food supply chain[248].

Tackling food loss and waste is key to achieving sustainability of the food system. However, food waste itself is just one aspect of a very complex system. In order to better understand how the food system functions, the figure below shows mass flows in the food system[249,250]. It illustrates amounts of food produced, processed, distributed and consumed and shows the complexity of the system. This impact assessment analyses impacts of the food waste reduction targets on that whole system.

Figure 24 – Sankey diagram of the product flows and food waste generated along the Food Supply Chain in the EU27 in 2018



The diagram contains feed and food flows, excluding soft drinks, mineral waters and some non-perishable foodstuffs (salt, coffee, etc.).

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[247] FAO, 2019

[248] UNEP Food Waste Index 2021

[249] Caldeira, C., De Laurentiis, V., Corrado, S., van Holsteijn, F. and Sala, S., *Quantification of food waste per product group along the food supply chain in the European Union: A mass flow analysis. Resources, Conservation and Recycling,* 2019.

[250] De Laurentiis, V., Caldeira, C., Biganzoli, F. and Sala, S., 2021. Building a balancing system for food waste accounting at National Level. Publications Office of the European Union.

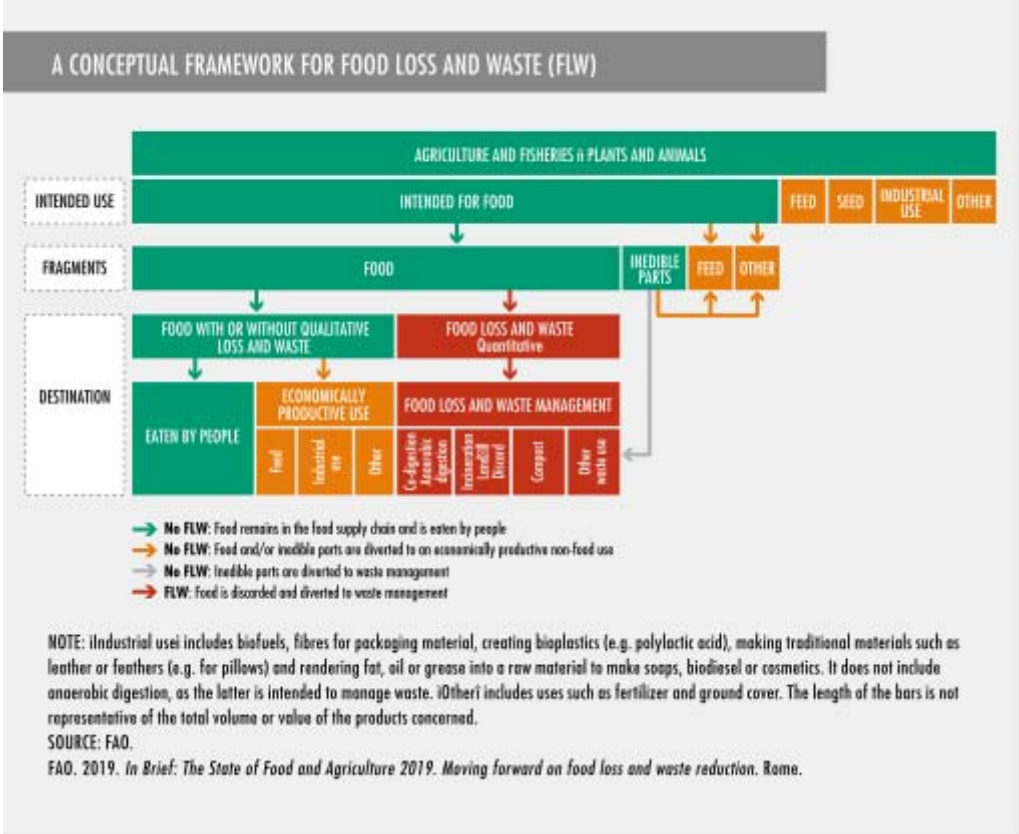
What exactly is food waste? There are several definitions of food waste (or food loss and waste) in the literature. Usually, these definitions are used to focus on specific challenges linked to food.

EU policy started from a focus on environmental aspects of management of food waste, by gradually limiting the landfilling of biodegradable municipal waste. Further studies on the environmental footprint of different materials, identified food as one of the priority streams for waste prevention due to very high environmental impacts linked to its production and consumption. In their assessment of the environmental impacts of production and consumption, the UNEP International Resource Panel concluded that agriculture and food consumption are among the most important drivers of environmental pressures comparable in magnitude only to fossil fuels.[251]

On the other hand, preventing food waste was also assessed as a key priority from the point of view of nutrition and food security, especially in developing countries. This approach led to defining food waste not by tons of food waste produced but rather that of nutrition lost (not necessarily limited to that food ending up as waste), such as crops which have not been harvested. Some definitions and measurement include economic value of lost food (e.g., Food Loss Index). Finally, even overconsumption, beyond actual dietary requirements, could be considered as a form of food loss and waste. (source: SOFA 2019).
The FAO SOFA report includes the following conceptual framework for food loss and waste. This concept is also used in EU legislation, although it is subject to further clarification.

Figure 25 – Conceptual framework for food loss and food waste

[251] assessing_scp_summary_report_english.pdf (resourcepanel.org)



Source: SOFA, 2019

In the WFD, food waste is defined as food (in the meaning of General Food Law[252] which has been disposed of as a waste (as defined in the WFD). This approach is largely based on the result of the FUSIONS research project, fits the existing regulatory framework on food and on waste and uses, to the extent possible, existing reporting and policy frameworks (e.g., Waste Statistics or Waste Prevention Programmes) in order to allow both stakeholders as well as Member States to quickly adopt the new definition and measurement of the problem.

It is important to remember that the definition of 'food' encompasses food as a whole, along the entire food supply chain from production until consumption. Food also includes inedible parts, where those were not separated from the edible parts when the food was produced, such as bones attached to meat destined for human consumption. Hence, food waste can comprise items which include parts of food intended to be ingested and parts of food not intended to be ingested.

Food waste includes:

- Whole foods or parts of food that people could eat but are thrown away. This could be, for example, milk spilled in a dairy factory; unsold vegetables in a supermarket; food prepared

[252] Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety *(OJ L 031 1.2.2002, p. 1),* https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02002R0178-20210526#:~:text=REGULATION%20%28EC%29%20No%20178%2F2002%20OF%20THE%20EUROPEAN%20PARLIAMENT,laying%20down%20procedures%20in%20matters%20of%20food%20safety.

at home and not eaten; or leftovers discarded after a restaurant meal. (This is a fraction of food waste that could be reduced or, ideally, avoided almost completely.)

- Elements associated with food – such as fish bones, eggshells, or fruit pits – that are not intended to be eaten. The notion of "inedible parts" varies from one place to another, or from one group to another. For example, some people peel apples while others will eat the whole fruit, including the core and seeds. In some countries, people consider chicken feet as food, and in other places, they'll typically throw them away. (This inedible fraction could be reduced, for instance by avoiding excessive peeling of vegetables, but cannot be entirely avoided. However, the way that such food waste is handled and recycled can be improved)

Due to variability in what part of food is considered "edible" and what is "inedible" and the complexity of measuring such fractions, the EU reporting framework requires only reporting of total food waste. Therefore, it is more practical to set a food waste reduction target on both edible and inedible food waste – i.e. on total food waste.

Reference to the EU definition of food excludes materials which are lost before they become food. Food losses occurring in primary production before crops and/or animals become "food"– that is, at the stage prior to crops being harvested or during the rearing of farmed animals – are not accounted for as food under EU legislation. These can include pre-harvest losses (whether these are due for instance to unfavourable climate or destruction by pests or not harvested for economical or technical reasons), food which was not allowed to enter the market due to contamination, animals affected with diseases etc.

Neither does food waste include material which is not waste; for example, surplus food that is recovered from the food supply chain and redistributed to those in need through – food donation or by-products that are used for animal feed or non-food products (e.g., cosmetics or glue).
In summary: food waste is any food that has become waste under these conditions:

1. it has entered the food supply chain,
2. it then has been removed or discarded from the food supply chain or at the final consumption stage,
3. it is finally destined to be processed as waste.

It is worth noting that this approach excludes agricultural material and animal by-products (which are not considered waste under the Waste Framework Directive (Art 2).

For practical reasons, food waste measurement further excludes some types of food waste which are technically too complex to measure:

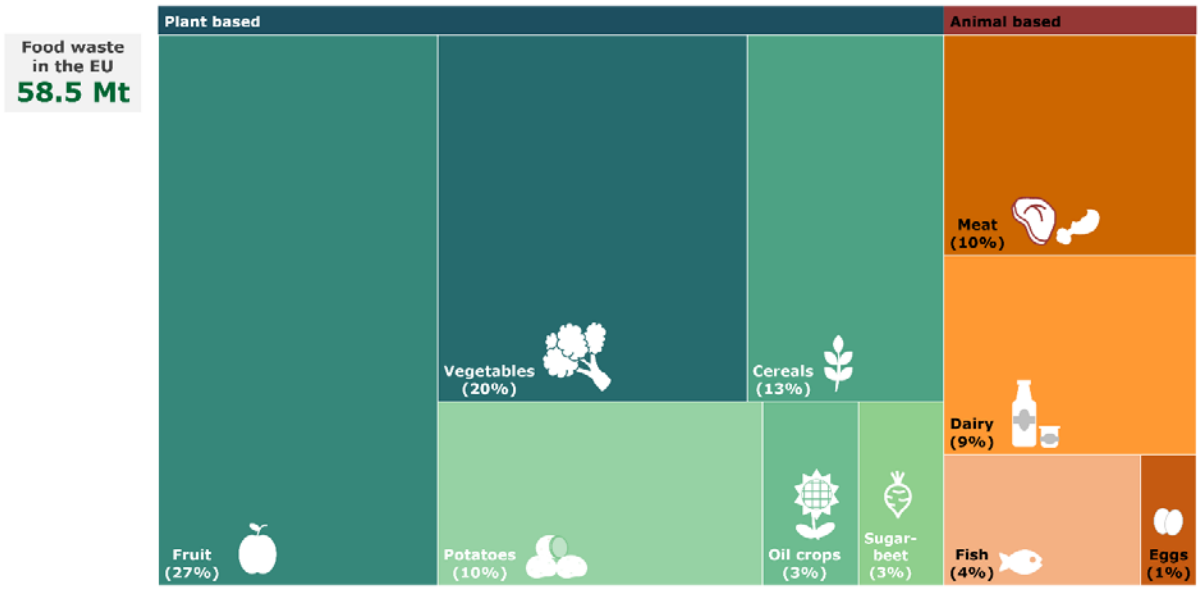
- food waste residues collected within packaging (code '15 01 — Packaging including separately collected municipal packaging waste);
- food waste residues classified under waste code: '20 03 03 — Street cleaning residues';
- food waste drained as or with wastewater.

How much food waste is generated by different food groups in the EU?

Fruits (27%) and vegetables (20%) are the food groups that produce the largest amounts of food waste, followed by cereals (13%), potatoes (10%), meat (10%), diary (9%), and oil crops and sugar

beets (each of 3%)[253]. The fish and eggs food groups, which make up a small share of food consumed, also generate low quantities of food waste in absolute terms.

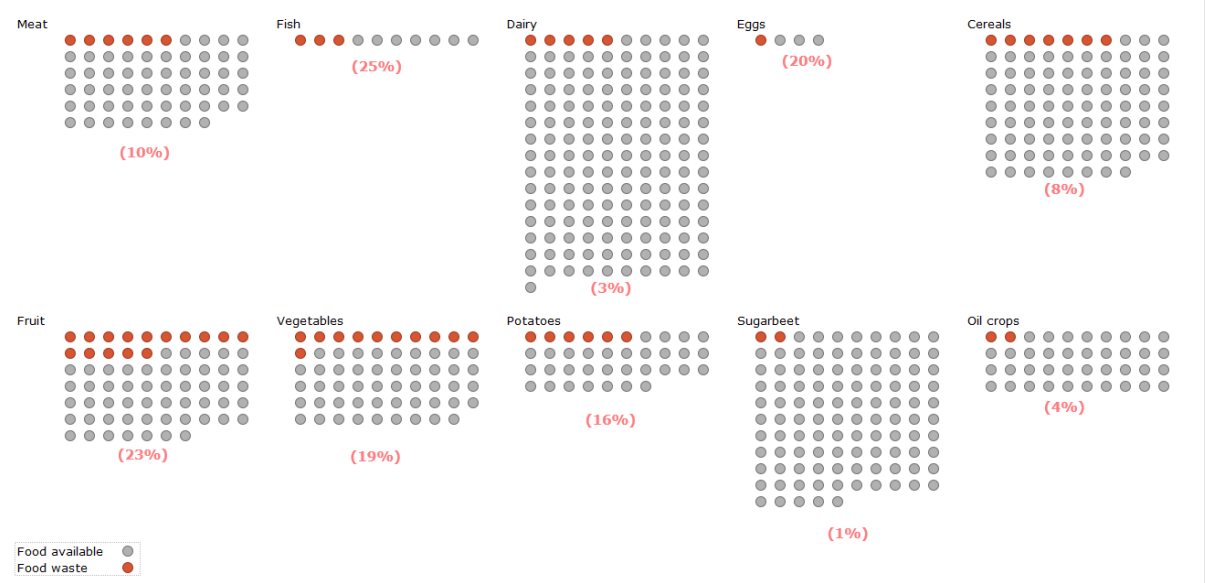
Figure 26 – Food waste generated in the EU27 by food group (2020 data). Mt in fresh weight.



On the other hand, the food groups that make the largest contribution to food consumption do not produce the largest amounts of food waste. The ratio of food waste to food supplied varies between groups, mainly due to the varying amounts of inedible content and the extent to which each group can be stored before consumption, e.g., cereals (pasta, rice) vs fruit and vegetables. Other factors affecting this ratio include the use of residues in primary production and processing and manufacturing for animal feed and other by-products, and water evaporation at the processing stage (for instance when converting milk into cheese) - (see Figure 27)[254].

Figure 27 – Relationship between food available at the beginning of the food supply chain (based on 2019 data) and food waste along the entire food supply chain, by food group in the EU. Each dot represents 1 Mt of food; red dots represent the amount wasted. The ratio of Food waste/Food available is given in brackets for each food group. (Please note, that due to rounding, the number of dots may slightly differ from percentages).

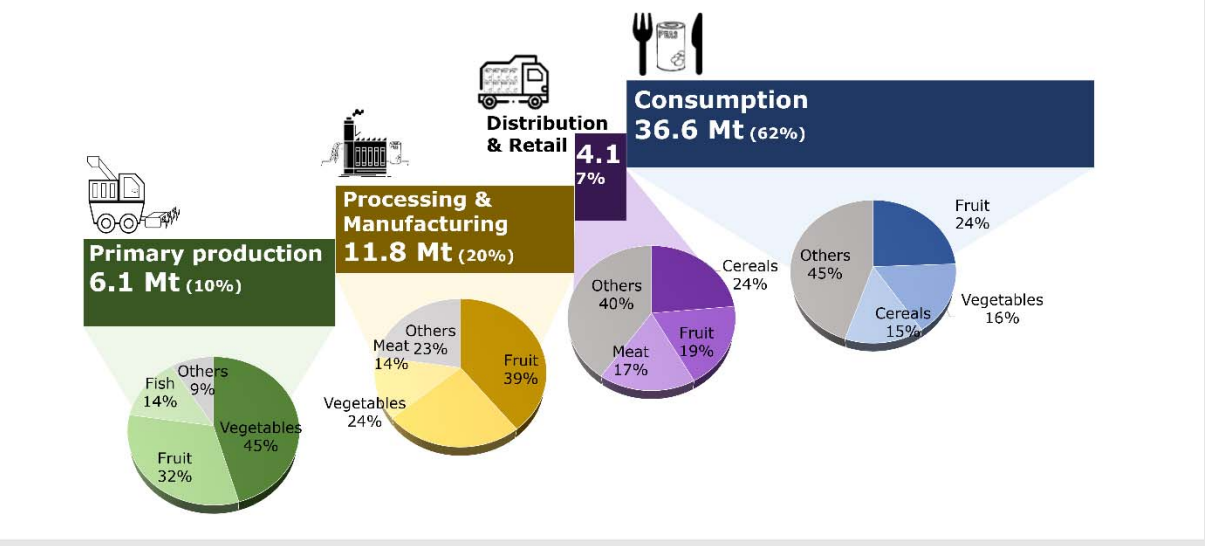
[253] Adapted from: Sanchez Lopez, J., Caldeira, C., De Laurentiis, V., Sala, S., *Brief on food waste in the European Union,* Avraamides, M. editor. European Commission, JRC121196, 2020.
[254] See footnote 253, p. 149.



How much food waste is generated in each stage of the food supply chain?

The largest amount of food waste is generated during the consumption stage, both in- and out of home (62%), followed by processing and manufacturing (20%) and primary production (11%). The distribution and retail stages only account for 7% of the food waste generated in the supply chain (see Figure 28)[255].

Figure 28 – Amount of food waste (in fresh weight) generated in the EU27 during the different stages of the food supply chain (bars) and breakdown by main food groups (pie charts).



[255] See footnote 253, p. 149.

While fruit and vegetables only represent 20% of available food, they account for as much as 77%, 63% and 40% of the food waste generated during primary production, processing and manufacturing and consumption, respectively. The significant shares that these food groups have in the food waste generated at the consumption stage is related to their high inedible fraction at the point of purchase and their high perishability compared to other food groups.

Significant share of the inedible parts produced during the processing of different food groups is valorised in other industries and is therefore not counted as food waste. For example, bones, blood, inedible organs, and skin from the processing of meat are used as fertiliser, feedstuffs, binders, clothing, pharmaceuticals, etc., while milling residues from cereals processing, brewer's spent grain from beer production, oilcake from vegetable oil production and residues from the potato processing industry are often used as animal feed.

Previous estimations of food waste amounts in EU (FUSIONS project)

The Commission has conducted various studies on the topic. In 2010, it published a report, Preparatory Study on Food Waste across EU 27[256] and, on this basis, the Impact Assessment on measures addressing food waste to complete SWD (2014) 207 final regarding the review of EU waste management targets. [257]

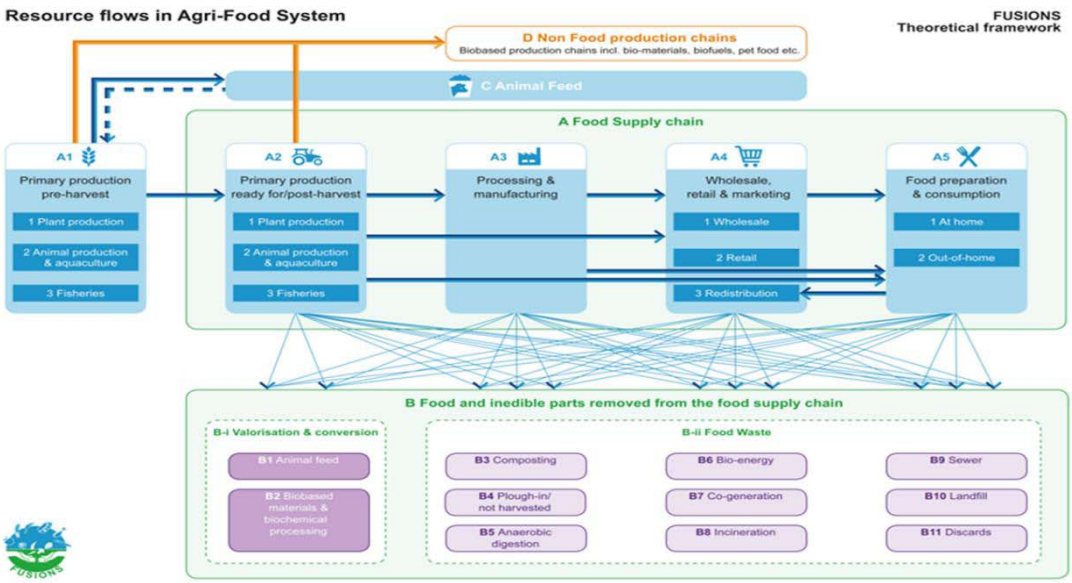
The study was based on 2006 data. The amount of food waste according to this study for EU 27 (with UK, but without HR) was then assessed at around 90 mln tonnes in 2010, and projected to grow to over 120 M tonnes in 2020. This assessment was not linked to actual measurement of food waste but was based on the analysis of other data reported in Waste Statistics.

The FUSIONS project (Food Use for Social Innovation by Optimising Waste Prevention Strategies, 2012-2016) provided useful input on food waste. In particular, it established a common definition of food waste, prepared harmonised quantification methods and, on this basis, provided estimations of food waste amounts in the EU.

In 2016, as a part of the FUSIONS project, the first comprehensive assessment of food waste in the EU was published. This EU research project calculated food waste amounts according to a slightly different methodology than that adopted subsequently in the EU. While the definition of food waste was very similar, the scope used by FUSIONS was extended to include food lost at farm level (including food not harvested). It also tried to estimate amounts of food discarded with wastewater. See the figure below.

Figure 29 –Amount of food waste (in fresh weight) generated in the EU27 during the different stages of the food supply chain (bars) and breakdown by main food groups (pie charts).

[256] European Commission, *Preparatory Study on Food Waste across EU27,* 2010, https://ec.europa.eu/environment/eussd/pdf/bio_foodwaste_report.pdf
[257] SWD(2014) 289 final



Source: FUSIONS 2016

The results were as presented in the table below.

Table 32 – Estimates of food waste in EU-28 in 2012 from this quantification study; includes food and inedible parts associated with food

Stage of the food supply chain	Food waste (M tonnes) with 95% CI*	Food waste (kg per person) with 95% CI*
Primary production	9.1 ± 1.5	18 ± 3
Processing	16.9± 12.7	33 ± 25
Wholesale and retail	4.6 ± 1.2	9 ± 2
Food service	10.5 ± 1.5	21 ± 3
Households	46.5 ±4.4	92 ± 9
Total food waste	87.6 ± 13.7	173 ± 27

*Confidence interval

According to FUSIONS, the sectors contributing the most to food waste are households (47 million tonnes ± 4 million tonnes) and processing (17 million tonnes ± 13 million tonnes). These two sectors account for 72 percent of EU food waste, although there is considerable uncertainty around the estimate for the processing sector compared to all the other sectors.

First reporting of food waste amounts in EU (for 2020)

In October 2022, Eurostat published the results of the first EU-wide monitoring of food waste levels, based on a harmonised methodology. Total food waste measured in 2020 nearly reached 58.5 million tonnes (131 kg per person per year).

Over half of food waste (53%) is generated at the level of households, representing more than 31 million tonnes. The second biggest share (20 %) is generated by the processing and manufacturing sector, where the amount of measured food waste is almost 12 million tonnes. The remaining shares – representing altogether a quarter of the total food waste – originate from the primary

production sector (6 million tonnes, 11% share of the total amount of food waste), restaurants and food services (more than 5 million tonnes, 9% of the total) and retail and other distribution of food sectors (more than 4 million tonnes, 7% of the total).

Table 33– Food waste amounts by Member State and by stage of the food supply chain for the reference year 2020.

Table 1: Food waste by sector of activities, 2020

(tonnes of fresh mass)

	Total food waste	Primary production	Processing and manufacturing	Retail and other distribution of food	Restaurants and food services	Households
EU (')	*58 512 559*	*6 067 377*	*11 806 452*	*4 079 709*	*5 275 265*	*31 283 755*
Belgium	2 881 897	38 699	1 862 177	73 591	88 333	819 097
Bulgaria	596 844	228 472	156 435	15 708	14 375	181 854
Czechia	*972 445*	27 022	100 339	*64 394*	*37 941*	*742 749*
Denmark	1 286 488	66 452	596 599	99 500	62 544	461 392
Germany	10 922 321	190 203	1 612 505	762 352	1 860 980	6 496 282
Estonia	166 513	23 612	31 622	19 976	10 739	80 564
Ireland	770 316	70 413	219 453	60 894	178 507	241 048
Greece (')	2 048 189	*372 204*	375 158	*150 472*	*220 032*	930 323
Spain (')	4 260 845	*845 620*	1 419 257	*348 219*	*213 023*	*1 434 726*
France	*9 000 000*	*1 059 000*	*1 926 000*	*800 000*	*1 096 000*	*4 119 000*
Croatia (')	286 379	*40 916*	9 866	4 180	15 072	216 345
Italy (')	8 650 456	*1 270 638*	510 018	343 535	*193 915*	*6 332 349*
Cyprus (')	*354 021*	*43 564*	*169 706*	*50 268*	*27 145*	*63 338*
Latvia (')	275 304	*32 487*	*36 107*	14 765	35 436	156 509
Lithuania	*382 665*	*81 202*	*28 057*	*27 342*	*4 495*	*241 570*
Luxembourg	92 580	7 384	10 692	8 525	8 739	57 240
Hungary	905 068	16 587	187 391	41 952	19 331	639 806
Malta	79 589	759	4 668	3 910	23 016	47 235
Netherlands	2 811 000	*463 045*	*1 031 407*	*209 805*	*83 035*	*1 023 708*
Austria	1 211 534	13 879	173 734	84 326	201 956	737 639
Poland	4 002 099	670 547	544 942	320 396	190 293	2 275 921
Portugal	*1 890 712*	*101 384*	*61 719*	*214 233*	*237 486*	*1 275 891*
Romania	:	:	:	:	:	:
Slovenia	143 570	93	10 757	15 290	42 666	74 764
Slovakia	455 587	71 889	4 113	15 825	7 110	*356 650*
Finland	641 258	48 011	162 278	57 555	77 914	295 500
Sweden	*905 000*	*22 000*	*53 000*	*97 000*	*98 000*	*635 000*
Norway	769 967	162 158	29 088	61 281	97 547	419 893

(:) not available

Figures in italic are estimates

(') Definition differs in some figures

Source: Eurostat (online data code: env_wasfw)

eurostat

Comparison of data reported (EUROSTAT 2022) with estimations of FUSIONS (2016)

Eurostat data of 2020, published in October 2022 may be perceived, on first sight, as showing a significant decrease (35%) in food waste amounts in comparison with the previously available dataset (FUSIONS project, published in 2016 on 2012 data).
However, the actual decrease should be much smaller given that the scope of FUSIONS' quantification was broader (number of countries, type of waste considered, coverage of the food supply chain, estimations used) than that of ESTAT.

- The FUSIONS figures included data from the UK, which was then responsible for more than 10% of food waste generated in the EU. Moreover, UK data were also used as a proxy for other countries (where data were missing), which likely inflated the FUSIONS findings given the high level of food waste generation at the time in the UK.
- The FUSIONS figures included estimations of food waste sent to sewer (which is excluded from the EU's quantification of food waste levels). This represents 8 million tonnes or approximately 10% of FUSIONS total.
- On primary production, the scope of FUSIONS estimation (food ready-to-harvest which was lost or wasted) was wider than that of ESTAT (food discarded as waste).
- It seems that the amount of household food waste sent for home composting could have been overestimated by FUSIONS (while underestimated in reporting to ESTAT), but lack precise data are not available to verify this claim.

Overall, a rough assessment (details are provided in the table below) would indicate an actual decrease at consumer level (household and food services) between 2012 and 2020 of about 12%. It is not clear whether this could be attributed to COVID, as according to ESTAT, countries informed that they did not observe a general reduction in the amount of collected waste but only a reduction at food services level. The reduction of food waste throughout the whole food supply chain could be estimated at around 8%, but with a high level of uncertainty, so this was not taken into account when developing the baseline for this Impact Assessment.

Table 34 – Comparison of data reported by Member States with FUSION estimations with and without impact of UK data.

	ESTAT (2022)		FUSIONS (2016)		FUSIONS 2016 (without UK and food to sewer)
Total food waste	Ca 57 million tonnes (56.981.209)		Ca 88 million tonnes (87.6 ± 13.7)		ca 62 mln tonnes
Kg/inhabitant	127		173		
	share FSC [%]	mln tonnes	share FSC [%]	mln tonnes	mln tonnes
Primary production *	11%	6.2	11%	9.1	8
Processing/manufacturing	18%	10.1	19%	16.9	9
Retail/other distribution	7%	4.1	5%	4.6	4
Restaurants/food services	9%	5.3	12%	10.5	10

Households**	55%	31.2	53%	46.5	31
Scope	*Excludes any pre-harvest losses ** Excludes food waste to sewer		*Includes food ready-to-harvest and discarded from FSC **Includes estimation of FW to sewer		*Includes food ready-to-harvest and discarded from FSC **Excludes estimation of FW to sewer
Source of data	Collected in 2020 according to harmonised EU methodology		National estimations for several MS (ca 2012). The average from these was used to estimate food waste amounts for the rest of EU.		Own calculations based on FUSIONS
Countries concerned	EU-27 – based on 23 responses. (without BE, LV, MT and RO)		EU-28 (including UK and HR)		EU-27 (without UK)

When modifying the FUSIONS data by removal of the input (and impact) of the UK as well as removal of food-to-sewer, the main difference was found in household food waste (decrease from 46,5 to 31 M tons, i.e. by 1/3) as well as in food processing (decrease from 17 to 9 M tons, i.e. almost by half, however FUSIONS data waste from food processing had high uncertainty). Removing the UK from estimates has no impacts on data from retail and from food services.

Finally, comparing the national studies for household waste (Denmark, Estonia, Finland, Germany, Ireland, Luxembourg, Netherlands, Sweden) from 2012 which wereused in FUSIONS estimations, with the country values reported to ESTAT (2020) – the results vary from -15% (Finland) and -9% (Netherlands) to +28% (Germany) and +35% (Luxembourg). However, a possible link between these findings and the presence (or absence) of food waste prevention policy cannot be established.

Estimations of trends on food waste amounts before 2020

There is no data series available on food waste so far. 2020 is the first year for which data on food waste have been collected across the EU and according to a harmonised methodology. The FUSIONS project provided a one-off estimate of food waste levels.

Between 2010 and 2018, Eurostat has been working with Member States to see if data collected within the framework of the Waste Statistics Regulation (WstatR) could be used for the purpose of monitoring of food waste. Data collected through the Waste Statistics Regulation, according to the EWC-Stat and NACE waste categories which are considered relevant for food waste data collection, are shown in below.

Table 35 – Relevant waste categories and economic activities in WstatR for calculating Food waste estimates

Item	NACE ACTIVITIES / EWC-STAT		A01-A03 Agriculture, forestry and fishing	C10 - C12 Manufacture of food products, beverages, tobacco	G - U excl. G46.77 Service activities	Households	Total
31	09.1	Animal and mixed food waste	Data reported for the Waste Statistics Regulation (WStatR) – waste generation				
32	09.2	Vegetal wastes					
34	10.1	Household and similar wastes					
51	TT	Total					

As can be seen in the table above (blue cells), the WstatR breakdown of the EWC-Stat allows the distinction of the following waste types containing food waste:

- 09.1 “animal and mixed food waste”,
- 09.2 “vegetable waste”,
- 10.1 “household and similar waste”.

As these waste categories include more waste than just food waste, Eurostat developed relevant methodology and requested Member States for voluntary reporting of disaggregated data, in order to better assess the actual amount of food waste. Eurostat published these estimates covering the period between 2012 and 2018, as part of the Monitoring Framework on Circular Economy, specifically the indicator on amounts of food waste generated. The values have been stable over that period and ranged between 66 and 69 million tonnes.[258] The main challenge was due to the limited information on the share of food waste within household waste, especially mixed household waste, hence the decision to develop a monitoring framework dedicated to food waste.

Three graphs below show trends in the amounts of waste coming from 3 sectors of the economy, classified in the following NACE categories:

- NACE A: Agriculture, forestry and fishing – expected to include food waste from primary production;

[258] Monitoring framework - Circular economy - Eurostat (europa.eu)

- NACE C10-C12: Manufacture of food products; beverages and tobacco products – expected to include food waste from processing and manufacturing;
- NACE G-U_X_G4677: Services (except wholesale of waste and scrap) – expected to include food waste from retail and food services.

It should however be noted that, for all waste streams presented in the graphs hereunder, it is not possible to disaggregate the food waste component; therefore the evolution of food waste over time cannot be determined. ,

Figure 30 – Generation of selected streams of waste (expected to including food waste) from primary production, in M tonnes

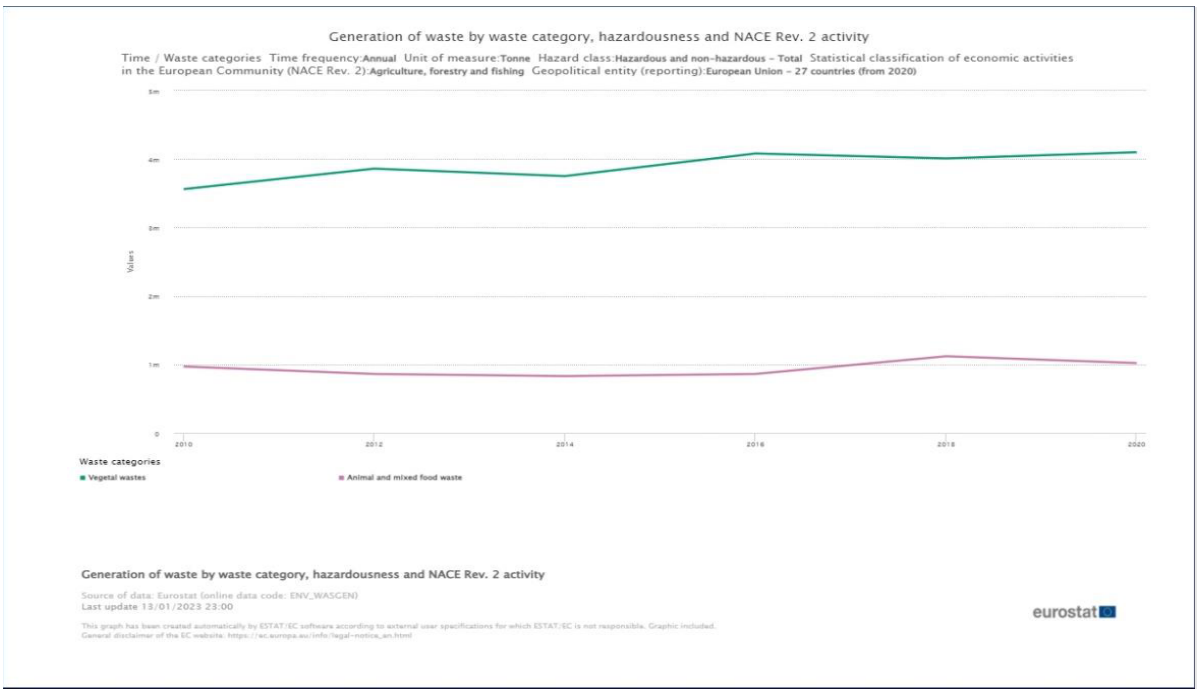


Figure 31 – Generation of selected streams of waste (expected to including food waste) from processing and manufacturing sector, in M tonnes.

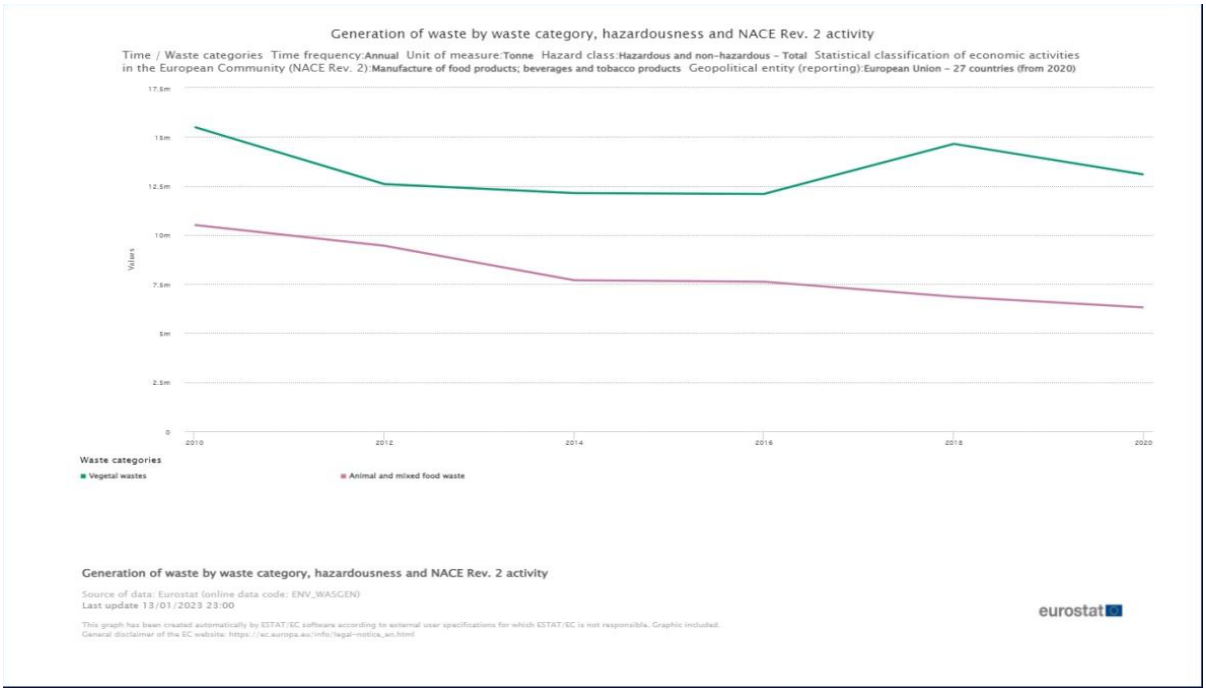
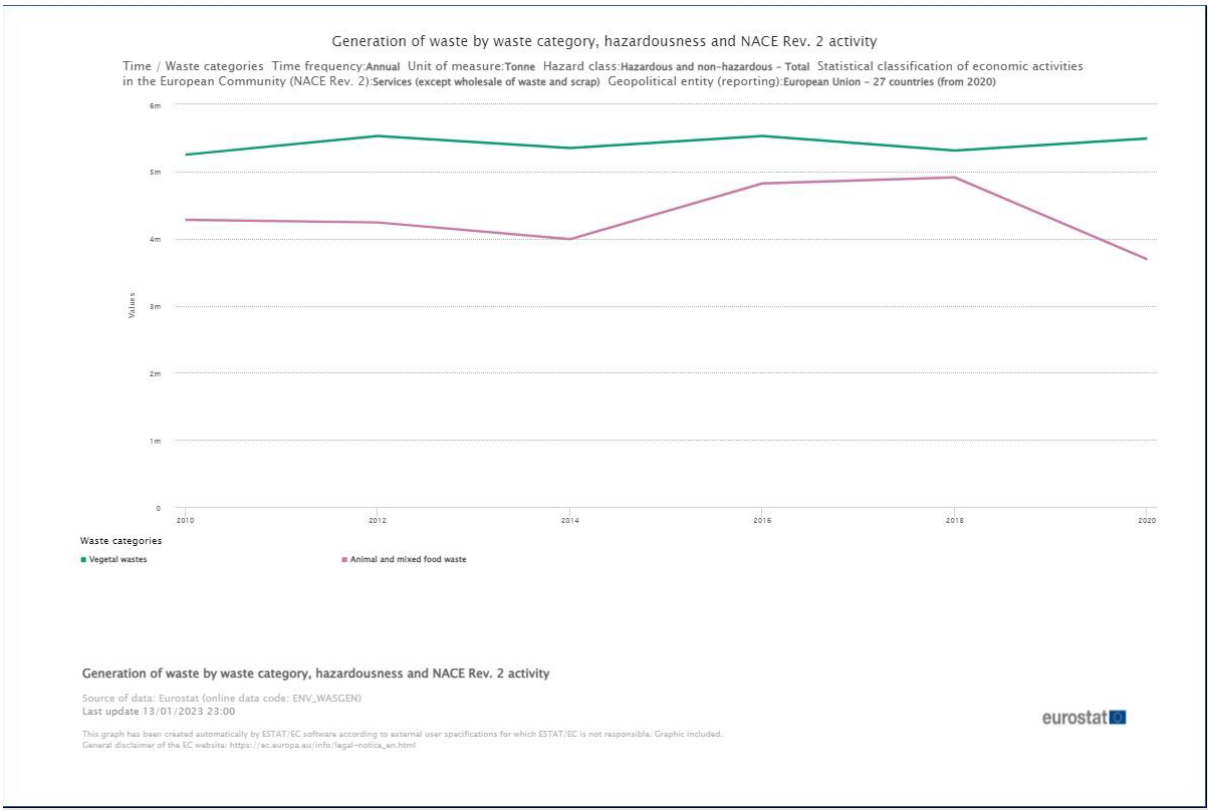
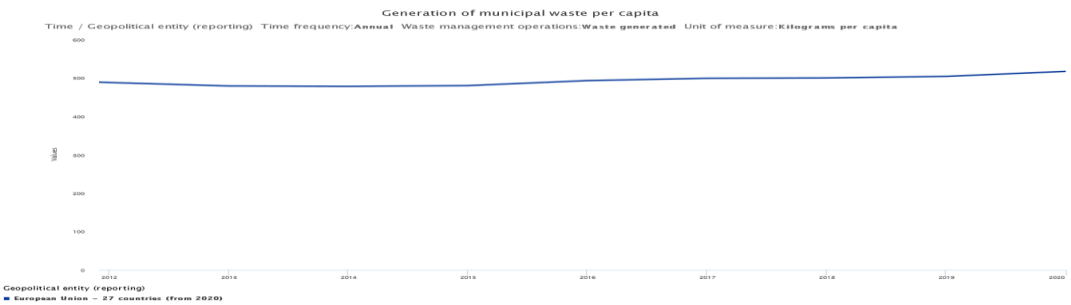


Figure 32 – Generation of selected streams of waste (expected to including food waste) from services sector, in M tonnes.



Finally, data on municipal waste (which include a large fraction of food waste) show stable trend.

Figure 33 – Generation of municipal waste in per capita (kg per capita, 2012-2020)



Generation of municipal waste per capita

Source of data: Eurostat (online data code: CEI_PC031)
Last update 26/09/2022 23:00

eurostat

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PART 3/4

COMMISSION STAFF WORKING DOCUMENT

IMPACT ASSESSMENT REPORT

Accompanying the document

Directive of the European Parliament and of the Council

amending Directive 2008/98/EC on waste

{COM(2023) 420 final} - {SEC(2023) 420 final} - {SWD(2023) 420 final} - {SWD(2023) 422 final}

ANNEX 7: PROBLEM DEFINITION

Annex 7 provides a detailed discussion of the problems and drivers that were identified in relation to food and textile waste, taking into account the outcome of supporting studies, stakeholders input and further analysis. Annex 8 provides the results of the preliminary analysis for other intervention areas that were subject to studies and stakeholder inputs.

1- Textiles

With regard to the textiles management, several problem drivers can be identified at all stages of the waste hierarchy. The full list is provided in the support study and includes those that cannot be tackled through a revision of the WFD.

The **visual problem tree** is presented as part of the intervention logic in Figure 2 - Intervention logic for textile waste.

The drivers that this initiative will attempt to tackle are detailed below and have been grouped according to their nature: regulatory and market failures as well as behavioural drivers.

Regulatory failures

- Different scopes and definitions
- Insufficient waste prevention activities
- Inconsistent separate collection schemes
- Insufficient sorting and recycling capacity

Market failures

- Distorted incentives for textile producers/brands to design long-lasting, reusable and recyclable products.
- Lack of circular business models at scale that extend the lifespan of products
- Insufficient funding to scale up separate collection and recycling
- Information failures

Behavioural drivers

- Consumption trends
- Insufficient citizen awareness
- Shift to online purchasing

Regulatory failures

Different scopes and definitions

Non-harmonised application of the notion of textiles

The Waste Framework Directive, albeit imposing specific obligations on the prevention and management of textile waste, does not provide a definition. In fact, there is no single notion of textiles as different EU legislation and strategies cover variable product categories under the term textile. Article 3(1)(a) of the Textiles Labelling Regulation defines 'textile product' as: "Any raw, semi-worked, worked, semi-manufactured, manufactured, semi-made-up or made-up product, which is exclusively composed of textile fibres, regardless of the mixing or assembly process employed". This definition is broad, and covers a wide range of products and materials, from yarns, fibres or fabrics to household textiles (towels, bed linen),

clothing, technical equipment and agricultural textiles containing at least 80 % by weight of textile fibres, as well as the textile component of other products such as floor coverings and coverings of mattresses and camping goods.

Textiles are also addressed at the industrial production statistics (Prodcom survey), that provides data on the production of manufactured goods carried out by enterprises on the national territory of the reporting countries. [1] Prodcom covers Mining and quarrying, Manufacturing and Materials recovery, i.e. sections B, C and E of the Statistical Classification of Economic Activities in the EU (NACE Rev. 2) [2], respectively. Production of textile goods is reported under divisions C13 (Manufacture of textiles) and C14 (Manufacture of wearing apparel), the latter including leather clothes, workwear, other outerwear, underwear, other wearing apparel and accessories, articles of fur, and knitted and crocheted apparel.

Common Nomenclature (CN) is an 8-digit goods classification tool set up to meet the requirements of both the Common Customs Tariff and the EU's external trade statistics used for export and statistical declarations[3]. The CN is also used in intra-EU trade statistics. At CN-classification, section XI is devoted to textiles and textile articles. In addition, Member States may also apply their own national codes for the classification of products, e.g. Basilea Codes in Spain.

There is no consistent application of any of these available definitions in the context of applying the rules on textile waste management in the Member States, in particular, in the context of applying extended producer responsibility schemes which create specific financial and reporting obligations on producers of textiles.

Non-harmonised definition of textile wastes and reporting on textile wastes

The WFD includes an obligation for Member States to separately collect textile waste from 1 January 2025. More generally, including in relation to textiles, Member States are required to take waste prevention measures, notably by encouraging the establishment of and support for preparing for reuse and repair networks, by facilitating, where compatible with proper waste management, their access to waste held by collection schemes or facilities that can be prepared for reuse but is not destined for preparing for reuse by those schemes or facilities, and by promoting the use of economic instruments, procurement criteria, quantitative objectives or other measures. However, the general definition of waste in the WFD is: "any substance or object which the holder discards or intends or is required to discard" and **there is no definition of textiles waste accompanying the obligations set out in the WFD.**

Member States have employed diverging practices in determining what is textile waste. **The categories how textile waste is grouped and accounted for under different reporting instruments in the EU also differ resulting in non-robust and non-comparable textile waste statistics.** Under the Waste Framework Directive, Member States report on municipal textile waste. The municipal waste reporting obligation stemming from the '2018 waste package' has a waste category W076_MUN 'Textiles' that will be reported annually from reference year 2020, in t +18. **The information that is collected is 'waste generated', 'waste collected separately' (voluntary), 'preparing for reuse'(voluntary), 'recycling' and 'other**

[1] EUROSTAT, *Prodcom - Statistics by products – Overview*, Overview - Prodcom - statistics by product - Eurostat (europa.eu).
[2] Complete list of all NACE Code (nacev2.com)
[3] European Commission, The Combined Nomenclature, The Combined Nomenclature (europa.eu)

recovery'. Some Member States reported the data already for year 2019 but as this was on a voluntary reporting there are big data gaps.

The European List of Waste (ELoW)[4] establishes a six-digit code for wastes, according to their origin and composition. Textile wastes are addressed in several headings both in chapters identifying the source of generation–subchapters 04 02 (waste from textile industries), 18 01 (human health care) and 19 12 (waste from the mechanical treatment of waste), and chapter 20 (municipal waste)–and in chapters based on the composition of waste–chapter 15 (packaging), subchapter 16 03 (off-specification batches and unused products). Certain headings relevant for textiles waste are therefore common for textile and non-textile wastes.

In principle, this classification would allow to differentiate between post-industrial textile waste (subchapter 04 02), pre-consumer waste (16 03), post-consumer waste (chapter 20) and textile waste generated at treatment facilities (19 12). However, interpretation on the codification of certain wastes may vary among Member (i.e. on consideration as municipal waste for waste generated by sources other than households).

Regulation on Waste Statistics (WSR) sets the legal framework for the Union level statistics on the generation, recovery and disposal of waste.

Waste generation data are provided granulated by two parameters: waste categories and source of waste generation. As for waste categories, data sets contain a breakdown into 51 aggregates according to the European Waste Classification for statistical purposes (EWC-Stat). Annex III of Regulation establishes a table of equivalence between EWC-Stat Rev4 and the European List of Waste.

There is a specific aggregate for textile waste (category W076 "textile wastes") as a segregated waste, that comprises worn clothing, miscellaneous textile waste and leather waste.

The scope for the reporting category 'textiles' at WSR includes some categories of waste that does not conceptually fall under the notion of textiles as relevant for the application of the specific textile waste management rules in the WFD, e.g., leather waste (fleshings and lime split wastes from the tanning sector) and organic matter from natural products (e.g., grease, wax).

Textile waste can also be part of other waste streams, such as W081 'Discarded vehicles' (e.g., in car seats), W101 'Household and similar wastes' (including bulky waste, such as furniture) and W102 'Mixed and undifferentiated materials'. In these cases, data correspond to the composed waste, so an estimation based on composition analysis would be needed to assess the content of textile.

Regarding its origin, generated textile waste can be broken down in 19 waste aggregations (18 economic activities according to the NACE rev. 2 classification, and waste generated by households).

Generation of household post-consumer waste could be obtained under this classification, but the share would also include leather waste. However, this statistic does not provide a breakdown into post-industrial, pre-consumer or commercial post-consumer waste, which are included into a broader range of categories and sources of waste.

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[4] 2000/532/EC: Commission Decision of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste (notified under document number C(2000) 1147), EUR-Lex - 32000D0532 - EN - EUR-Lex (europa.eu).

Under WSR, waste treatment covers waste generated minus exported waste plus imported waste. Waste treatment statistics can be broken down into six treatment categories (three recovery and three disposal operations).

Waste treatment statistics can be broken down into six final treatment categories (three recovery and three disposal operations). They do not cover intermediate operations, such as sorting, and integrate within the same operation code (R3) preparing for reuse and recycling.

The Waste Statistics Regulation includes a textiles category that is frequently quoted in established literature and indicates that 2.03 million tonnes of textile waste are generated in the EU in 2020. Waste treatment shows even lower figures. The reason for that is that a big share of textile waste moving within the EU is seen as second-hand products and not as waste in the receiving country. Similarly, textiles may be seen as second-hand textiles by the collector but as waste by a treatment facility or vice versa. The waste criteria of article 3 (1) of WFD is difficult to apply in the household sector, because textiles or often only given away under the constraint that they are reused.

With regard to reporting under the WFD, in accordance with the Implementing Decision (EU) 2019/1004, Member States reported the first set of data for the year 2020 to Eurostat but data has quality problems.

The main issue with the data reported pursuant to Implementing Decision (EU) 2019/1004 is that countries should estimate waste generation by material breakdown (including a specific class for textiles) by applying waste composition analysis to the different waste streams. The Eurostat guidance [5] indicates that countries should estimate waste generation by material breakdown (including a specific class for textiles) by applying waste composition analysis to the different waste streams. However, Annex V of Commission Implementing Decision 2019/1004, footnote 1 reads: "The amount of generated waste per material may be based on data on separately collected waste and on estimates derived from regularly updated waste composition surveys of municipal waste. Where no such surveys are available, the category of mixed waste may be used". **From the 2020 data, 14 countries out of 22 seem not to have applied such waste composition analysis.** Such sentence allows for different interpretations when to use waste composition analysis. In fact, for those countries, the municipal textile waste generation reported is as very low. In addition, residual waste composition analysis in different Member States is undertaken for different purposes, the way it is conducted varies, and therefore they are not comparable. The 30% share of e-commerce accounts complicates the accuracy of data of amounts of textiles placed on the market and the responsible traders. Data on the actual management of textiles following their discard is also not very robust, with little consistent data on the volumes collected, their reuse, their recycling and their disposal.

In the Waste Shipment Regulation, classification of certain textile or textile related product categories (e.g., shoes) is not fully clear, creating administrative burden when trading textile waste, mixed with for example shoes. [6] Textile waste can be classified under Basel entry B3030

[5] EUROSTAT, 2021, https://ec.europa.eu/eurostat/documents/342366/351811/Guidance+on+municipal+waste+data+collection/
EUROSTAT, 2021, https://ec.europa.eu/eurostat/documents/342366/351811/Guidance+on+municipal+waste+data+collection/

[6] See footnote **Error! Bookmark not defined.**

if […] the materials are not mixed with other wastes. [7] Mixed waste does not generally have a separate code and is regarded as "unlisted", resulting in their shipment being subject to the notification procedure. Some shipments of "clothing, accessories and footwear" waste for sorting and subsequent reuse have been stopped as illegal shipments of waste. [8] Some combinations of materials have been included in Annex IIIA of the Regulation, which means they can be shipped without prior consent within the EU. However, clothes and shoes is not a combination included in Annex IIA. The proposal for a WSR includes an empowerment to expand this list of mixtures. It can be noted that while shoes are sought after and have a relatively high price in the secondary market, the have very low recycling potential as they involve different processes, raw material and chemicals compared to textile fibres. [9] Since there are no uniform rules on the sorting requirements for re-use, such as end-of-waste criteria, the enforcement of Union rules on the shipment of waste remains challenging and subject to varied national decisions on the waste or non-waste status of the loads.

The Harmonized System Codes (Basel codes) is developed and maintained by the World Customs Organization and is used by customs authorities worldwide to identify traded products, and specifically for the purpose of subjecting certain waste to one or the other shipment procedure[10]. There are efforts made, both at EU and the global level (WCO) to clarify the interrelation between the CN and the Basel codes which are not fully aligned because they have different starting points: CN typically codes identify materials, without regarding the waste definition, while the Basel or EWC start from wastes as defined by the Convention or the WFD respectively.

Beyond product categories, **there is also confusion on how to consider the origin of textiles, i.e., whether post-industrial, pre-consumer and post-consumer (both from businesses and households) should be included in the scope of the term "textile waste" in relation to obligations under the WFD.** How the industry and Member States apply these categories (i.e. which products are included in which category) is also unclear as relevant data is exceedingly limited. In relation to municipal waste reporting Member States do not consistently include post consumer commercial waste in the municipal waste statistics, such as waste from horeca, hospitals and prisons.

There are different points at which textile materials may or may not be considered as waste are created, with raw, semi-worked, semi-manufactured and semi-made-up products generally becoming waste at the pre-consumer / factory waste stage whilst manufactured and made-up products generally taking the form of post-consumer textiles generally become waste following their use by the consumer.

Waste versus non-waste status

Whether collected textiles are considered waste or not depends on what is understood by the notion of "discards which is central to the definition of waste. Discarding can be interpreted differently depending on the intention of the user and the communication from the collector on the bin or otherwise (requesting only reusable textiles or not, certain specific kinds of textiles

[7] European Parliament, 2016, https://www.europarl.europa.eu/doceo/document/E-8-2016-003038-ASW_EN.html.
[8] EURIC, *Waste Shipment Regulation proposed legislative revision*, 2022, https://www.euric-aisbl.eu/position-papers/download/1687/586/32.
[9] Maletic, M., *Shoe Recycling Guide: Recycle Your Footwear Responsibly,* Green Citizen, 2022, Shoe Recycling Guide: Recycle Your Footwear Responsibly (greencitizen.com).
[10] Basel Convention, Harmonized System Codes for Wastes, Overview (basel.int)

(only clothes, clothes and shoes etc.) but also on what happens to the discarded item i.e., if a discarded item is collected and reused is it and should it be considered waste at any point or not. [11] There are no EU level harmonised criteria for differentiating waste textiles from used textiles destined for reuse. Therefore, there is confusion as to when the separately collected textile should be considered discarded and hence waste and when it could be considered as given as used good ready for reuse and hence not considered waste. Stakeholders indicate that typically what is collected over the counter or in other manned collection points is not considered waste while what is collected via containers is.

The waste status of used textiles is not applied consistently across Member States – and sometimes also different regions within one Member State. This difference has important implications for textile collection and subsequent treatment in relation to the obligations of the operators collecting, transporting and treating this material, statistics on textile waste. For instance, if textiles are defined as waste upon collection, waste collectors would need to be authorised to collect them, to be registered as a waste collector and to register the quantities collected [12].

In Italy, Austria, Germany, and the Netherlands, all collection of textiles via bring banks is classified as waste collection, regardless of the quality of the textiles or the intent of the deliverer. In France and Sweden, collected textiles are considered as used textile until they enter a waste sorting centre.[13] [14] In other countries, such as the Nordic countries, collection via bring banks is not classified as waste collection, provided collectors clearly indicate the type of material accepted or not.

Also, the WFD does not provide specific end-of-waste, i.e. sorting or other recovery criteria, for textiles so there is no common understanding under what circumstances (common waste categories, common standards for products "prepared for reuse" or "prepared for recycling") textile waste could be considered to have ceased to be waste and should be considered a product, in particular, for the purposes of recognising used textiles for re-use from waste) [15]. The need for harmonised EU level end of waste criteria for preparation for re-use and recycling are among the priority requests from the textile and textile waste industry to reduce the regulatory fragmentation and harmonise the sorting industry's standards and requirements to prepare textiles for reuse and recycling and therefore scale up these activities.

The inconsistent application of the waste and non-waste status to used textiles and the notion of textiles also impact the robustness of the new data flow on re-used textiles under Commission Implementing Decision (EU) 2021/19 on the reuse of products pursuant to which the first data will be reported to the Commission by the Member States in June 2023. The data on re-use of textiles cover used textiles that have never been defined as waste. It is expected that the first set of data available under this act will not be robust due to the lack of clarity that exists in that Implementing Decision, i.e. on the notion of textiles, when used textiles are categorised as waste or used product, under what circumstances reporting takes place under

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[11] ECAP, 2018, http://www.ecap.eu.com/wp-content/uploads/2018/07/ECAP-Textile-collection-in-European-cities_full-report_with-summary.pdf.
[12] ECAP, *Used textile collection in European cities,* 2018, http://www.ecap.eu.com/wp-content/uploads/2018/07/ECAP-Textile-collection-in-European-cities_full-report_with-summary.pdf.
[13] Interview with Refashion.
[14] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144
[15] Call for evidence (Policy Hub, Circularity for Apparel and Footwear).

that act or under the Commission Implementing Decision (EU) 2019/1004 which defines the reporting format for reporting on municipal textile prepared for re-use and due to non-harmonised methods for data collection and representativeness of the data sampling that Member States use..

Insufficient textile waste prevention activities and monitoring

The EEA study on 'Progress towards preventing waste in Europe – the case of textile waste prevention' [16] examined approaches of Member States to address textile waste prevention. **Whilst 40 measures were recorded in total only 6 out of 31 national and regional waste prevention programmes included specific indicators on textile waste prevention.** In relation to targets, it was found that none of the programmes quantified targets for textile waste prevention. This is considered as a major drawback in monitoring the effectiveness of waste prevention efforts and policies.

While Member State programmes do contain some measures on the prevention of textiles, as the problem definition demonstrates, the trends in terms of consumption and re-use of textiles are continuing to raise. Various regulatory and economic instruments and incentives can facilitate textile waste prevention, such as, facilitation of re-use, repair, sharing operations and business models through preferable national taxation systems. These measures should also actively engage the users and the producers of textiles to raise the awareness of users on the negative environmental and human health impacts linked to the textile production and waste management to change consumption behaviours. Such awareness raising measures and campaigns are instrumental also for the successful introduction and engagement of the society in participating in the separate collection systems, as demonstrated in other separate collection targeting other waste streams.

Inconsistent and insufficient separate collection schemes

Delays in implementation of the 2018 separate collection obligation

Article 11 of the WFD specifies that Member States shall take measures to promote high-quality recycling and, to this end, requires Member States to set up separate collection for at least for paper, metal, plastic and glass, and, by 1 January 2025, for textiles. Most Member States have transposed the separate collection obligation for textiles in their national legislation and some have already taken steps in planning, regulatory and procurement processes, albeit the implementation planning for five Member States could not be identified. Where plans are in place **a significant number of Member States have yet to adopt the additional measures necessary to implement these provisions in practice (i.e. the organisation of the infrastructure and operational services for separate collection and the supporting infrastructure for the sorting and recycling of the separately collected material). The collection rates are at a very low rate** with 12 Member States that currently have separate collection systems collecting less than 20% of discarded clothing and household textiles. The support study, based on a questionnaire addressed to the Member State competent authorities and literature review, estimates that the **timely implementation of the 2025 separate collection obligation will prove challenging** for the majority of Member States. An overview of the state of planning in relation to textile separate collection in mid-2022 is provided below alongside the state of separate collection in 2021 for each Member State. It shows that most Member States have identified textiles as a priority waste stream with regard to which specific regulatory and organisational measures on separate collection need to be introduced and rolled

[16] EEA, Progress towards preventing waste in Europe – the case of textile waste prevention, 2021.

out across the national territory. It also identifies the countries with regard to which information on the state of planning could not be identified.

Table 1 Overview of textile separate collection rate (in 2021) and the state of planning of further measures across the EU pursuant to Article 11 WFD

Member State	Collection rate %	State of planning in relation to separate collection
AT	30%	Introduction of preliminary measures and/or application of advanced prevention measures for textile waste
BE	55%	Introduction of preliminary measures and/or application of advanced prevention measures for textile waste
BG	18%	Introduction of preliminary measures and/or application of advanced prevention measures for textile waste
CY	20%	Textile waste is determined as a priority waste stream but collection rates remain low
CZ	18%	Textile waste is determined as a priority waste stream but collection rates remain low
DE	62%	Introduction of preliminary measures and/or application of advanced prevention measures for textile waste
DK	42%	Textile waste is determined as a priority waste stream
EE	17%	No planning identified
EL	18%	Textile waste is determined as a priority waste stream but collection rates remain low
ES	21%	Textile waste is determined as a priority waste stream but collection rates remain low
FI	47%	Introduction of preliminary measures and/or application of advanced prevention measures for textile waste
FR	39%	Introduction of preliminary measures and/or application of advanced prevention measures for textile waste
HR	19%	Textile waste is determined as a priority waste stream but collection rates remain low
HU	18%	Textile waste is determined as a priority waste stream but collection rates remain low
IE	34%	Textile waste is determined as a priority waste stream
IT	39%	Introduction of preliminary measures and/or application of advanced prevention measures for textile waste
LT	31%	Textile waste is determined as a priority waste stream but collection rates remain low
LU	25%	No planning identified
LV	12%	Textile waste is determined as a priority waste stream but collection rates remain low
MT	38%	Textile waste is determined as a priority waste stream but collection rates remain low
NL	45%	Introduction of preliminary measures and/or application of advanced prevention measures for textile waste
PL	18%	No plannning identified
PT	15%	No plannning identified
RO	18%	No plannning identified
SE	62%	Introduction of preliminary measures and/or application of advanced prevention measures for textile waste
SI	12%	Textile waste is determined as a priority waste stream but collection rates remain low
SK	12%	Introduction of preliminary measures
Total	39%	

Textiles are different to many other materials concerning the way they are collected at the point of discard. Typically, textiles suitable for both reuse and recycling are collected together. This means that to determine their best method of treatment against the waste hierarchy sorting must be undertaken to separate out reusable and recyclable textiles. The reusability and recyclability of material collected can only effectively be assessed after collection, at the sorting stage, either through manual or automatised sorting.

Additionally, there is no available detailed and accurate information on the types and quantities of textiles typically collected (clothes, household textiles, etc.). Consequently, there is no indication if and which of these categories may have better prospects of being reused ore recycled, except for shoes for which sorters and recyclers confirmed that they have a relatively high reuse value but very little recycling potential. The **Member States** with some separate collection of textiles networks already in place, those in the process of rolling them out or those only considering the possible options have **identified different scopes in terms of the products covered by the separate collection activities** as detailed in Annex 6. There are also different approaches to collecting textiles both for reuse and recycling, with clothing and household textiles generally separately collected through separate collection bins but mattresses and other similar bulky materials containing textiles collected curbside or disposed of in civic amenity sites. Post-consumer textiles from commercial sources (e.g. horeca, hospitals, prisons, schools) are subject to private waste management operations which may also entail separate collection. Stakeholders consider that this fragmentation, making the collection largely limited to household used clothes, is an additional barrier to collection.[17] It also hinders the development of at scale sorting and subsequent treatment of sorted textiles that would provide a consistent supply, composition and quality of textiles for an integrated market in reuse markets for textiles and markets for secondary raw materials from textile waste.

The table below illustrates the wide variety of the textile products that are subject to separate collection systems nationally. This impacts the material composition of the collected material and the cost and therefore the feasibility of subsequent sorting for re-use or recycling since sorting operations generally have predefined acceptance criteria for the material composition it may process. The information in this table is gathered based on a questionnaire survey of Member State competent authorities and an analysis of available literature. Most collection schemes focus on the collection of small textile items from households.

Table 2– Scope of separate collection schemes in the EU Member States, 2022

Member State	Scope of products accepted in the separate collection systems for textiles
Belgium	Flanders: Clothing and accessories (belts, bags, shoes per pair) – Bedding (pillows, sleeping bags, sheets, blankets and duvets) – Kitchen and bathroom textiles – Home textiles (tablecloths, curtains, seat covers) – Cuddlies – Clean rags, textiles with small defects. Brussels: clothing, household textile, footwear, bedlinen, towels.
Bulgaria	EPR: textile and footwear.
Czechia	Clothing, household textile, footwear

[17] Stakeholder workshop.

Germany	Separate collection: clothing, household textiles and footwear
Denmark	Separate collection on textile waste: clothing and other household textile waste that is not suitable for reuse. Footwear is not included.
Greece	Clothing, household textiles, professional clothing and textiles. Also, an EPR for mattresses under study.
Finland	Clothing, textiles
France	Clothing, household textiles and footwear
Croatia	Clothing, household textile, professional clothing and textiles. Also, an EPR for mattresses under study.
Hungary	Currently: clothing, shoes. Planned EPR: clothing, household textiles, curtains, carpets and textile floor coverings.
The Netherlands	Clothing, household textiles, shoes. EPR: clothing

Lack of information on or fragmentation of waste management responsibilities

Further, **there is great variety in the responsible entities that are legally responsible for the collection of textiles**. **f**or many Member States, textile collection operates in the absence of specific legislation assigning responsibility for the management of textile waste, principally through charitable and commercial collectors. [18] In view of the mandatory separate collection obligation to be implemented, this responsibility should be specifically assigned since it entails management costs. The various approaches of Member States have led to significant diversity in the way that separate collection schemes operate as well as the level of Member State maturity with respect to amounts separately collected across the EU[19]. In some cases, due to the presence of several actors collecting textiles in the same territory, there can be situations where competition builds between them. Where social enterprises/charities operate in the same locations as commercial textile collectors this may also impact on the ability for social enterprises to operate effectively. An overall coordination of the instructions to citizens on the separate collection systems from all the actors is important to avoid the confusion of citizens who generate textile waste and, where appropriate, also of the citizens' desire to partake in social and charitable activities. To reduce confusion among citizens, some municipalities decide to grant permission to collect textile waste to only few actors. Municipalities also take part in textile collection and are responsible for the subsequent treatment and ownership decisions, including passing collected waste to charities or social enterprises or commercial collectors. [20]

[18] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144

[19] See footnote 7, p. 6, stakeholder workshop.

[20] ECAP, 2019. ECAP and used textiles. http://www.ecap.eu.com/wp-content/uploads/2019/07/Guidance-for-Textiles-Collections.pdf

The great variety of actors engaged in collection and the fragmentation of the resulting material streams hampers coordinated investment planning in collection, sorting and subsequent management infrastructure, as noted in the stakeholder interviews undertaken and duplicated in the textile stakeholder workshops. The confusion in responsibilities, actors and collection systems put in place provide a source of confusion for stakeholders in how to manage their textiles at the point of discard and planning at the municipal level challenging.

Some **Member States have indicated that they are waiting for the outcome of discussions at EU level in the context of this initiative to take stance at national level on the separate collection implementation**. This is related to decisions both in terms of the scope of textiles subject to the obligation and to the collection approach, namely giving the responsibility of the separate collection obligation to municipalities (such as Finland) or to the producers of textiles through the setting up an EPR scheme, including its specific operational and organisational features (such as Netherlands) and the role of commercial and social/charitable enterprises (such as Spain mandating a specific share of textiles to be collected and managed by social enterprises).

Inconsistent application of extended producer responsibility

With regard to those Member States that have established an extended producer responsibility (EPR) to manage textile wastes or those that are assessing the feasibility of doing so and its features, **a divergence in approaches to defining the scope, operational and organisational features of the EPR schemes can be observed**. France is currently the only Member State with an EPR for textiles in place. The Netherlands, which was due to implement EPR for textiles on 1 January 2023 (and has been delayed until summer 2023 according to the latest information available) will be the second Member State to implement EPR for textiles and Sweden, based on the state of its national discussions, could become the third country to introduce it. The scope and operational and organisational features of these EPR schemes varies and the potential for other yet different EPR schemes for textiles across the EU risk the development of rapidly diverging schemes. This regulatory fragmentation would hamper the development of an integrated Union market for re-use and waste textile management and uptake of secondary raw materials because the compliance costs and the administrative burden resulting from the manoeuvring potentially 27 different EPR rules and uneven level playing field for the involved operators across the EU would hamper their ability for coordination and investment in sorting and recycling which are intrinsically cross-border activities and sensitive to the demand market needs as well as other market factors such as the labour costs of sorting operations.

The below table compares the approaches applied in the EPR schemes for France, the Netherlands and Sweden (based on a draft decree subject to public consultation) for certain operational and organisational features of the EPR schemes. Any divergences that apply across the Member States for the same product or the same obliged economic operator would create administrative burden that would impact their competitiveness and ability operate across the common EU market. As the facts and figures laid down in Annex 6 explain, the textile sector is highly integrated both at placing on the market of textiles, used textiles and sorting and recycling activities. The table demonstrates that there is a difference in the scope of products covered by the EPR schemes and the mode how the products are identified, namely, the degree of legal certainty offered on which products are within the scope and which not. These differences create uneven level playing field to the producers operating in different Member States and reduces the competitiveness of the producers operating across several Member States due to compliance costs resulting from understanding and operating under different

regulatory regimes for the same product and activity. The varied scope will also undermine the attainment of economies of scale for sorting and recycling which require consistent and standardised composition. Another key difference is the different approach to treating SMEs and the criteria for fee modulation.

Criteria	Member State		
	FR	**NL**	**SE**
Scope	New clothing textile products, shoes or household linen intended for private individuals and, from 1 January 2020, new textile products for the home, excluding those which are furnishing elements or intended to protect or decorate items of furniture. Note that CN codes are not specifically addressed in the Ministerial Decree;	Using the relevant CN codes: Household textiles : table, bed and household linen as referred to in Chapter 63, Part I, heading 6302 Clothing : consumer and industrial clothing as referred to in Chapters 61 and 62; Specifically excluded goods are: Shoes, bags, belts (no textile products); Unsold inventories at producers (not placed on the market); Returns to producers upon cancellation of purchase (not placed on the market); Blankets (6301); Net curtains , curtains and roller blinds (6303); Bedspreads (6304); Pockets (6305); Tarpaulins , sails , tents (6306); Mop , Dishcloths , Cleaning Cloths , Dusters (6307)	Using the relevant CN codes: 4202 1291 Bags with textile exterior 4202 1299 Bags with textile exterior 4202 2290 Bags with a textile exterior 4202 3290 Articles normally carried in the pocket or purse 4202 9291 Bags with textile exterior 4202 9298 Bags with textile exterior 57 Carpets and other textile floor coverings 61 Clothes and accessories for clothes knitted or crocheted 62 Clothing and accessories for clothing not knitted or crocheted 6302 Bed linen, table linen, toilet towels, kitchen towels and similar articles 6303 Curtains, blinds and draperies; curtain valances and bed valances 6304 Other furnishing articles
Reporting frequency	Annual	Annual	Annual
Reporting date	By March 31 on previous years data	By 1 August on previous years data	By March 31 on previous years data
SMEs addressed	Yes, albeit a flat fee of 75 euro per year is applied to producers with less than 750 000 euro turnover per year or if they sell less than 5 000 products in France	A further explanation is also requested of the possibility of exempting small producers from the reporting obligation in the ministerial regulation. The latter is indeed possible: an exemption can be included for producers who produce up to a certain size. In the case of plastic packaging, for example, it has been decided in the ministerial regulation on packaging reporting that producers who use less than 50,000 kilograms of packaging annually are exempt from the reporting obligation under the Decree. No decision has yet been taken on whether an exemption will be applied to textile producers and where the limit would be. This is laid down by ministerial regulation. A basis for this is included in Article 7(3) of this Decree. No decision on this has yet been taken	The investigation has assumed that all manufacturers, sellers and renters of textiles are producers. This would include SMEs.
Obligation to use a PRO	Producers can either set up an individual scheme for the recycling and treatment of this waste or can contribute financially to an organisation created for this purpose and to which they belong (a producer responsibility organisation - PRO).	Producers can jointly implement the obligations arising from the EPR textiles (Article 6 of the EPR Decree). The obligations resting on the individual producers will then be transferred to the producer organization, which will notify the Minister of Infrastructure and Water Management on behalf of these producers. It is estimated that the implementation of the Decree will cost 16.8 FTE at the level of individual producers, compared to an expected 5.8 FTE if a producer organization is present.	Producers can use a PRO but it is not obligatory.
Eco-modulaton	Eco-modulation is applied based on durability and recycled content of products	This is regulated in Article 6, third paragraph, of the UPV Decree. The fourth paragraph of this article obliges the producer organization to differentiate the contribution of producers if possible, in particular by taking into account the entire life cycle of products and the durability, reusability, recyclability and the presence of hazardous substances. In view of Article 6(4) of the EPR Decree, however, tariff differentiation falls under the responsibility of the producer organisation(s).	In order to obtain permission to operate a collection system, the applicant must thus demonstrate that the fee for an individual producer, whenever possible, adapted based on the properties of the textile that the collection system has undertaken to take care of when it becomes waste. When the fee is calculated, a life cycle perspective must be applied and special consideration must be given to properties that affect the textile's active lifespan and material recyclability. If the Commission publishes guidelines and adopts harmonized criteria, the operator of the collection system and the Swedish Environmental Protection Agency can use these as a starting point when applying this requirement.

Several other Member States are at different stages of planning or assessing the feasibility and appropriateness of introducing an EPR, including the different features of the EPR schemes. This increases the risk of further regulatory fragmentation for same products and economic operators. As these schemes develop it is expected that the divergences identified in the case of French, Dutch and Swedish systems will continue on a larger scale across the EU as Member States determine the scope and nature of their own schemes. In each of these cases variation of the requirements is likely to result in a lack of level playing field across the EU for producers, re-use and waste management operators, their competitiveness and ability to effectively and swiftly scale up re-use and recycling of textiles.

- **In Bulgaria**, there is a legal requirement in place to set up an EPR scheme for textiles, with a delegated act expected to follow shortly. The Bulgarian Waste Management Act (WMA) was amended in 2021 so as to include textiles as the seventh stream to be managed under EPR. All Bulgarian EPR schemes (including future textile ones) operate on a competitive basis, involving two or more EPR organizations. Regulatory details on the scope of the textile EPR scheme are meant be presented in the upcoming delegated act. That being said, one of the key regulatory aspects already clarified in the WMA has to do with the minimum requirements which future textile EPR organizations need to meet in order to start their operations. For example, these requirements relate to a minimum financial guarantee which has to be deposited by each EPR organization at the start of its operations, as well as a legally mandated minimum number of municipalities that must be served by every EPR organization. As of 2022, there are two prospective producer responsibility organizations (PRO) for textiles which have already paid the required financial guarantee and are currently in the process of concluding contracts with municipalities.

- In **Belgium**, a voluntary system called Circletex is in place. The aim of Circletex is to facilitate the collaboration between service providers, manufacturers and other stakeholders and meet the supply and demand of materials and products. They also facilitate separate collection, sorting and valorisation of pre-consumer and post-consumer textile flows. In doing this, they apply the principles of circular economy. In phase one, they created a PRO. At this stage, their focus is on reporting and data gathering. They collect fees which consist in provisions until the start of EPR scheme.

- In **Italy**, Sistema Moda Italia (SMI), a trade association for Italian textile companies at the industrial level, in view of making the textile industry more resilient, have argued for a harmonised EPR system and proposed the scope of EPR to include clothing, household textile, footwear, and leather accessories. The EPR scheme would include all types of textile products including household textiles and professional textiles. The EPR scheme also entails prevention of waste as part of the objectives of EPR.

- In **Spain**, the legislation on waste mandates the establishment of the separate collection of textiles by the 31st of December 2024, and the EPR will be mandated within 3 years. A law on EPR has been adopted in April 2022. The observatory of the textiles industry ("Observatorio español") was created by sectorial organisations (representing more than 350 organisations) - among others, they are engaged in the scoping and research work need to create a Spanish EPR for textiles.

- In **Slovakia**, the Slovak Ministry of Environment is considering EPR for the future collection, treatment and recycling of textile waste.

- **Finland** on the other hand has chosen to introduce separate textile waste collection by 2023 with a nationwide collection system involving all Finnish municipal waste companies and mechanical processing plant, with intentions to process post-consumer textile waste from Finland and potentially also from the Baltic Sea region. Research suggests a market potential in Finland for mechanical recycling of textiles worth between €60 million and €120 million with employment creation between 150 and 300 jobs following initial investment in the range of €20- 30 millions.

Insufficient sorting and recycling capacity

The lack of a harmonised definition of 'textiles' and of the scope of textiles subject to separate collection is not conducive to planning and scaling up sorting and recycling infrastructure across the EU where it negatively impacts the cross-border shipments in used and waste textiles and the consistency in scale and composition of material flows to attain economies of scale. It is also the responsibility of the Member States to identify in their national and regional waste management plans the amount of textile waste generated and the infrastructure needed to collect and treat it, including the financing sources; therefore, it is within the remit of the competent authorities to engage with the economic operators in securing the treatment installations for the treatment of its waste.

Sorters consulted in the context of this initiative have indicated that manual sorting remains profitable in the context of the overall reuse business case if a maximum of about 20% of the collected textiles are waste. Several studies have taken place to analyse the textiles currently disposed of in residual waste that would be additionally separately collected and their possibility to be reused or recycled.

The results of the analysis undertaken is summarised in the table below. The presented numbers give a wide range of reusable, recyclable and waste (not reusable or recyclable) textiles found in residual waste depending on the scope of textiles assessed in each study. This, in part, reflects the different levels of separate collection in place with lower levels of separate collection likely to inform higher levels of reusable and recyclable textiles found in residual waste and vice versa. As an average, therefore, it is considered that of textiles currently discarded in residual waste 24% is likely to be reusable on average, 31% would be recyclable (notwithstanding further technological developments in sorting and recycling technologies) and 42% would likely be residual waste.

Table 3 – Textile waste potential to be reuse and recycled

	Reusable	Recyclable	Waste (not reusable or recyclable)
NL 2015[1]	24%	32%	44%
NL 2016[1]	20%	31%	50%
NL 2017[1]	23%	29%	30%
NL 2018[1]	28%	30%	42%
DK[2]	23%	64%	13%
DK[3]	65%		
SE[4]	59%		
UK[5]	59%		
UK[6]	43%		

Sources: [1]Rijkwaterstaat 2020[21]; [2]Watson et al, 2018[22]; [3]Nørup, 2019[23]; [4]Hultén et al, 2016[24]; [5,6]JRC, 2021[25]

The information provided in Annex 6 indicates that at present 0.5 -1.0 Mt of used and waste textiles leave the EU unsorted due to a **gap in sorting capacity**. There is also a **lack of recycling infrastructure in the EU**. Closed-loop textile-to-textile recycling processes are still under development and have not yet reached commercial stage or market penetration on a large scale. [26] There is also a lack of funding for sorting capacity and recycling technologies. Many of the more promising chemical recycling technologies are still not operating at industrial scale. As such, only a minor share of used and waste textiles is recycled into new textiles (further information available in Annex 6), such as clothing. [27] Current textile recycling processes are often a matter of downcycling where the recycled material is of lower quality and functionality than the original material. Approximately 30% of the used textiles that are separately collected in Europe each year are used as industry wipes or for other recycling purposes on European and global markets. [28] The exact timescales and scale for rollout of greater recycling capacity and development of recycling technologies also remain unclear albeit Rehubs indicates funding needs of €6-7 billion up to 2030 with the source of this funding also unclear.

Looking at the level of collection of textile waste within the EU that sits at approximately 2.44 million tonnes per annum and reuse that is approximately 1.10 million tonnes per annum, the maximum amount of textiles that would be available for recycling sits at approximately 1.34 million tonnes per annum. However, current recycling capacity within the EU sits at approximately 0.70 Mt-0.85 Mt per year[29], dominantly for open loop recycling. A current recycling gap of approximately 0.49-0.64 million tonnes currently exists A move to use greater levels of closed loop recycling would see an even greater investment gap that would need to be addressed.

To make recycling economically viable, **the recycling industry needs sufficient and regular volumes of well-sorted textile waste of a certain quality**. The amounts of textile waste collected are not yet sufficient for recycling to take place at an industrial scale. An increase in

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[21] Rijkswaterstaat 2020. Samenstelling van het huishoudelijk restafval, sorteeranalyses 2019 (Composition of household residual waste, sorting analysis 2019). Rijkswaterstaat. Dutch Ministry of Infrastructure and Water. available at: https://www.afvalcirculair.nl/onderwerpen/linkportaal/publicaties/downloads/downloads-0/samenstelling-7/

[22] Watson, D, Trzepacz, S. & Gravgård Pedersen, O. 2018b. Mapping of textile flows in Denmark. Danish Environmental Protection Agency Project no. 2025.

[23] Nørup 2019. An environmental assessment of the collection, reuse, recycling and disposal of clothing and household textile waste. PhD Thesis from Danish Technical University (DTU).

[24] Hultén, J., Johansson, M., Dunsö, O., Jensen, C. 2016. Plockanalyser av textilier i hushållens restavfall, En kartläggning av mängder och typ av kläder, hemtextilier och skor. Report by IVL and SCB in Swedish for SMED.

[25] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144

[26] See footnote **Error! Bookmark not defined.**

[27] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144

[28] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144

[29] Joint Research Centre. 2023. "Techno-scientific assessment of the management options for used and waste textiles - Preparatory study for the possible setting of preparation for re-use and recycling targets" (unpublished work).

collection rates would ensure that more textiles are collected, but not that the quality of the textile waste is sufficient to reintroduce these textiles into a circular loop. Indeed, the composition of non-reusable textiles waste arising in Europe is largely unknown, and this knowledge gap may be hindering private investment in industrial scale recycling facilities. In comparison to post-consumer waste, post-industrial waste is likely to consist of a smaller variety of fibre types and material blends [30] and have a well-identified material composition compared to post-consumer waste [31]. There is also a lack of industrial scale technologies for sorting the collected textile, separating blended fibres, separating fibres from chemicals including colour during recycling, and establishing which chemicals were used in the production in the first place. Manual sorting is unable to meet the demands of the recycling industry to provide the consistent quality and large volumes that are required for textile recycling at large scale, as the process is time-consuming and not cost-competitive.[32]

The support study found that sorting and recycling technologies are not presently mature enough to deal with the complexity of textiles. The input requirements for closed-loop recycling have specific needs in terms of purity of input and these often require manual and automated sorting that drive up the costs. There is also the need to remove disruptors like zips, buttons and the like prior to recycling. The recycled fibres are shorter and lower quality and thus lose 75% of their value. They are therefore not usually used to manufacturing new clothes, but are rather downcycled into insulation material, wiping cloths or mattress stuffing[33]. The recycling business model is weak due to high costs and low market demand since recycled textile fibres are not competitive compared to virgin fibres[34]. The JRC[35] notes that the use of waste in replacement of primary materials, if used by final consumers, is often prevented by the waste status of the material. Waste is associated with discarding and users may fear to use waste instead of primary materials with a predicted quality.

There are also limited research and development funding opportunities. The current research focuses on recycling of clothing and not of footwear or household textiles. There is lack of recycled content commitments by the industry or legal requirements setting such requirements in new textile products, which could boost the uptake of recycled materials in textiles, and would drive the demand side for recycled materials, engaging the recycling industry in long term infrastructure investments. In terms of the Technology Readiness Levels (TRL) of textile recycling technologies, a European Commission technical study[36] identified the following information.

Table 4 – Technology Readiness Levels of different recycling technologies

Textile recycling technology	**Current TRL**	**Year expected to reach TRL of 9**
Mechanical recycling	9	Present day

[30] See footnote 145, p. 87.
[31] See footnote **Error! Bookmark not defined.**
[32] Call for evidence (TOMRA).

[33] European Parliament, 2019.
https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2019)633143.
[34] See footnote **Error! Bookmark not defined.**
[35] JRC, *End-of-waste criteria*, 2009.
[36] See footnote **Error! Bookmark not defined.**

Mechanical recycling to spinnable fibres	7	Not specified
Thermo-mechanical recycling of post-industrial waste	7	2023
Thermo-mechanical recycling of blends of thermoplastic materials	2-3	Not specified
Thermo-chemical recycling	9	Present day
Polymer recycling of cotton	7-9	2025 for those currently 7-8
Monomer recycling of PA6 and PET	9 for PA6 textiles, 4-& for PET textiles	Present day for PA6, 2023 for first PET textiles technologies
Recycling of polycotton blends using solvent-based dissolution and filtration	5	2024/2025
Recycling of polycotton blends using hydrothermal technologies	6-7	2023/2024
Recycling of polycotton blends using enzymatic route	6	2023

Further, hazardous substances can potentially be present in recycled materials obtained from textile waste, be it as a result of prior use of currently restricted substances in the textile itself or the textile getting soiled with hazardous substances during use or contamination resulting from mixing with other waste streams. [37] These information gaps about the amount and nature of hazardous substances in textiles make it difficult to assess whether the different recycling technologies will be effective in removing these substances and can make the recycling process more difficult and expensive. [38] In comparison to post-consumer waste, pre-consumer and post-industrial waste is likely to consist of a smaller variety of fibre types and material blends with the identification of the material composition simpler compared to post-consumer waste. Additionally, contamination by soiling of post-industrial and pre-consumer textile wastes is generally not an issue. Post-industrial pre-consumer wastes are also less likely to contain disruptors such as buttons and zips meaning that the waste materials that are generated are more suitable for recycling that post-consumer textiles and is part of the reason why some recycling technologies limit themselves to processing post-industrial or pre-consumer textile waste streams. This makes these types of waste a valuable input to supporting the development of recycling infrastructure across the EU.

[37] H&M group, IKEA, Adidas, Bestseller, PVH, Gap Inc, Kingfisher, *Collaborative study on chemicals in recycled textiles,* 2021, https://www.naturvardsverket.se/contentassets/be04327b5a874955a5402d4f663d1632/webinar-collaborative-study-chemicals-recycled-textiles-hm-ikea.pdf.

[38] See footnote **Error! Bookmark not defined.**

The JRC study "Assessment of the definition of recycling"[39] indicates that "quality of recycling is a rather complex concept, at the same time acknowledged as very important and left undefined in both EU acquis and scientific literature…The quality is important as it determines the type of use of the recyclate and its further recyclability. This in turn affects the closure of material loops in specific sectors/markets, i.e., the circularity".

The share of worn out and lower quality textiles has increased, due to the large market share of fast fashion (characterised by low-price, low-quality clothing) and to emerging trends of consumers selling their best quality textiles themselves via C2C exchange platforms[40]. There is also some confusion on what textiles to give for collection. Citizens typically don't give what they do not themselves consider reusable but this may in fact be reusable on global markets or, failing that, recyclable. A message that everything is accepted can solve this issue and increase collection rates. On the other hand, collecting worn-out textiles negatively affects the economics of the collector; collection costs per tonne remain relatively unchanged, sorting costs increase, and the price per kg that textiles can fetch on global markets falls rapidly as the reusable share reduces. The share of top-quality reusable clothing has also been decreasing because the amount of separately collected textiles is increasing in Europe[41].

In practice, re-usability and recyclability of the textiles collected can only effectively be assessed after collection, through professional sorting. [42] The **lowering quality of textile causes less possibility for reuse in the EU and the global market.** In France, for example, the volumes of items going for reuse has decreased by between 10% and 15% during the last 3-4 years. [43] Even textile collectors in the Nordic countries, with traditionally high shares of top-quality reuse clothing ('crème'), experience an increased used textile market pressure. Whereas collectors with long term contracts and higher than average quality can still sell collected textiles with no sorting ('original') at higher prices, the on the spot-market has dropped to 20-26 Eurocents per kilogram[44]. This represents less than a third of market prices reached some years ago [45]. This creates strain on the business models of charity actors, who rely on the good quality of reusable textile to finance their activities and also creates costs for the disposal of non-reusable textiles when charities receive such products.

Market failures

Distorted incentives

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[39] Grant, A., Cordle, M. and Bridgwater, E., Quality of Recycling - Towards an operational definition, Canfora, P., Dri, M., Antonopoulos, I. and Gaudillat, P. editor(s), Publications Office of the European Union, Luxembourg, 2020, ISBN 978-92-76-25426-3, doi:10.2760/225236, JRC122293.

[40] Köhler, A., Watson, D., Trzepacz, S., Löw, C., Liu, R., Danneck, J., Konstantas, A., Donatello, S., Faraca, G., Circular Economy Perspectives in the EU Textile sector, Publications Office of the European Union, 2021.

[41] Euwid Recycling & Entsorgung, (2019); Ljungkvist et al, (2018) in Danish Environmental Agency,2020. Towards 2025: Separate collection and treatment of textiles in six EU countries.

[42] Watson, D., Kirstine Aare, A., Trzepacz, S. and Dahl Petersen, C., *Used Textile Collection in European Cities,* ECAP, 2018 Technical report templates (ecap.eu.com).

[43] EEA, *Progress towards preventing waste in Europe - the case of textile waste prevention,* 2021.

[44] Euwid Recycling & Entsorgung (2019) in Danish Environmental Agency,2020. Towards 2025: Separate collection and treatment of textiles in six EU countries.

[45] Danish Environmental Agency, *Towards 2025: Separate collection and treatment of textiles in six EU countries*, 2020.

Textile producers/ brands lack incentives to design long-lasting, reusable and/or recyclable products[46]. In addition, prices of new textiles do not account for the negative environmental externalities of manufacturing, transport and waste management. These negative externalities are significant, with the EEA[47] noting that textiles have on average the fourth highest negative life cycle impact on the environment and climate change, after food, housing and mobility including in relation to:

- Raw material use amounting to 391kg per person in the EU per annum.
- Water use amounting to 9m3 per person for the production of textiles and 44m3 per person for the production of the raw materials used in textile production per annum. 88% of
- Land use in the supply of textiles to the EU of around 180 000 km^2.
- Greenhouse gas emissions of 270kg CO2e per person per annum.

Most of the environmental impacts generated by Europe's textile consumption takes place outside Europe, that is the case of 80% of primary raw materials, 88% % of water and 92% of land used, and 73% of greenhouse gas (GHG) emissions.

Additionally, the waste management costs of used clothing and household textiles are not addressed in the price of new products. On average, the costs of collection and treatment would equate to approximately 12c per item. However, these costs vary by item type, with those involving a mix of textile fibre types and the inclusion of disruptors (for example buttons and zips) costing more to manage and those that comprise a single fibre type with no disruptors such as T-Shirts costing less. Given the large volumes of textile wastes currently disposed of in residual waste the costs of disposal and the environmental externalities of that disposal including emissions from incineration / energy recovery and emissions from landfilling are also not addressed in the pricing of new textiles.

Furthermore, it is often cheaper to buy new products rather than repair broken ones, partly also due to their low quality. Labour costs in particular impact on the competitiveness of repair in comparison to buying new purchases that benefit from economies of scale producing the same good in a batch rather than tailor repairs that operate on an item-by-item basis.

There is also insufficient collection of non-reusable textile, given that **traditional collection focuses on collecting textiles for reuse** and concerns mainly post-consumer waste. There is little/no focus on collection for recycling because of the high costs of collecting non-reusable textiles[48] and according to stakeholders, little focus on post-industrial waste and post-consumer commercial waste.[49]

Lack of circular business models

Current product design practices hamper the development of circular business models at scale that could extend the lifespan of products: reuse, repair, remanufacture, product-as-a-service systems (textile leasing, rental, etc.)[50]. It also leads to some textiles not being fit for recycling.

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[46] Stakeholder workshop, call for evidence.
[47] EEA, 2022. Textiles and the environment: the role of design in Europe's circular economy
[48] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144
[49] Stakeholder workshop.
[50] Stakeholder workshop, call for evidence (Policy Hub, Circularity for Apparel and Footwear).

It is particularly difficult to determine the size and trends of the reuse market because of many sales taking place informally such as physical donations to known people, markets, and the numerous online platforms or apps. However, sales data from online platforms shows an explosion in growth with younger, style-conscious shoppers being the main driver of the growth[51]. It is also difficult to determine whether second-hand purchases replace new ones or not. Farrant et al. (2010) found that the purchase of 100 items of SHC was estimated to reduce the purchase of between 60 and 85 virgin clothes, depending on the place of reuse[52]. As of mid-2023, Member States will also have to report data on the amounts of textiles reused (from reference year 2021), in line with Implementing Decision (EU) 2021/19 [53] which lays down a common methodology and a format for reporting on reuse. In the annexes to the legislation, the format for reporting includes a section on quality of the data. Member States are required to identify and describe which public authorities are responsible for the adoption and implementation of measures on reuse, which products these measures address, which reuse operators are addressed by the measures and which actions Member States take to assess reuse through indictors and targets. Additionally, Member States are obliged to report the content of the measures, e.g., logistical, economic, physical and educational (including awareness raising campaigns) measures supporting reuse operators. The first data (on 2021) is to be reported by Member States mid-2023. As this is a novel exercise for many Member States, some data quality issues are to be expected.

Insufficient funding for waste management and low demand for recycled materials

Reuse sales currently finance the collection and sorting necessary to extract the 'crème' that can be sold for a profit. Sorting at this stage is manual as the market potential of the textiles is based on their quality and state but also on their potential to be sold, i.e., the tastes, seasons. Some sorters have their own second-hand shops in the EU and some have developed or plan to develop their own recycling facilities, such as Oxfam or Les Petits Riens. As indicated by EuRIC in their position paper, **waste streams that do not have a positive value**, i.e., whose costs for waste management cannot be covered by the sale of the raw materials recovered (and from reuse in the case of textiles), **require the setting up of an EPR scheme**. The French Law No. 2020-105 on the fight against waste and the circular economy in France (known as the AGEC law) provides for the establishment of a fund dedicated to the financing of reuse (and repair) activities within the framework of the EPR system, with funding allocated based on procedures, open to organisations of the social and solidarity economy.

Further, clothes' rental businesses (B to C) or informal resale (C to C) incentivise higher uptake of higher quality and more expensive clothes. **The C2C used textile market has also shown to encourage customers to buy more** reused products because they are cheaper. However, given the environmental impacts of reused products versus new products, the environmental benefits of second-hand garments still outweigh the potentially larger quantities bought. In addition, consumers could be incentivized to buy more new products as they know that they

[51] The Conversation, 2022, Do you shop for second-hand clothes? You're likely to be more stylish (theconversation.com).
[52] Farrant, L., Olsen, S.I. & Wangel, A., 2010, https://doi.org/10.1007/s11367-010-0197-y.
[53] Commission Implementing Decision (EU) 2021/19 of 18 December 2020 laying down a common methodology and a format for reporting on reuse in accordance with Directive 2008/98/EC of the European Parliament and of the Council (notified under document C(2020) 8976), EUR-Lex - 32021D0019 - EN - EUR-Lex (europa.eu).

will be able to subsequently sell their products on the second-hand market.[54] [55] [56] The trend shows however that such new products are more expensive, of higher quality and have longer durability, which is also favourable from its environmental impact compared to fast fashion textiles.

Following the sale of the 'crème' in the EU, the next most profitable channel is to sell the remaining reusable items in third countries, mainly to developing countries causing pressure on the local textile production. Sorters are often dealing with a limited number of actors in specific markets to sort out the textiles that correspond to each market's criteria. Based on the support study, the estimated reuse rate is 58% of waste collected. This reuse rate as share of collection for the period 2030-2035 was estimated using the reuse rate as share of waste generation estimated by McKinsey base-case scenario for 2030.

The reuse market relies heavily on the export of the textiles with the declared purpose of reuse. However, the **increasing volumes of textiles mean that some reuse markets are saturating**, contributing to increased waste generation as products of low quality have a shorter longevity. Global markets for reuse have also been affected by a stagnation in demand, particularly because of cheap primary clothing available[57] affecting the value more than the volumes. EuRIC[58] notes that EU's export of textiles has increased from 400,000 tonnes in 2003 to 1.3 million tonnes in 2019, whilst the value of exported materials has followed a different trend with the price of used textiles falling from 0.95 euro per kg of textiles in 2013 to 0.70 euro per kg in 20203, making business less profitable for second-hand garment traders. Indeed, **there is some uncertainty about whether it is all in fact reused**. A recent investigation by Changing Markets indicates that those interviewed in Kenya were universally of the opinion that the amount of unusable clothing arriving from abroad has increased significantly in the last few years. This portion is mainly composed of cheap, synthetic clothing that ends up as fuel, burnt or dumped in rivers and dumpsites.[59]

Figure 1 – Growth in exports of sorted used textiles, including apparel and household textiles, from EU-27 by weight and value

[54] Carrasco Campos, P.A. (2022) Circular economy rebound effect in the context of secondhand clothing consumption in the Netherlands.
[55] Interview with RREUSE.
[56] Farrant, L., Olsen, S.I. & Wangel, A. Environmental benefits from reusing clothes. Int J Life Cycle Assess 15, 726–736 (2010). https://doi.org/10.1007/s11367-010-0197-y
[57] RREUSE, *Research study on developing reuse networks in Europe,* 2022.
[58] EuRIC, 2023. LCA-based assessment of the management of European used textiles
[59] Changing Markets Foundation, *Trashion: The stealth export of waste plastic clothes to Kenya,* 2023. (due for publication Feb 2023, http://changingmarkets.org/wp-content/uploads/2023/02/Trashion-Report-Web-Final.pdf.

Source: JRC

The WSR applies to waste. In the case of textiles that are considered fit for reuse, Member States may consider that such materials are not waste and that the WSR will not apply to the materials that are being shipped. This non-waste determination effectively removes the traceability requirements in relation to the textiles exported as well as the need to ensure their environmentally sound management (ESM). Since there is no traceability, waste textiles can also be mixed in with reusable materials and inappropriately shipped to third countries.

The local waste management rules and/or facilities in third countries are not always equivalent to the levels set in EU legislation. [60] In this context and due to the claim that the import of reusable textiles negatively impacts local manufacturing, some countries have placed bans on the import of used goods (Rwanda in 2018, Kenya temporarily in 2020). [61] A working hypothesis is that the 'crème' of those exported textiles is sold in the third country it was imported to and is enough to finance the purchase of the entire bale.

After the different reuse possibilities are exhausted, materials are sold for recycling and sorters will pay a fee for the textiles that are not suitable for recycling for them to be disposed of correctly in the EU (or elsewhere).

Information failures

There are significant information shortages in relation to textile waste that are further exacerbated by the disparate way in which Member States collect textile and waste textile data that prevents well informed actions to be put in place to address textile waste generation in the first place. The composition of post-consumer textiles if often unknown as labels get removed or are illegible. It would also be extremely time consuming to read the label of each textile item to determine its composition. The presence of hazardous substances is also an issue for recycling as explained above.

In 2020, the biggest net importers of global used textile were Ghana (USD 181M net trade value), Ukraine (USD 154 net trade value), Nigeria (USD 123M net trade value), Kenya (USD 122M net trade value) and Tanzania (USD 102M net trade value). Sorters claim that the costs

[60] Greenpeace, *Poisoned Gifts. From donations to the dumpsite: textiles waste disguised as second-hand clothes exported to East Africa,* 2022, https://www.greenpeace.org/static/planet4-international-stateless/2022/04/9f50d3de-greenpeace-germany-poisoned-fast-fashion-briefing-factsheet-april-2022.pdf.
[61] The Exchange, Africa is fighting a losing battle banning used apparel, 2021, https://theexchange.africa/industry-and-trade/africa-second-hand-clothes-imports-ban/.

of collection and sorting are high enough that it would not make sense to send reusable textiles for disposal in third countries. This was emphasised in the Commission's Staff Working Document accompanying the ecodesign proposal [62] that notes that garments exported for reuse often end up being burnt, which impacts the local environment and inhabitants as developing countries generally do not have the suitable infrastructure to discard them safely.[63] No official data exists on how much of the **exported used textile is or quickly ends up as waste**, as there is no traceability of the fate of these exported textiles. Several NGOs and press stories claim that around 40-50% (now up from the previous decades) of second-hand clothing which arrives from the UK, the EU, North America and Australia is of such poor quality that it is deemed worthless on arrival and sent to disposal.[64] [65] Considering waste sorting practices, McKinsey & Company estimated that up to 40% of the textiles exported to third countries are not sorted[66] while 60% of third country exports and all other textiles retained within the EU are sorted. In addition, 95% of what is sorted is manually sorted, and thus 5% is automatically sorted for the 2021-2035 period. This is because sorters concentrate on sorting for reuse, which is what they business model rests on. Sorting of the currently unsorted textiles will require additional capacity and the relevant investments to increase the capacity and run the facilities.

Funding for research and development

There are also limited research and development funding opportunities. The current research focuses on recycling of clothing and not of footwear or household textiles. There is lack of recycled content commitments by the industry or legal requirements setting such requirements in new textile products, which could boost the uptake of recycled materials in textiles, and would drive the demand side for recycled materials, engaging the recycling industry in long term infrastructure investments. In terms of the Technology Readiness Levels (TRL) of textile recycling technologies, a European Commission technical study[67] identified the following information.

Table 5 – Technology Readiness Levels of different recycling technologies

Textile recycling technology	Current TRL	Year expected to reach TRL of 9
Mechanical recycling	9	Present day
Mechanical recycling to spinnable fibres	7	Not specified
Thermo-mechanical recycling of post-industrial waste	7	2023

[62] SWD(2022) 82 final Part 4/4
[63] Matteis S. & Agro C., January 2018. What really happens to old clothes dropped in those in-store recycling bins, CBC News.
[64] ABC News, 2021, Dead white man's clothes: How fast fashion is turning parts of Ghana into toxic landfill - ABC News
[65] Hale, B., 2022, Dumped in the Atacama desert, the mountain of discarded cheap clothes from the West | Daily Mail Online
[66] McKinsey & Company, 2022.
[67] See footnote **Error! Bookmark not defined.**

Thermo-mechanical recycling of blends of thermoplastic materials	2-3	Not specified
Thermo-chemical recycling	9	Present day
Polymer recycling of cotton	7-9	2025 for those currently 7-8
Monomer recycling of PA6 and PET	9 for PA6 textiles, 4-& for PET textiles	Present day for PA6, 2023 for first PET textiles technologies
Recycling of polycotton blends using solvent-based dissolution and filtration	5	2024/2025
Recycling of polycotton blends using hydrothermal technologies	6-7	2023/2024
Recycling of polycotton blends using enzymatic route	6	2023

Further, hazardous substances can potentially be present in recycled materials obtained from textile waste, be it as a result of prior use of currently restricted substances in the textile itself or the textile getting soiled with hazardous substances during use or contamination resulting from mixing with other waste streams. [68] These information gaps about the amount and nature of hazardous substances in textiles make it difficult to assess whether the different recycling technologies will be effective in removing these substances and can make the recycling process more difficult and expensive. [69] In comparison to post-consumer waste, pre-consumer and post-industrial waste is likely to consist of a smaller variety of fibre types and material blends with the identification of the material composition simpler compared to post-consumer waste. Additionally, contamination by soiling of post-industrial and pre-consumer textile wastes is generally not an issue. Post-industrial pre-consumer wastes are also less likely to contain disruptors such as buttons and zips meaning that the waste materials that are generated are more suitable for recycling that post-consumer textiles and is part of the reason why some recycling technologies limit themselves to processing post-industrial or pre-consumer textile waste streams. This makes these types of waste a valuable input to supporting the development of recycling infrastructure across the EU.

The JRC study "Assessment of the definition of recycling"[70] indicates that "quality of recycling is a rather complex concept, at the same time acknowledged as very important and left

[68] H&M group, IKEA, Adidas, Bestseller, PVH, Gap Inc, Kingfisher, *Collaborative study on chemicals in recycled textiles,* 2021, https://www.naturvardsverket.se/contentassets/be04327b5a874955a5402d4f663d1632/webinar-collaborative-study-chemicals-recycled-textiles-hm-ikea.pdf.

[69] See footnote **Error! Bookmark not defined.**

[70] Grant, A., Cordle, M. and Bridgwater, E., Quality of Recycling - Towards an operational definition, Canfora, P., Dri, M., Antonopoulos, I. and Gaudillat, P. editor(s), Publications Office of the European Union, Luxembourg, 2020, ISBN 978-92-76-25426-3, doi:10.2760/225236, JRC122293.

undefined in both EU acquis and scientific literature…The quality is important as it determines the type of use of the recyclate and its further recyclability. This in turn affects the closure of material loops in specific sectors/markets, i.e., the circularity".

Behavioural drivers

Fast fashion trends

The "use-and-dispose" culture or "take-make-use-throw" mindset is still largely fostered across the whole supply chain and adopted by consumers[71]. Despite increasing concerns about conditions in which clothes are made and subsequent impacts, including those due to waste management (see Annex 2), complex consumption patterns maintain the gap between awareness and action, making it difficult for consumers to adopt new habits [72]. Therefore, there are increasing volumes of textile waste being generated and sent for disposal.

As noted in the EU Strategy for Sustainable and Circular Textiles[73] between 1996 and 2018 clothing prices in the EU decreased by over 30% relative to inflation making clothes increasingly inexpensive. At the same time, the quality of the clothes purchased and sold has shown a decreasing trend with Fashion For Good noting that the quality of the textiles collected is decreasing at least in part due to decreasing material quality[74].

Insufficient citizen awareness

There is a lack of consumer awareness of the true cost of production, i.e., considering the negative environmental externalities and the cost and impacts of managing textiles' end-of-life. For example, it is often cheaper to buy new products rather than repair broken ones, partly also due to their low quality.

Once goods are no longer wanted, there is lack of consumer awareness, accessibility, convenience on how to donate and/or sell and purchase reused products and confidence in their reliability and performance. Also, in some Member States a separate collection scheme for textile waste (not only for reusable textiles) is in place, but often citizens may be unaware of its existence[75] as well as potential gaps in knowledge about disposal methods with such gaps having previously been identified as needing additional promotional campaigns to improve textile disposal methods[76].

Shift to online purchasing

According to a Eurostat news item, in 2020, 22% of EU enterprises had e-commerce sales and 19% reported that their online sales reached at least 1% of their total turnover. This is 1 percentage point (pp) increase compared with 2019 and 6 pp up from 2010. The steady growth in the use of e-commerce sales in many countries, was heightened by the coronavirus pandemic and movement restrictions, which led both customers and businesses to an increased interest in online sales. E-commerce accounts for 30% of the EU's total fashion market in 2020. [77]

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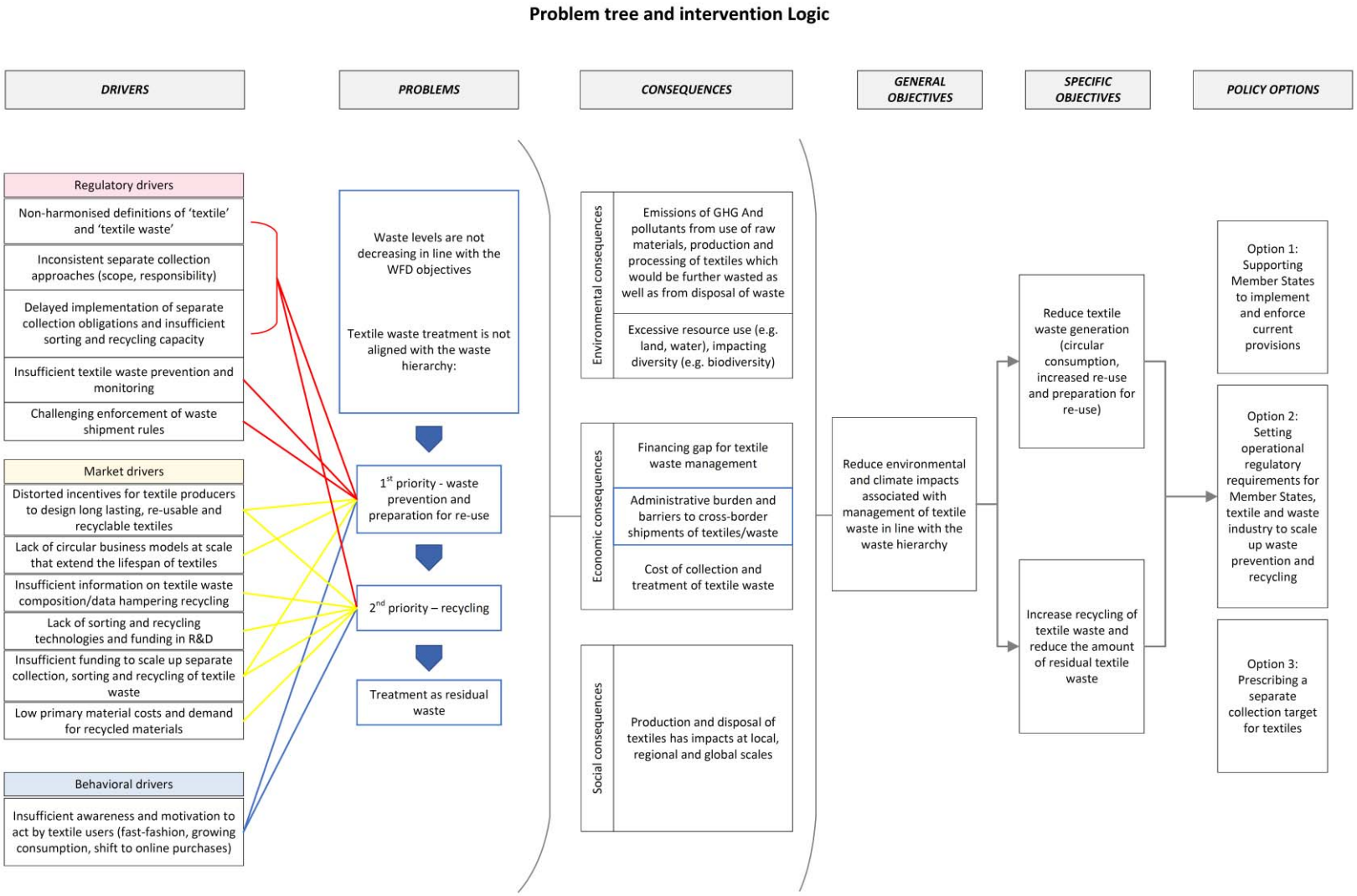
[71] Call for evidence (Municipal Waste Europe).
[72] RREUSE, *Vision for a new fashion season: social and circular, stakeholder workshop*, The Policy hub – response to interview questionnaire.
[73] COM(2022) 141 final
[74] Fashion For Good, 2022. Sorting for circularity Europe – an evaluation and commercial assessment of textile waste across Europe.
[75] Stakeholder workshop.
[76] Henzen R and Pabian S, 2019. Increasing Consumer Participation in Textile Disposal Practices: Implications Derived from an Extended Theory of Planned Behaviour on Four Types of Post- Consumer Textile Disposal
[77] The Global Fashion Business Journal, 2021.

Existing and upcoming textiles EPR schemes are considering online free riding. However, as only one EPR scheme for textiles is currently implemented within the EU, little quantitative data is available on current free riding. There is a risk that textiles EPRs may face the same issues observed for WEEE, packaging and batteries. The study procured by the Commission on Online Free-riding and EPR estimates that the total free riding of online WEEE sales is between 23.6 and 28.9% compared to an assumed level of free riding amongst traditional sales of 5%.

Figure 2 - Intervention logic for textile waste



Key environmental, economic and social consequences of the problem

As detailed above, there are several drivers that contribute to the main problem of increasing volumes of textile waste being generated and sent for disposal. The drivers and the consequences of the problem have been summarised in the problem tree presented below. Some drivers and some of the consequences cannot be tackled through a revision of the WFD as detailed in the study report and have therefore not been represented in the diagram. This is particularly the case in relation to unsustainable global supply chains, destruction of unsold or returned goods (these will be addressed through the implementation of the Ecodesign Directive), child labour and gender inequality. The EU Textiles Strategy as well as the Commission Communication on making sustainable products the norm foresee measures to tackle these issues and whilst they may be indirectly impacted by measures foreseen in this report, they are not specifically targeted by the scope of the WFD and are, therefore, addressed only indirectly in this assessment. The problem tree within the scope of the WFD as presented below.

Environmental impacts

The current system for producing, distributing, and using clothing operates in a linear way. The environmental impacts of textiles are spread out throughout their entire lifecycle. The textile sector represents the **fourth highest pressure category for use of primary raw materials and water**. It ranks as the **second highest for land use and the fifth highest for greenhouse gas emissions** (15-35 tonnes of CO2 eq. per tonne of textiles produced). It also has **high impacts in terms of chemicals and water pollution**. As the ecosystem is highly globalised with the production of clothing mainly outsourced to Asia, where environmental protection and working conditions are not strictly regulated and controlled. During both the production and end-of-life treatment phases, many workers are offered a poor and unsafe working environment.[78]

The **production of raw materials is responsible for a large share of the environmental impact of the textile and clothing industry**, notably from growing crops for natural fibres that globally required a lot of land and water. For example, estimates indicate that to make a single cotton t-shirt, 2 700 litres of fresh water are required, enough to meet one person's drinking needs for 2.5 years. Textile production discharges high volumes of water containing hazardous chemicals into the environment. As an example, 20% of industrial water pollution globally is attributable to the dyeing and treatment of textiles.[79]

As explained in detail in Annex 6, most textile raw materials and final products are imported into the EU, which means **long delivery routes, including for e-sales**. Large amounts of non-renewable resources are extracted to produce clothes that are often used for only a short period, after which the materials are largely lost to landfill or incineration. This puts pressure on resources,

[78] See footnote 82, p.84.
[79] Ellen Mac Arthur Foundation, 2017, https://ellenmacarthurfoundation.org/a-new-textiles-economy.

pollutes and degrades the natural environment and its ecosystems, and creates significant negative societal impacts at local, regional, and global scales[80].

Distribution generates waste through any soiled or damaged textile goods but also packaging, tags, hangers and bags. The use stage was estimated as having a large share of the environmental footprint in the lifecycle of clothes, owing to the water, energy and chemicals in detergents, tumble drying and ironing, and the microplastics shedding into water[81]. Doubling the lifespan of a textile product can reduce its environmental impact by 49%[82].

It is estimated that the fashion industry is responsible for 10% of global carbon emissions – more than international flights and maritime shipping combined. According to the European Environment Agency, textile purchases in the EU in 2017 generated about 654 kg of CO2 emissions per person.[83] It is estimated that the global warming potential of textiles placed on the EU27 market can be extrapolated to 198 million metric tonnes CO2eq[84].

Production: The production of raw materials is responsible for a large share of the environmental impact of the textile and clothing industry, notably from growing crops for natural fibres. With respect to fibre composition, it is estimated that cotton is the most prevalent fibre type covering 37%, followed by polyester (32%), polyamide (8%) and wool (4%). Polypropylene, viscose and acrylic recorded minor values (each ~3%)[85]. Cotton is considered especially problematic because it requires huge quantities of land, water, fertilisers and pesticides. [86]

It takes a lot of water to produce textile. It is estimated that the global textile and clothing industry used 79 billion cubic metres of water in 2015, while the needs of the EU's whole economy amounted to 266 billion cubic metres in 2017. The environmental impacts of organic cotton can be drastically reduced compared to conventional cotton, as it uses less water and pollutes less. The share of sustainable cotton increased from 6% in 2012 to 2013 to 19% in 2016 to 2017. [87]

Overall, in relation to both the production of raw materials and textile most of the pressures and impacts related to the consumption of clothing, footwear and household textiles in Europe occur in other regions of the world. This is the case for 85% of primary raw materials, 92% % of water

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[80] Ellen Mac Arthur Foundation, 2017, https://ellenmacarthurfoundation.org/a-new-textiles-economy.
[81] European Parliament, *Environmental impact of the textile and clothing industry: What consumers need to know,* 2019, https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2019)633143.
[82] Swedish Environmental Protection Agency, *Response to interview questionnaire,* 2022.
[83] European Parliament, 2020, https://www.europarl.europa.eu/news/en/headlines/society/20201208STO93327/the-impact-of-textile-production-and-waste-on-the-environment-infographic.
[84] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144
[85] JRC Technical report on Material Flow Analysis of textile, forthcoming
[86] European Parliament, 2019. https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2019)633143.
[87] European Parliament, 2020, https://www.europarl.europa.eu/news/en/headlines/society/20201208STO93327/the-impact-of-textile-production-and-waste-on-the-environment-infographic.

and 93% of land used, and 76% of greenhouse gas (GHG) emissions.[88]The majority of these impacts are felt in Asia where most fibre production and textile manufacturing takes place[89].

Transport and distribution: Most textile raw materials and final products are imported into the EU, which means long delivery routes. However, according to the Pulse of the Fashion Industry report, this stage accounts for only 2% of the climate-change impacts of the industry (excluding e-commerce transport), as most large players have optimised the flow of goods. However, this phase is also characterised by waste generated through packaging, tags, hangers and bags, as well as by a proportion of products that never reach consumers as the unsold leftovers are thrown away.[90]

Consumer use: The use stage was estimated as having a large share of the environmental footprint in the lifecycle of clothes, owing to the water, energy and chemicals (primarily detergents) used in washing, tumble drying and ironing, and the microplastics shedding into water. [91] Washing synthetics releases an estimated 0.5 million tonnes of microfibres into the ocean a year. The EU Commission stated that up to 35% of all the microplastics released into the environment can be traced back to textile products. [92] A single laundry load of polyester clothes can discharge 700 000 microplastic fibres that can end up in the food chain. [93]

End of life: A large share of used textile is exported for reuse, partly to East Asian or African countries, leading to additional transport. In addition to export of textiles for reuse has prompted accusations that cheap second-hand clothes cause the decline of local textile industries. Also, there is some uncertainty that some of these textiles exported for reuse are or quickly become waste and that some of these third countries with less stringent waste management rules or enforcement are thus victims of pollution from the discarded textiles (e.g., on beaches). [94]

The majority of exports from the EU to third countries of used clothing and clothing accessories, blankets and travelling rugs, household linen and articles for interior furnishing and textile materials including all types of footwear and headgear are to non-OECD countries. An examination of data from Comext[95] for the period 2017-2021 shows that in 2021, 61 countries received 98.8% of volumes exported from the EU, amounting to at least 1 000 tonnes of used textiles from the EU. The controls in place for the management of these materials are likely to vary dramatically.

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[88] EEA. Textiles and the environment: the role of design in Europe's circular economy (2022). Available at: https://www.eea.europa.eu/publications/textiles-and-the-environment-the

[89] European Environment Agency, 2022. Textiles and the Environment - The role of design in Europe's circular economy

[90] European Parliament, 2019, https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2019)633143.

[91] European Parliament, 2019, https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2019)633143.

[92] European Commission, *Sustainable and Circular Textiles by 2030,* 2022, https://ec.europa.eu/commission/presscorner/api/files/attachment/872168/Textiles%20Factsheet.pdf.pdf.

[93] European Parliament, 2020, https://www.europarl.europa.eu/news/en/headlines/society/20201208STO93327/the-impact-of-textile-production-and-waste-on-the-environment-infographic.

[94] European Parliament, 2019, https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2019)633143.

[95] DS-045409

The top ten destination countries for EU exports the period 2017-2021 are shown below.

Table 6 : Destination countries for EU exports of used textiles

	Year				
	2017	**2018**	**2019**	**2020**	**2021**
Total EU exports	1,143,487	1,188,647	1,298,263	1,209,608	1,325,079
Country of destination					
Pakistan	119,989	158,959	181,650	174,302	213,549
United Arab Emirates	67,166	87,776	110,733	139,423	137,608
Tunisia	107,539	97,483	109,026	102,692	102,754
Cameroon	66,048	67,235	67,097	71,293	63,005
Türkiye	59,417	62,412	71,312	54,844	54,193
Togo	50,439	51,177	53,212	52,930	50,972
Ukraine	72,967	65,114	67,354	57,213	49,541
India	35,498	31,347	44,611	38,756	43,161
Ghana			37,196	42,785	42,104
Russian Federation (Russia)	36,311	37,014	37,986	35,874	39,472
Belarus	32,205	33,337			

Stakeholders in the context of the impact assessment accompanying the proposal for a revision of the Waste Shipments Regulation[96] raised the issue that third countries often welcome EU wastes as they are generally well sorted and have a higher economic value compared to domestic waste or waste from other countries. However, the import of EU wastes can displace domestically generated wastes in other countries with even less effective management of waste or cause them to be simply disposed or even dumped rather than being managed appropriately as shown in Table 57 below.

An examination of waste management practices in the top destination countries of used EU textiles listed using data from the World Bank[97] notes a high level of landfilling and open burning in those countries.

Table 7 : Waste management practices in importing third countries

[96] SWD(2020) 26 final

[97] World Bank (2020) What a Waste Global Database - Country level dataset – note that gaps in the data exist with no data reported for Ghana and in some cases only some percentages reported by treatment type

Country	Waste treatment method applied					
	Percentage of waste disposed of in controlled landfill	Percentage of waste disposed of in other landfill	Percentage of waste open dumped	Percentage of waste incinerated	Percentage of waste recycled	Percentage of waste composted
Pakistan		40	50		8	2
United Arab Emirates		9	62		20	9
Tunisia		70	21		4	5
Cameroon			80.3		0.4	
Türkiye			44			1
Togo			96.2		2	1.8
Ukraine		94.07		2.73	3.2	
India			77		5	18
Ghana						
Russian Federation (Russia)			95		4.5	
Belarus	76.9		7.1		16	

Source: World Bank, 2020

In general (except Turkey) within OECD and EU countries only 35% of waste is landfilled[98] meaning that these countries have more effective waste management in place in comparison to those countries receiving used EU textiles. To determine the environmental impacts resulting from textile waste management in third countries in comparison to the EU the support study used the dedicated waste LCA-model EASETECH[99] also used by the JRC applied the datasets describing open dump and open burning activities for individual waste materials. In the absence of a specific dataset for textile the impact of textile waste has been approximated as a mix of plastic (15%) and paper/cardboard (85%) based on the assumption that ca. 15% of the textile is composed of biological fibres while the rest is synthetic (Riber et al. 2009[100]). To calculate the net environmental benefits of managing textile wastes in the EU in comparison to third countries the following results from EASETECH have been applied a GHG saving by treatment in the EU in comparison to third countries of CO2 -Eq of 1.7 tonnes per tonne of textiles disposed of and saving in terms of externalities when 285 euro per tonne has been applied[101].

With regard to the disposal of textiles in residual waste in comparison to reuse and recycling within the EU the calculation of changes in CO2e emissions resulting from changes in management at the point of discard of used textiles and textile wastes the European Environmental Bureau (EEB) [102] value have been identified as presented below.

Table 8 – CO2 equivalent emissions saved by destination of textile at EoL (in tonnes per tonne of textile), EEB

Route	Cotton t-shirt	Wool jumper

[98] World Bank (2020) What a Waste Global Database - Country level dataset – note that gaps in the data exist with no data reported for Ghana and in some cases only some percentages reported by treatment type
[99] Clavreul et al. (2014) https://www.sciencedirect.com/science/article/pii/S1364815214001728
[100] Riber et al. (2009) https://www.sciencedirect.com/science/article/abs/pii/S0956053X08003322
[101] These are the same values used in SWD(2020) 26 final in relation to disposal of textiles in third countries in comparison to the EU.
[102] European Environmental Bureau, *Advancing resource efficiency in Europe*, 2014.

Direct reuse	12.8	9
Preparing for reuse	11	8
100% recycling	<1	<1
100% landfill	-0.2	-0.2

Further, when using recycled fibres, the environment and climate impact only decrease by about 5-10 % compared to if virgin fibres are used. Meanwhile, doubling the lifespan of a textile product can reduce its environmental impact by 49%. [103]

Economic impacts

At a global scale, the negative impacts of the industry are becoming more transparent and understood by customers, leading to reputational risks for brands and to regulatory trends that could affect the profits of businesses that fail to respond. Fashion brands could see a decline in earnings before interest and tax margins of more than three percentage points if they were to continue business as usual. This would translate into a profit reduction of approximately EUR 45 billion (USD 52 billion) for the industry. [104] The industry has also been challenged to find systemic solutions to tackle "overconsumption", moving beyond downstream, short-term approaches to reduce the industry's impact. [105]

The lack of definition of 'textiles' in the WFD leads to confusion as to what Member States are meant to be doing in relation to the 1 January 2025 deadline and what they are meant to report on in relation to the Implementing Decision on reuse. Member States have chosen different scopes in relation to textiles and textile waste as explained in Annex 6. This leads to differing implementation and data that is incomparable. This fragmentation of rules across the EU causes confusion and leads to additional admin burden as movements, sorting, and exports have to consider the differences in scope. If these diverging interpretations were to be carried into the scope of possible EPR schemes, producers would be subject to different requirements depending on the Member State. This would increase their administrative burden and would not allow a level playing field amongst the obliged industry actors. It can also create problems at collection and sorting stages with operators dealing with varied textile streams depending on their point of origin, and can pose barriers to cross-border shipment, intra- and extra EU due to variations in the composition of the materials shipped. Some stakeholders suggest clustering products which require similar collection and recovery systems when considering products categories for collection and treatment policy. Finally, the lack of a harmonised definition may lead to missed opportunities to fully align different pieces of legislation including the revised Ecodesign Directive and the Textiles Labelling Regulation to the same category of textiles threatening the coherence between EU policy instruments.

[103] Swedish Environmental Protection Agency, Response to interview questionnaire, 2022.
[104] Ellen Mac Arthur Foundation, 2017, https://ellenmacarthurfoundation.org/a-new-textiles-economy.
[105] Ellen Mac Arthur Foundation, 2017, https://ellenmacarthurfoundation.org/a-new-textiles-economy.

This lack of harmonised definition about when a textile becomes waste or ceases to be waste hampers a harmonised classification of textiles, which can hinder reuse and recycling. Textile reuse or waste management operators experience such barriers, for instance where export restrictions for collected clothing in one country and its administrative procedures to lift such restrictions in another make trade difficult. In other cases, shipping collected textiles outside the EU for reuse or recycling may require clothing to be de-constructed in the EU before shipment, which limits their use to recycling only. In the context of a developing textiles recycling market the lack of harmonisation creates uncertainty in relation to waste management decisions for textiles including producers and users of recycled materials. This is in keeping with the work of the JRC on end-of-waste criteria[106]. Additionally, as more Member States look to determine end of waste status for textiles the possibility exists for ever increasing divergence beyond the lack of uniform understanding of textile wastes found today.

The WFD imposes controls on the reuse of secondary materials, to protect human health and the environment in their collection, transport, treatment, storage and tipping. These administrative burdens in some cases might not be necessary where little risk is involved and the certainty of use is guaranteed – this is particularly the case for reusable and recyclable textiles that are generally inert in nature and for which in the case of reuse an already existing market for reusable textiles exists across the EU. Removing the administrative burdens, by changing the waste status of the material when it is no longer necessary, may be an economic incentive encouraging the recycling and reusing of wastes.

The JRC[107] also notes two additional factors to be considered in relation to wastes that are equally applicable to textile wastes:

i) For certain wastes, end-of-waste criteria can promote the production of higher quality secondary products by defining technical and environmental minimum requirements to be fulfilled by the materials. Information on the product characteristics facilitates their comparison and may enhance the final quality of the final product leading to an increase in their demand and a positive on the recycling rates.

ii) The use of waste in replacement of primary materials, in particular if used by final consumers, is often prevented by the waste status of the material. Waste is associated with discarding and users may fear to use waste instead of primary materials with a predicted quality. End-of-waste may help to alleviate any user prejudice, to increase the confidence of the users on quality standards and to encourage the use of secondary materials.

At the end-of-life stage, as seen previously, the lowering quality of textile reaching the reuse sector creates a risk for the actors of this sector, often charities, whose business model relies on the sale of good quality used textile. In terms of recycling, the increasing amounts of textile waste which will be sent to recycling in coming years will put pressure to scale recycling technologies, and thus in ensuring that the business models associated are viable. The lowering quality of textiles also affects their recyclability.

[106] JRC 2009. End-of-waste criteria.
[107] JRC 2009. End-of-waste criteria.

Further, there is no harmonised understanding of what can be considered as "reusable" and "recyclable" textile, causing difficulty at the separate collection, reuse and recycling stages to determine where the used textile and textile waste should be sent. Measures are proposed in the revision of Regulation No 1257/2013 on shipments of waste to address textile waste shipments to third countries and it is expected that this proposal will address this problem subject to the outcome of the ordinary legislative procedure for that proposal.

Social impacts

Almost 13 million full-time equivalent workers were employed worldwide in the supply chain to produce the amount of clothing, textiles and footwear consumed in the EU-27 in 2020. This makes the textiles sector the third largest employer worldwide, after food and housing.[108]

In 2018, the textile industry in the EU employed 1.66 million people (down from 2.03 million employed in 2010), of which 70% are women. In the EU, it represents 9% of manufacturing companies, 5% of employment and 2% of value added of the manufacturing sector. [109].

However, most production takes place in Asia, where low production costs come at the expense of workers' health and safety.

High cost and time pressures are often imposed on all parts of the supply chain, which can lead to workers suffering poor working conditions with long hours and low pay, with evidence, in some instances, of modern slavery and child labour. The potential for negative societal impacts does not stop at the factory door. Local communities, while benefitting from employment in the industry, may suffer from its poor environmental practices.

At the production stage, the use of substances of concern, as defined in Article 3(28) of the ESPR proposal, has negative effects on farmers, factory workers, and the surrounding environment as it pollutes local rivers used for fishing, drinking, or bathing.

Finally, the lowering quality of textile reaching the reuse sector creates difficulty for this sector to ensure their principal ambition: distributing used textiles of good quality to people in need as well as the generation of funds to support charitable activities.

How will the problem evolve?

This section makes use of several different sources of data and estimates/expected trends for the future. This also means that some of the data presented may not be consistent with other data referred to due to different reasons, including heterogenous scope, definitions and assumptions underlying projections.

The increased interconnectivity in the Asia-Pacific region and the rising number of e-commerce platforms is adding growth to regional and global markets. Furthermore, favourable demographics, rising income and growth levels, favourable government policies in manufacturing countries and

[108] European Environment Agency (2022) Textiles and the environment: the role of design in Europe's circular economy.
[109] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144

improving marketing activities by textiles companies are expected to increase the market size in the future, both globally and in the EU. There is no reliable data on the textiles online sales in the EU market. However, Reuters[110] indicates that "secondary fashion sales are booming, with the global market for pre-owned apparel" growing at a rate of 15 percent per year, as consumers increasingly tap into the online consignment segment, new market entrants rush to meet burgeoning demand, and existing players look to differentiate themselves and their value propositions."[111]

The **global consumption of clothing and footwear is expected to increase by 63% by 2030 compared to 2019**, from 62 million tonnes now to 102 million tonnes in 2030.[112] Similar **historical and projected data in terms of quantities is not available for the EU market**. However, **fast fashion trends are expected to continue** with consumption patterns likely to accelerate and the overall quality of the discarded textiles to decrease. In addition, the prices of commodities are expected to rise in the future due to increasing global consumption and therefore, rising demand for resources.

Since waste generation is correlated with economic growth, it is likely that waste generation will increase along with the economic recovery expected following the COVID-19 pandemic. As previously explained, data on used textiles and textile waste is subject to significant variation depending on the scope of what is considered a textile. There are issues with the robustness and comparability of the data itself that should improve to some extent with subsequent reporting years.

The EU Textiles Strategy is the main EU policy scenario affecting the baseline consumption of textiles in the EU. It proposes actions for the full lifecycle of textile products, by targeting design and consumption patterns, in line with the commitments set under the European Green Deal and the Circular Economy Action Plan. It addresses the way textiles are designed and consumed, including by looking at sustainable technological solutions and innovative business models.

The most relevant set of measures is the implementation of the ESPR to textile products. Ecodesign requirements for textiles will aim at increased product durability reparability, recyclability and the use of recycled materials, contributing to a reduction in textile waste generation and facilitate increased recycling rates. The actual requirements for textiles and the applicable product scope will be determined in a dedicated impact assessment. In addition, the EU Textiles Strategy includes a review clause to assess mandatory targets for preparing for reuse and recycling of textile waste by 2024 and the assessment of measures to ban the destruction of unsold products under certain conditions, including unsold or returned textiles. However, the impact of these measures is unlikely to be felt until the end of the decade. That leaves a challenge of dealing with poorer quality textiles for reuse at present whilst recognising that measures proposed elsewhere should help to plug the quality gap in the future.

The amendment of the Textile Labelling Regulation, in line with the Textiles Strategy, will have an impact on the baseline. The potential introduction of digital and physical labels on the sustainability and circularity aspects of textile products will ensure the ease of access, intelligibility, and comparability of ecodesign information. The accessibility of information is

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[110] https://www.thefashionlaw.com/the-resale-market-watch-a-running-list-of-funding-and-ma/
[111] A Running Timeline of Resale Funding and M&A (thefashionlaw.com).
[112] Global Fashion Agenda, 2017.

expected to potentially increase the demand for higher quality textiles products, thus reducing the frequency of their replacement and the quantity of textiles placed on the market. Furthermore, the amendment is expected to review fibre identification rules, thus easing sorting and recovery of materials and fibre-to-fibre recycling. Other envisaged labelling elements are also expected to have a positive environmental impact. These include "care labelling", which can foreseeably play an important role in reducing energy consumption in washing and in extending the durability (and indirectly the re-usability and recovery of materials) of textile products; and "uniform size labelling", which is expected to boost the integration of the second-hand market across Member States.

Determining the impact of the separate collection obligation under Article 11 of the WFD that requires separate collection for textiles from 1 January 2025 is subject to a number of challenges, in particular with regard to progress to date and planned progress by Member States to meet the Directive deadline of 1 January 2025.

As noted in Annex 6, based on Member State data on separate collection schemes in place collection sits at around 39%. This assessment assumes that Member States are going to implement the separate collection obligation and to some extent encourage the reuse of products and the setting up of systems promoting repair and reuse activities (even though this is a softer requirement).

In order to determine the likely changes that will result from the obligation both up to 2025 and beyond two main sources of information have been used. The first source uses information from the JRC[113] that considered historical year-on-year improvements in countries/regions that had already made strong efforts to increase collection rates through target setting, communication and an emphasis on collection of the non-reusable collection waste (France, Flanders and Netherlands). In applying these trends to Europe, the JRC considered that as a result of the separate collection obligation that 65 000 to 90 000 tonnes will be collected in addition each year, that is a 50-80% total increase with respect to the 2020 volumes. However, this expected growth was expected to start slowly with less than half of this growth to be expected in the years up to 2025 with an acceleration of collection rates beyond that date.

The second source comes from McKinsey[114] that estimated that pre-consumer waste collection would increase from 30-35% in 2020 to between 50% and 80% by 2030. Under the 50% base case scenario the values were determined using France as a reference case because the study considered that France has the longest data record as the EPR for textiles was introduced in the country in 2009. In the French case textile collection increased from 15 percent in 2007 by 2.0-2.5 percentage points per year until it reached 35 percent, and then flattened to 1.5 percentage points per year. McKinsey then applied the French curve to their own determined collection rates giving different countries different growth rates based on how advanced they were in their current collection schemes. This scenario resulted in a collection rate growth of around 15 percentage points over ten years across the EU, taking its average to 50% in 2030. The McKinsey 80% scenario is based on the assumption that the separate collection obligation under the WFD requires 100% separate collection of textile wastes but that over the lifetime of the McKinsey optimistic scenario it would

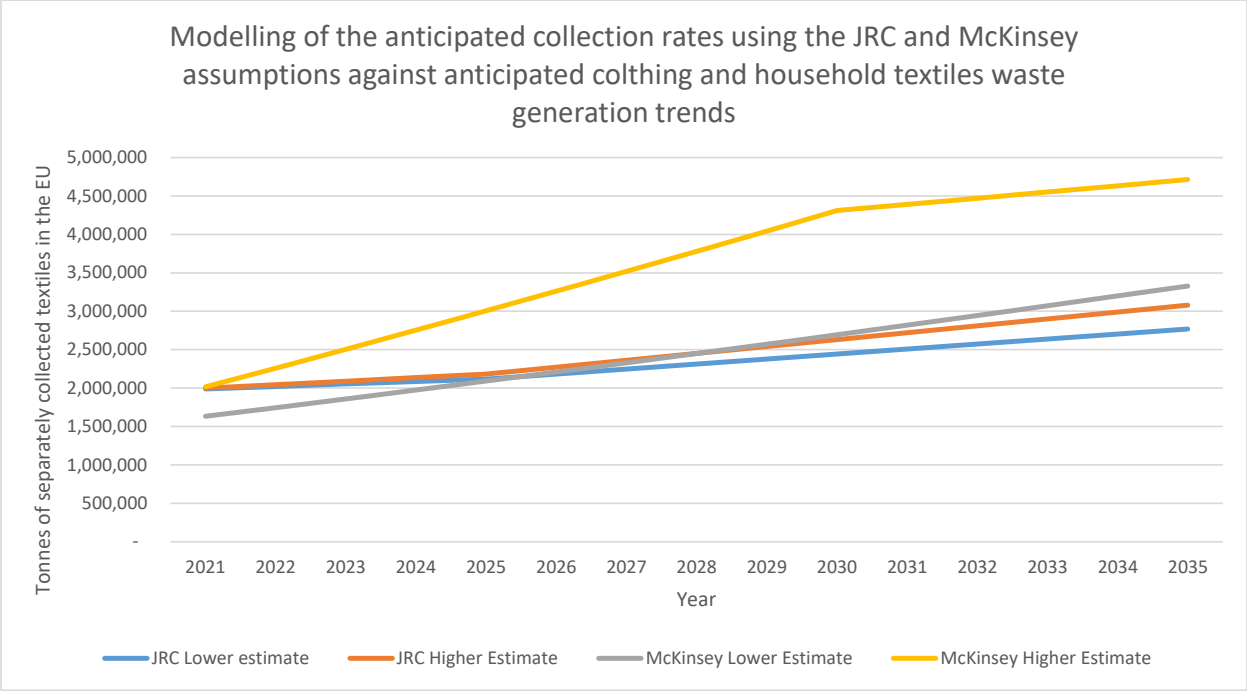
[113] See JRC, 2021. Circular economy perspectives in the EU Textile sector
[114] McKinsey & Company, 2022. Scaling textile recycling in Europe–turning waste into value

not be possible to reach the 100% value and that 80% appeared a more reasonable value to be attained by 2030.

The two sources above are not without their shortcomings, and both offer a degree of optimism bias in terms of the Member States that have been used as the basis for determining future trends in collection for the entire EU. In the case of the JRC extrapolation, FR, NL and Flanders are unlikely to be representative of the remaining EU and in the case of FR where a long-established EPR scheme has been in place to assist in funding the necessary infrastructure to improve collection over time, it is apparent that such mechanisms exist or are planned to exist in only a minority of Member States. In the case of McKinsey, the reliance on FR only data exacerbates this optimism bias to an even greater extent. Furthermore, the assumption that 100% of textiles will be separately collected as a result of the Article 11 WFD obligation appears unrealistic as no current separate collection obligation at the EU level achieves such collection rates.

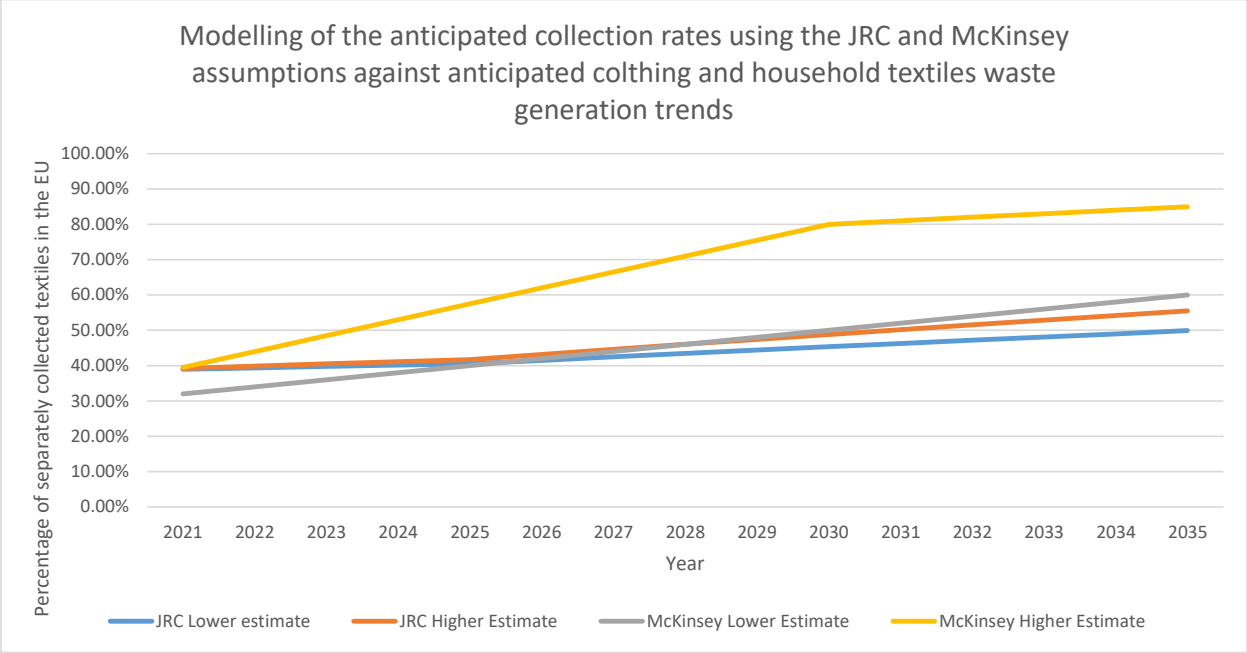
The figure below uses the JRC extrapolation and McKinsey assumed impacts of the separate collection obligation up to 2035. In the case of McKinsey, the growth rates under the base case scenario continue between 2030 and 2035. In the case of the optimistic scenario an assumption has been made that growth will increase by one percentage point per annum beyond 2030. This is because a 100% separate collection rate for textiles is considered unrealistic.

Figure 3 Modelling of changes in separate collection of textiles using data from the JRC and McKinsey in tonnes collected



As can be seen, the JRC extrapolation and McKinsey lower estimates result is somewhat similar collection rates by 2035, albeit the McKinsey estimates result in higher collection volumes than anticipated by the JRC. The McKinsey higher estimate appears very optimistic, as previously explained. Taking the same values and displaying them as percentages of separately collected textile wastes gives the following result.

Figure 4 Modelling of changes in separate collection of textiles using data from the JRC and McKinsey as a percentage of separately collected textiles wastes

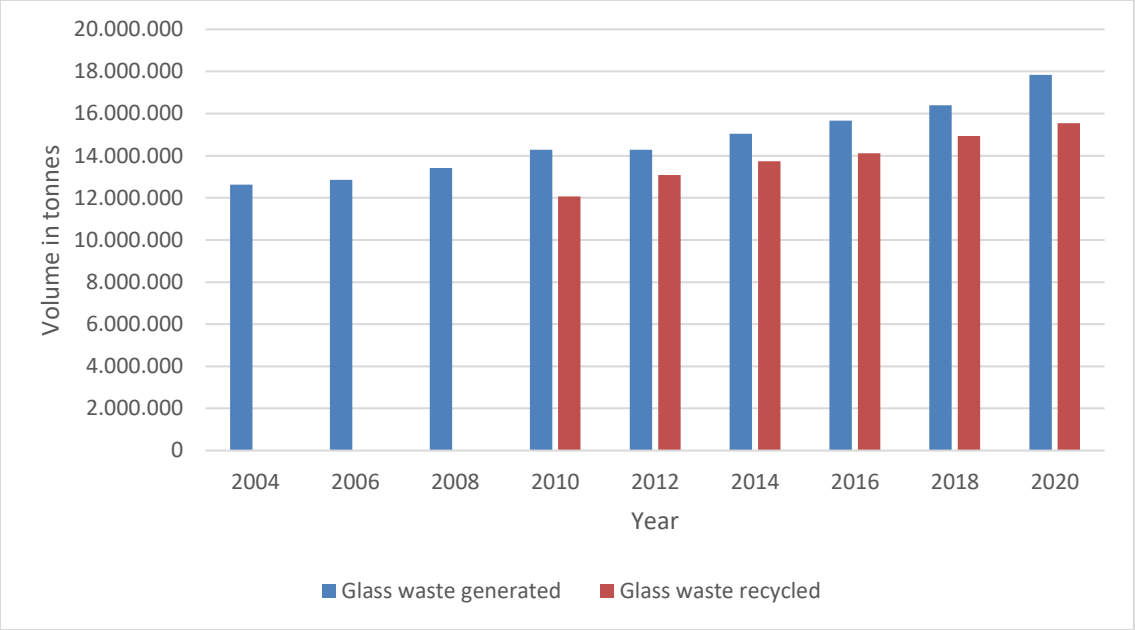


In order to determine the reliability of the trends in collection above, a comparison with the waste generation and recycling rates of glass for which targets have been set at the EU level has been made. Glass was chosen as the most realistic proxy to textiles as glass recycling is reliant on the collection of waste glass predominantly through kerbside collection and bottle bank recycling – very similar to the collection methods for textiles presently employed. As there is no data on actual collection rates for glass at the EU level the assumption has been made that all glass that is recycled has been collected. Data from Eurostat[115] indicates trends in glass waste generation and recycling over the period 2010-2020[116] showing a growth in recycling rates of approximately 29% over a ten-year period. This recycling required collection capacity to increase accordingly by at least the same rate. This compares well with the predicted fifteen-year increase in collection for textiles shown above between 2021 and 2035 of between 39% at the lower bound and 55% at the higher bound as presented by the JRC and suggests that the rates of McKinsey appear to be less realistic.

Figure 5 Glass waste generation and glass waste recycling for the period 2004-2020 within the EU

[115] Databases used from Eurostat were was_gen and env_wastrt

[116] Note that data on glass recycling quantities is not available for the years 2004-2008. For this reason, the data over the longest available data period has been used to determine glass recycling trends covering 2010-2020.

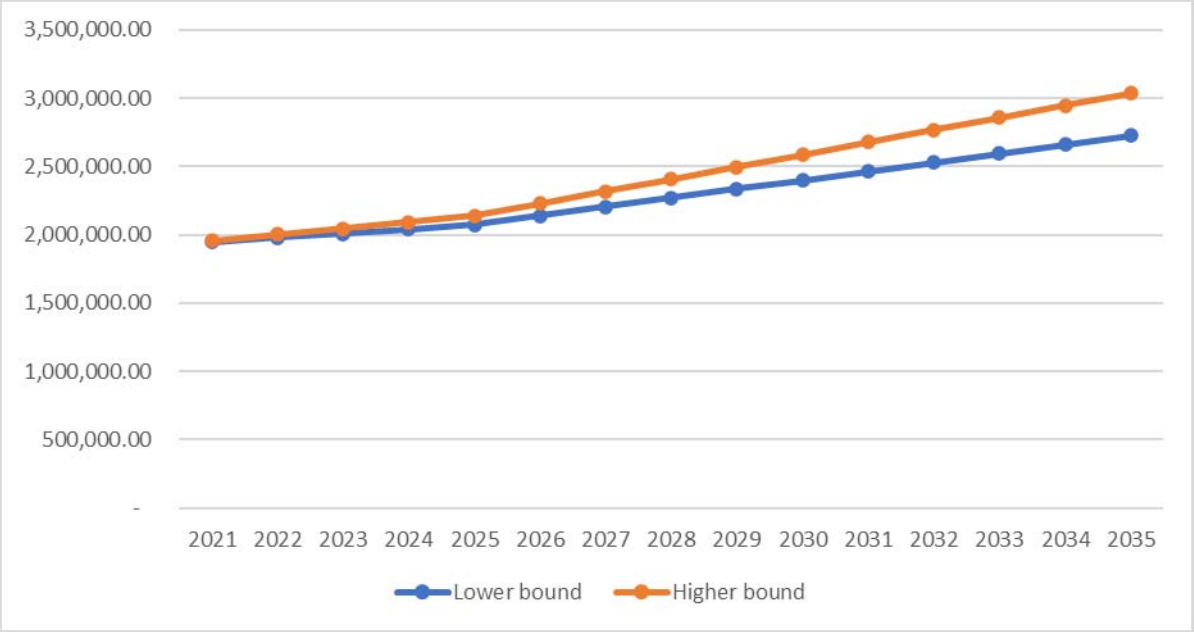


Based on the current status reported by the Member States in the context of the consultations, the support study expects that most Member States will face challenges for the timely implementation of the separate collection obligation.

Given the above, the support study uses estimates based on material from the JRC that considers that 65 000 to 90 000 tonnes will be collected in addition each year, that is a 50-80% total increase with respect to the 2020 volumes[117]. Less than half of this growth can be expected in the years up to 2025, as Member States would need to adjust their collection systems to implement the Directive. This estimated yearly increase in the tonnes of textile waste collected has been used to predict the forecasts for the period 2021-2035 starting from the tonnes of textiles collected by each Member State in 2020. The lower and upper trend for textile waste collected are estimated at 2.8% and 3.9%, respectively. The full forecast is shown in Figure 6 below, which shows an increase in textiles waste collected for the whole period, with an increasing rate after 2025. The trend shown above is based on the same measures currently in place in different Member States being still applicable, meaning that in some cases separate collection would be mainly undertaken by charitable organisations, whereas in others the commercial sector would be the dominant actor involved in the collection. There is a lack of infrastructure in the EU to deal with those volumes in terms of collection and sorting, this will mean that textiles will not be managed according to the waste hierarchy.

Figure 6 – Trends of textiles waste collected in the EU27 for the period 2021-2035

[117] See JRC, 2021. Circular economy perspectives in the EU Textile sector



Under this baseline it is anticipated that by 2025 approximately 2.1 million tonnes of discarded clothing and household textiles will be separately collected from a total of 5.2 million tonnes of such wastes likely to be discarded in the same year leaving approximately 60% of discarded clothing and household textiles in residual waste. This statistic hides the fact that some larger Member States already separately collect a large proportion of their textile wastes, meaning that in reality up to two thirds of Member States are unlikely to collect more than 30% of their textile wastes by the Article 11 implementation deadline.

Additionally, there is no clarity on **what share of textiles that are currently discarded may be fit for reuse or recycling**. Any measures aimed to increase reuse of the textiles currently discarded in mixed municipal waste, need to consider the likely quality of those textiles before they were discarded. The JRC[118] notes that there are a small number of such studies. For example, the NL has carried out surveys that indicate that between 2015 and 2018 the reusable fraction of textiles found in household mixed waste varied between 20% of the quantity discarded and 28% of the volume discarded. Similarly, a review in seven DK municipalities found that 23% would have been reusable[119], albeit a separate study indicated that the figure could be 65% after a repair operation[120]. Another study in SE found 59% of the textiles discarded in residual waste could have been reused and picking analyses in the UK indicated that in 2000, 59% of the textiles discarded in mixed household waste could have been reused, falling to 43% by 2008 in part due to increasing separate collection of textiles. The JRC also notes that there are range of factors that can affect the

[118] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144.
[119] Watson, D, Trzepacz, S. & Gravgård Pedersen, O. 2018. Mapping of textile flows in Denmark. Danish Environmental Protection Agency Project no. 2025. available at: https://www2.mst.dk/Udgiv/publications/2018/08/978-87-93710-48-1.pdf
[120] Nørup 2019. An environmental assessment of the collection, reuse, recycling and disposal of clothing and household textile waste. PhD Thesis from Danish Technical University (DTU).

results found above and that it is difficult to reach general conclusions accordingly. However, the JRC reaches the conclusion that at least 50% of the textiles discarded in mixed waste could have been reused or recycled. Combined with actual reuse and recycling figures this suggests that for all textile wastes discarded approximately 63% could be reused and/or recycled in total with the remaining share currently unsuitable for such reuse or recycling.

The share of collected textile suitable for reuse is likely to fall from 58% in 2021 to 50% in 2035. This will challenge the reuse actors' business model because of limited increase in their revenues from reuse activities while they will have to sort and dispose of more waste. In addition, the second-hand textiles sector is expected to double in 5 years. However, resale platforms drive the main growth with more consumers selling their 'crème' directly and hence reducing the amount available to reuse actors.[121]

The current model that relies heavily on social enterprises, will be threatened by the large amounts likely to be collected once the separate collection obligation comes into force and in the following decade. The larger quantities of textiles will increase the costs while revenues are unlikely to grow at a similar rate. With the increase of textile waste generation and the upcoming separate collection obligation, the entire used textiles and textiles waste management chain will have to be scaled up dramatically, requiring efforts to build additional infrastructure and train staff to manage the collected textiles. This is a key barrier to a better management of used textile and textile waste, as without separate collection textiles are either incinerated or landfilled as household waste. It is likely, therefore, that municipalities will increasingly be required to set up collection schemes or contract commercial enterprises to collect used textiles on their behalf to address this collection shortfall.

A general theme identified in relation to the quality of textiles found in residual waste by the JRC[122] is that the higher the share of textiles that are already separately collected, the lower the average quality and value of textiles discarded in residual waste. The JRC considers that this is partly because households already make fairly reasonable decisions about what has significant value and should thus be donated/sold for reuse, and what has little reuse value. A 2018 study in DK[123] corroborates this theory whereby the 42 000 tonnes of textiles discarded in Danish residual waste for incineration in 2017 were estimated to have had a value of 12-15 million euro prior to discarding whereas the 36 000 tonnes of separately collected textiles were sold on reuse markets for an estimated 65 million euro, i.e., 4 to 5 times the value per tonne.

However, the support study considers that these base-case figures are an optimistic scenario because with increased collection it is likely that the portion of unsuitable textiles will go up since they are the ones that citizens currently dispose of in the mixed waste bin. On average, it is predicted that by 2035, 50% to 56% of textile waste generated across the EU would be separately collected in the absence of additional measures put in place (this acknowledges that some Member

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[121] McKinsey & Company, 2022.

[122] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144

[123] Watson, D, Trzepacz, S. & Gravgård Pedersen, O. 2018b. Mapping of textile flows in Denmark. Danish Environmental Protection Agency Project no. 2025. available at: https://www2.mst.dk/Udgiv/publications/2018/08/978-87-93710-48-1.pdf

States already have significant shares of separate collection as well as accounting for a larger proportion of total EU waste).

In addition, the **lower quality of textiles also affects their recyclability,** leading to them being mainly sent for disposal. It is apparent that there remains a fraction of textiles that are suitable for reuse that are currently discarded. However, the challenge is in developing a measure to address this fraction that is realistic in light of the apparent quality challenges in this faction as well as the global saturation of the second-hand clothes market.

McKinsey[124] considers that over time the share of unsorted textile waste exported from the EU is expected to decline by 30 percentage points, going from 40% of waste generated in 2020 to around 10% in 2030. However, the sources of funding to address the additional sorting that would be required are not addressed in that study. The growth rate of sorted waste follows the upper and lower bound of the collected rate. However, the same challenges in terms of the quality of sorting remain with some failing to correctly differentiate between reusable, recyclable and fractions for disposal. Manual sorting will keep playing an essential key role for the identification, distinction, and destination materials, especially for reuse purposes. Automatic sorting is still in its infancy and predictions as to its likely share of sorting in the future are not robust. However, its role will become increasingly important as it will allow to automatise the sorting of products to be recycled. As a matter of fact, it is the most preferred option for non-reusable waste outputs or for processing non-reusable pre-consumer waste.[125] Automated sorting could then be expected to be increasingly employed in the period up to 2035. The support study also estimates that 5% of manually sorted waste will then be subject to a second phase automatic sorted in the 2021-2035 period. To face additional volumes of textiles waste to be processed through automated sorting, significant investments are necessary. For example, sorting efficiency can be improved thanks to technologies processing clothing information in terms of fibre and material composition.[126] Staff previously in charge of sorting such products to be recycled will be then shifted to sorting additionally collected waste to focus on reusable materials with automated sorting applied to this manually screened material for recyclability. Nevertheless, manual sorting will keep playing an essential key role for the identification, separation, and sorting of textile waste. The entire sorting process will then speed up, become potentially less costly, and higher volumes of waste might potentially be processed.

Predicted rates of textile recycling will change from the status quo. This is particularly the case as focus moves away from mechanical open loop recycling to closed loop recycling. It is expected that through additional fundings and investment in R&D, recycling technologies will benefit from a potential commercial scaling and will become more affordable. Several studies have looked to predict changes in textiles recycling[127]. Annex 6 provides information on the nature of textile

[124] See footnote 46, p. 47.
[125] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144.
[126] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144.
[127] See footnote **Error! Bookmark not defined.**; See footnote 46, p. 47.

recycling technologies both in use and in development. It is apparent that there are several challenges in relation to increasing recycling capacity, including the TRL of recycling technologies as well as the investment costs necessary to install and operate the necessary recycling capacity. The referenced studies indicate optimistic growth rates in closed-loop textile recycling with the most optimistic addressed in McKinsey that identified a base-case scenario of 36% of separately collected textiles being fibre-to-fibre recycled by 2030. The JRC report[128] had also identified potential trends in textile-to-textile chemical recycling with a predicted installed capacity of approximately 900 000 tonnes by 2025. Given the state current recycling capacity, these predictions appear optimistic. Based on trends in closed-loop recycling to date and the predicted investments in future[129] the support study has estimated that 28% of textiles collected that will be closed-loop recycled and 14% of textiles collected that will be open loop recycled in 2030[130]. It is assumed that such trends will remain constant up to 2035. Assuming a constant recycling growth rate between 2020 and 2030, recycling rates for the period 2021-2029 have been calculated by adding such growth rate to the rate in the previous year.

However, it has to be taken into account that a portion of textiles collected will not be reused, prepared for reuse or recycled and will contribute to waste being disposed. Textile waste 'crème' is likely to be already in the reuse market, either informally or through separate collection and subsequent sorting. The separate collection obligation entering info force in 2025 (especially when it is made easier for citizens through a kerbside collection) will probably encourage citizens to dispose of their old textiles which are damaged beyond repair. These would have previously gone to municipal waste and be landfilled or used for energy recovery. The JRC comes to the conclusion that "a large part of the 65 000 to 90 000 tonnes year-on-year growth in textiles diverted from mixed waste to separate collection each year are likely to be non-reusable or at least to have no value on second-hand markets."[131] This will put pressure on the business model of reuse actors who can currently finance collection and sorting via the reuse sales. The uncertainty of what share of those would be reusable in the EU or on the global market, and what share would be recyclable means is very difficult to determine if the sorters' business case would still be sustained.

The destination of reuse remains difficult to predict and is dependent upon the nature of consumer behaviour in the years to come. The trend of decreasing quality of textiles is expected to be counteracted by the implementation of the ESPR that will encourages more sustainable and long-lasting textiles of good quality, thus enhancing reusability and recyclability. Textile waste 'crème' (textile waste with the best quality) is already separately collected, and the generalisation of the separate collection of textile waste (especially when it is made easier for citizens through a kerbside collection) encourages people to put out their old clothes which are damaged beyond repair, these textiles previously would have gone to municipal waste and be landfilled or used for energy recovery[132]. Should that remain as present, then it could be expected that 15% of textiles suitable for reuse would remain within the EU with the remainder exported to third countries. The

[128] JRC, 2021.
[129] ReHubs, 2020
[130] More specifically as an example, McKinsey estimates that 50% of total waste is collected in 2030 and 25% of total waste is reused. Consequently, the share of collected that is reused is equal to 25%/50%=50%.
[131] JRC, 2021.
[132] https://www.letsrecycle.com/news/quality-concerns-kerbside-textile-recycling/

reuse rate as share of collection for the period 2030-2035 have been estimated using the 50% collection rate as share of total waste estimated by McKinsey base-case scenario for 2030.[133] Assuming a constant decline of reuse rate between 2020 and 2030, the reuse rates for the period 2021-2029 have been calculated by adding such rates of decline to the rate in the previous year. Considering an increasing collection rate, the proportion of collected textile that is suitable for reuse will fall during the period 2021-2035 (going from 58% to 50%). However, as the total volumes that are collected increases, the volume suitable for reuse is also likely to increase.[134] However, direct consumer sales on C2C platforms and global saturation are likely to have a negative impact on reuse rates that was not quantified due to a lack of reliable data.

Circle Economy & Fashion for Good (2022)[135] estimated the portion of textile waste collected not reusable nor recyclable to be 8% of collected waste in 2019. Considering that such estimate considers only a few Member States, and it thus highly optimistic, we have assumed that 8% represents the portion of waste collected not reused nor recycled for the EU27 in 2035. Similarly, the estimates for closed loop recycling from McKinsey are considered too optimistic given the status of this technology. Therefore, keeping the share of open loop recycled as originally calculated, the share of closed loop recycled for 2035 has been calculated as the remaining portion of collected waste that is not reused or prepared for reuse (50%) open loop recycled in 2035 (14%) or disposed (8%). Therefore, the share of textile waste that will be closed loop recycled in 2035 is estimated at 28%[136]. The share of textile waste that is closed loop recycled in the period 2022-2034, is then calculated assuming a constant growth rate and adding such growth rate to the 3% share estimated for 2021.

Considering an increasing collection rate, the share of collected textile that is going to be closed loop recycled will thus increase (going from 3% to 28%) during the period 2021-2035, while the share of collected textile that is going to be open loop recycled will decrease (going from 23% to 14%). Consequently, the share of collected waste that is not reused or recycled will decrease (going from 16% to 8%). The overall volumes of open loop recycled products will decrease over the period, while the volumes of closed loop recycled products will increase.

The Commission has proposed the revision of the WSR and at the time of writing this assessment the proposal was passing through the ordinary legislative procedure. The way textiles will be handled within the EU in the future according to the proposal are important to consider. The proposal aims to restrict the export of all waste to non-OECD countries. The EU exports of 'green-listed' waste should be authorised only for those non-OECD countries that explicitly notify the EU of their willingness to receive EU waste exports and demonstrate their ability to treat this waste, including textiles, in an environmentally sound manner. These third countries will be included in a list of countries to which export of green-listed waste would be authorized. The list will be drawn up by the Commission and export will not be possible for countries and waste not included therein. The proposal also looks to establish clear criteria to prevent waste from being falsely exported as

[133] As explained above, this is calculated using the JRC data on collection and waste generation, complemented by the same data provided by a number of Member States.
[134] More specifically as an example, McKinsey estimates that 50% of total waste is collected in 2030 and 25% of total waste is reused. Consequently, the share of collected that is reused is equal to 25%/50%=50%.
[135] Circle Economy & Fashion for Good, *Sorting for circularity Europe. An evaluation and commercial assessment of textile waste across Europe*, 2022.
[136] 28% = 100%-50%-14%-8%.

used goods. This would allow the Commission, working with relevant stakeholders and Member States, to adopt criteria for specific problematic wastes in order to differentiate between used goods and waste. This will ensure that items including textile waste, which are often labelled as used commodities, are not exported outside the OECD, where they are likely to create sizeable environmental and health damage. In particular, the impact assessment accompanying the Commission's proposal for the WSR, estimated the volume of waste retained in the EU, under the hypothesis that between 20 and 50% of currently exported waste are retained in the EU. Under the 20% scenario, an additional 0.3 to 0.4 million tonnes per year of textile wastes would be retained and disposed in the EU in the period 2019-2030. Such volume would grow to 0.7-1 million tonnes per year under the 50% scenario. The impact assessment has additionally specified that given the time necessary to adjust to the amended regulation, part of the textiles waste retained in the EU will not be sent to recycling, but to energy recovery. Therefore, if adopted, the proposal for a new regulation on waste shipment will affect the baseline through an increase in the textile waste to be managed at EU level. However, the impact will be felt most beyond the collection phase i.e., in relation to sorting, reuse and recycling as well as in relation to disposal. Quantification of these impacts has not been possible.

Stakeholders claim that there is a lack of research & development mainly due to insufficient funding opportunities to bring recycling solutions to scale and due to high recycling prices and low demand for recycled products that can rarely compete with virgin materials. At the same time, however, it is apparent that textiles can be significantly impacted by rising costs and global textiles supply chain stability as highlighted by the global federation of national Associations for the screen printing, digital printing and textile printing community (FESPA). In its 2022 Article, FESPA identified that inflationary pressures resulting from supply chain squeezes and raw material costs, including the cost of oil increasing cotton and polyester fabric prices, with for example, woven cotton fabric showing an 18.9% increase between 2020 and 2022[137]. Manual sorting will keep playing a necessary role in the distinction and destination materials, especially for reuse purposes.

As previously explained, it is estimated that less than 3% of separately collected used textiles in 2020 were recycled using current fibre-to-fibre recycling whilst approximately 23% of separately collected textiles were used for other recycling purposes. [138] McKinsey estimates that 36% of the textiles collected will be closed-loop recycled and 14% of textile waste collected that will be open loop recycled in 2030[139]. However, these rates appear optimistic given the state of closed-loop recycling at present and the study supporting this impact assessment uses a more conservative estimation with closed loop recycling expected to be applied to 28% of separately collected textiles in 2035 and open loop recycling to remain static as a percentage of 14% of collected textiles, reflecting in part the move to apply greater levels of closed loop recycling to materials subject to open loop recycling at present.

In 2020, EURATEX, the European Apparel and Textile Confederation, in coordination with its members (Creamoda, Fedustria, Consejo Intertextil Español, Finnish textile & Fashion, Sistema

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[137] FESPA, *The impact of rising costs and global textile supply chain instability – what you need to know?*, 2022.
[138] Approximation of McKinsey (2022).
[139] More specifically as an example, McKinsey estimates that 50% of total waste is collected in 2030 and 25% of total waste is reused. Consequently, the share of collected that is reused is equal to 25%/50%=50%.

Moda Italia and Textil + Modewith), launched a joint initiative to set European Textile Recycling Hubs, the **ReHubs**[140]. This joint initiative aims at turning the upcoming textile waste problem into an opportunity and to create value. The mission is to "establish 5 recycling hubs serving the whole Europe, for upcycling waste and circular materials by collecting, sorting, processing and recycling industrial, pre-consumer and post-consumer textile wastes[141]." The timeline for implementation of the ReHubs initiative runs to 2030. The immediate focus is on sorting technologies to accurately identify materials for subsequent circular recycling processes. Led by Texaid AG, of Schattdorf, Switzerland, the aim is to establish the first 50 000 tonne facility by the end 2024[142]. However, by 2030 fibre-to-fibre recycling should, according to EURATEX, reach 2.5 million tonnes per year, corresponding to 23% of Europe's total textile waste.

In line with the separate collection requirements, Spain and Italy have indicated in their national recovery plans that they are considering establishing Recycling Hubs to collect, sort and process textile waste into secondary raw materials. Implementing Recycling Hubs will require major investments[143]. Many researchers are also contributing to the improvement of textile waste recycling and its reuse. [144]

It is expected that through additional fundings and investment in R&D, recycling technologies will benefit from a potential commercial scaling and will become more affordable. Therefore, textile recycling will change from the current ones. This is particularly the case as focus moves away from mechanical open loop recycling to closed loop recycling. It is expected that through additional fundings and investment in R&D, recycling technologies will benefit from a potential commercial scaling and will become more affordable.

From a theorical perspective, pre-consumer textile waste is easier to recycle compared to household textile waste, because it is more homogenous, the identification of the fibre composition is simpler, and it does not usually require a decontamination step in the pre-treatment stage[145]. As previously stated, the pre-consumer textile waste is going to increase in the period under study. Of such waste, an increasing but limited portion will be available for recycling. However, it should be noticed that all recycling technologies require well-defined input for technology to scale. For this reason, processing pre-consumer textile waste is more limited and bigger volumes of waste are necessary. The quality of the input material to be recycled affects the quality of the output of the recycling process. Consequently, sorting textiles waste is an important first step as part of the pre-treatment stage, especially for household textile waste that consists of larger blend of materials and fibres compared to pre-consumer textile waste[146]. Most recycling technologies highly depend on well-sorted inputs, as they can only work with pre-treated textile waste. However, exceptions exist with some recycling processes having embedded pre-treatment stages[147].

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[140] ReHubs, 2020
[141] ReHubs, *A joint initiative for industrial upcycling of textile waste streams & circular materials*, 2020.
[142] Innovation in textiles, *ReHubs seeks €6-7 billion for bold plan*, 2022.
[143] ReHubs, 2020
[144] MDPI, 2021, https://www.mdpi.com/2071-1050/13/24/13732/pdf.
[145] See footnote **Error! Bookmark not defined.**
[146] See footnote **Error! Bookmark not defined.**
[147] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144.

McKinsey & Company[230] considers 18-26% of textiles could be fibre-to-fibre recycled by 2030. Additionally, other textiles would be available for other types of recycling, including open loop recycling accounting for another 7-11% of textiles handled.

Energy recovery from textile waste through incineration as well as disposal via incineration and landfill will remain for a share of textile wastes generated – namely those textile wastes that will not be collected separately as well as those collected that cannot be reused or recycled. It is expected that the share of textile waste that is either used for energy recovery via incineration or disposed of, will decrease in the period 2021-2035 as collection, sorting, reuse and recycling will increase. The main driver behind this is that a larger share of textile waste will be expected to be separately collected and sorted, allowing it to go through the waste hierarchy rather than being used for energy recovery or disposed of directly. Assuming that everything that is not collected is used for energy recovery through incineration or disposed of and that sorting, reuse and recycling remain efficient and in line with increased collection rates, and considering that the portion of textile collected that is not reused, prepared for reuse or recycled will be disposed, textile disposal will fall from 67% in 2021 to 54% in 2035, under the lower case baseline scenario, or from 67% in 2021 to 49% in 2035, under the upper case baseline scenario. While the situation is expected to improve, considerable amounts of textile waste would still be disposed and there is very little clarity of where the funding for some of the future projections would come from, thus making these optimistic.

The ongoing JRC work[148] highlights that there are different approaches to target setting, and the level of the proposed target would be highly dependent on the scope of textile waste and preparing for reuse. In addition, sufficiently robust data on textiles placed on the market, collected, sorted, reused and recycled needs to be available to develop a robust baseline and assess if the proposed targets potentially addressing one or more of these used textiles and waste textiles phases are realistic.

The JRC will commence work on a report to support the possible development of end-of-waste (EoW) criteria for textile waste in early 2023, focusing on separately collected clothing and other textiles prepared for reuse, on cellulosic fibres from textile waste and on mixed fibres. Such harmonised EoW criteria are expected to bring legal certainty and contribute to smooth shipment of materials derived from treated textile waste for reuse and recycling within the EU and, potentially OECD and non-OECD countries in line with the proposal on the Waste Shipments Regulation. The situation of used textiles which are not collected as waste would not be addressed therein, given such materials are not waste and therefore are shipped as ordinary textile goods. The revision for the WSR proposes that the Commission should be empowered to establish specific criteria to distinguish between used goods and waste for export purposes. This could, potentially be used towards bringing clarity to the shipment of sorted used textiles for reuse.

Diverging rules in national EPR schemes will cause confusion amongst producers as well as unnecessary compliance costs and administrative burden. The Statista Digital Market Outlook[149] estimates that e-commerce revenue from apparel, accessories and footwear will almost double

[148] JRC, 2023 under development

[149] Statista, Fashion e-commerce revenue forecast in Europe from 2017 to 2025, by segment, 2022 Europe: e-commerce fashion segment revenue | Statista.

from 2020 to 2025. The growing trend of e-commerce increased market share and its expected continuation in the future is an important factor to consider for EU or national measures on extended producer responsibility for the purposes of ensuring level playing field among the obliged industry and enforcement.

The estimates below on the evolution of the problem are based on an ongoing study by the JRC[150], including a mass flow analysis of textile value chain and waste management in the EU in 2035. As previously stated, while the overall magnitudes remain fairly consistent with the above-mentioned figures, there might be important differences that are due to the scope, definitions and assumptions underlying the projections. The JRC considers the following assumptions on key aspects concerning the projections:

- *Apparent consumption*

In order to set the baseline scenario, the projection of import, domestic production and export (and then, apparent consumption) of textile products is estimated assuming a Compound Annual Growth Rate (CAGR) equal to 3%.

This value is aligned to the Strategy for Sustainable and Circular Textiles. In addition, this number is in line with the data provided in the JRC 2023 report (Joint Research Centre, 2023). During the JRC workshop on textile waste[151], stakeholders confirmed that a 3% compound annual growth rate is a realistic outlook for the EU.

Under these assumptions, **apparent consumption is expected to increase from 12.0 Mt in 2019 to 17.4 Mt in 2035.**

The value of each indicator (import, domestic production or export) of a product in 2035 is the calculated as:

$$I_{2035} = I_{2021}(1 + CAGR)^{\Delta t}$$

Where:

- I_{2035}: is the value of the indicator in 2035.
- I_{2021}: is the value of the indicator in 2021.
- $CAGR = 0.03$.
- $\Delta t = 14$, being the time (in years) between 2021 and 2035.

Note that projections are made starting from year when we have the most recent observation (2021).

- *Recycling of post-industrial and pre-consumer waste*

[150] Joint Research Centre. 2023. "Techno-scientific assessment of the management options for used and waste textiles - Preparatory study for the possible setting of preparation for re-use and recycling targets" (unpublished work).
[151] Workshop organised by JRC on 18-19 April 2023 to discuss a draft version of their report (Joint Research Centre, 2023). More than 150 organisations, including industry organisations active in the textile sector, participated in this workshop.

Post-industrial and pre-consumer waste generation are estimated as 37% of the textiles produced in the EU, with losses assumed from the production of yarns, fabrics, and finished textiles equivalent to 8%, 13%, and 20% of their total production, respectively (Sadowski et al., 2021). Pre-consumer waste was assumed to be 3% of the textile placed on the market (McKinsey & Company, 2022). It is assumed that these shares do not change in comparison with the status quo scenario (reference year 2019).

The recycling of post-industrial and pre-consumer textile waste is assumed a constant share of the total recycling capacity estimated. It is assumed that the ratio of the ratio (post-industrial plus pre-consumer waste sent to recycling)/total textile waste sent to recycling) remains equal to status quo scenario, at 33%.

The projection is thus based on two following assumptions:

- future total recycling capacity in 2035 of 1.3 Mt yr^{-1} (see section 2.6, estimate based on JRC 2023 report and ensuing discussions during the JRC workshop, to be fine-tuned).
- as for current-state scenario, 1/3 of total recycled textile mass is assumed to come from post-industrial waste.

Recycled post-industrial and pre-consumer waste in 2035 is then projected as:

$$\frac{1.3}{3} = 0.43\ \frac{Mt}{yr}$$

Note that this 0.43 Mt will include a minor share of post-industrial waste which is imported in EU (data retrieved from Comext database) and assumed to go directly to recycling.

- *Separate collection*

Total separately collected textile in 2035 assumed to be between 3.2 and 3.6 Mt yr^{-1}, based on Kohler et al. (2021). This assessment is based on an estimated growth of separately collection in the EU-27 of 65 000 to 90 000 tonnes yr^{-1}. The upper bound is preferred since separate collection is low in many EU countries and is likely to increase significantly before 2035. Based on these assumptions, the best estimate for separately collected textiles in baseline scenario is assumed 3.6 Mt yr^{-1}.

- *Export of unsorted separately collected textiles*

Relative to the 2019 status quo scenario, a decrease in the exports to third countries of unsorted textile waste is expected because:

(i) At present, approximately 50% of the textiles are exported to non-OECD countries. With a possible revised Waste Shipment Directive in place, environmental sound waste management practices and the demonstration thereof may be instated for such textile waste;

(ii) In addition, and potentially also in response to the point above, receiving countries may set stricter quality requirements on the amounts and types of textiles that are they import.

At present, no data are available to estimate the impact of such revised settings on the export of unsorted waste, but it seems likely that some of the exports may continue to take place to the same

or other third countries, whereas a different share of the fraction may be rerouted to the EU for domestic sorting. In the absence of sound data, it is assumed that the exports of unsorted textile waste may overall decrease by 25%, mainly due to reduced exports to non-OECD countries.

- *Textiles export after sorting in EU*

A lower quality in the separately collected textiles, and subsequent reductions in the fraction that is re-usable, could be expected in case increased separate collection circumvents certain (worn-out or damaged) textiles from ending up in mixed municipal solid waste. It can be assumed that this value decreases to 42% for the supplementary collected apparel and household textiles (Joint Research Centre, 2023; section 4.1.4 – with 42% is the average value of studies listed). Reuse share of sorted textiles is then projected in 2035 as the weighted average of the re-usability of currently separately collected textiles (2.44 Mt yr^{-1}) and the future fraction that will be separately collected (1.16 Mt yr-1), as follows:

$$Reuse\ [\%] = \left(\frac{2.44}{3.6}0.57 + \frac{3.6 - 2.44}{3.6}0.42\right) \times 100 = 52\%$$

Where:

- 2.44 Mt yr-1 is the mass of separately collected textiles in current-state scenario.
- 0.57 is the share of "high-quality" textiles going to reuse (in and outside EU) after sorting.
- 3.6 Mt yr-1 is the mass of separately collected textiles in baseline scenario.
- 0.42 is the share of "lower quality" (additionally collected) textiles going to reuse (in and outside EU) after sorting.

The exports involve both textiles that are destined for re-use as well as further sorting the third country of destination.

2.5 Re-use in the EU

Similar to the status quo scenario, it is assumed that re-use in the EU of the separately collected waste is only small fraction of the total fraction of the separately collected waste (~8%).

- *Recycling of post-consumer textile waste (after sorting)*

The current recycling capacity for the year 2023 is estimated in the EU is estimated at 0.75-0.80 Mt yr-1. In case we assume an average compound annual growth rate that is similar to historic capacity developments for the recycling of other secondary raw materials (paper and cardboard, packaging waste (with a compound annual growth rate of 3%-5.5%; Joint Research Centre, 2023), the total textile waste recycling capacity in 2035 would grow to approx. 1.3 Mt yr-1. Assuming that, similar to the status quo scenario, about 66% of this capacity is being used to process post-consumer waste, the total recycling of post-consumer waste would be projected as:

$$1.3 \times 0.66 = 0.87\frac{Mt}{yr}$$

- *Incineration and landfill rate*

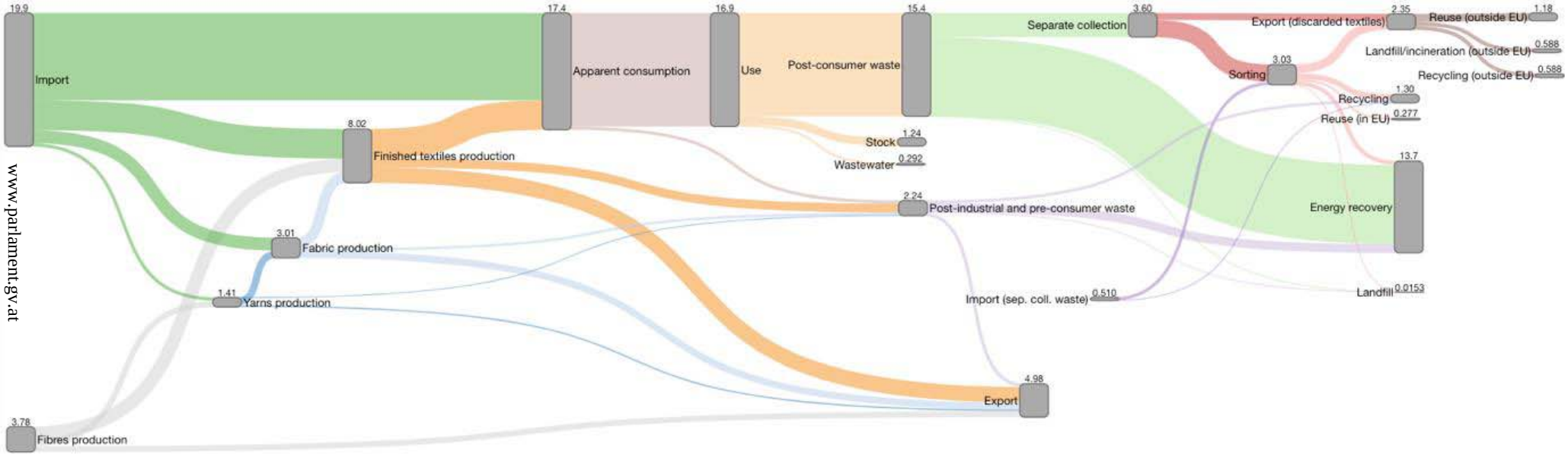
Mass of discarded textile not separately collected, selected for reuse or recycling or exported, was sent to energy recovery or landfill, based on proportions found in data on mixed waste treatment

in Eurostat. In case of current-state scenario, this proportion was calculated based on Eurostat data for 2019. In case of baseline scenario, the proportion for 2035 was projected by means of linear regression over time.

- *Import of textile waste*

Mass of imported textile was estimated based on data from Comext database. For current-state scenario, data referred to 2019 were used. In case of baseline scenario, imported textile waste in 2015 was projected by means of linear regression over time.

Figure 7 – Mass flow analysis for textile generation and waste management in the EU (for the baseline scenario for 2035). The mass flows in each node are expressed in Mt/year



2- Food Waste

Globally, consumer food waste occurs at the retail (13%), food service (26%), and household (61%) stages of the food supply chain and accounts for 17% of global food production[152]. Recent estimates suggest that household food waste accounts for a large share of consumer food waste regardless of a country's GDP.

In the EU, the situation is similar. The first EU-wide monitoring of food waste levels[153] shows that 71% of food waste generated arises at consumption (53% households, 9% restaurants and food services and 7% at retail). Eurostat roughly estimates that around 10% of food made available to consumers may be wasted.

The main drivers and situations that generate food waste in the food value and consumption chain are widely documented[154] and relate to: **insufficient consumer food management**; **inefficiencies and trade-offs in the food supply chain**; and **lack of understanding and certainty regarding food safety standards**. Moreover, in the EU – except for a few front runners – the **lack of evidence-based, coordinated approaches in MS** leads to food waste generation going largely unchecked.

Insufficient consumer food management

At the **consumer level**, the drivers[155] and behaviours that lead to food waste are complex and often inter-related. These can occur during planning, shopping, storing, preparing and/or consuming stages.

Food waste reduction depends on consumers' motivation, opportunity and ability to act[156,157]. There may be **insufficient motivation to take action** due to a number of factors including lack of awareness about food waste; attitudes and/or level of concern about food waste and its related impacts; lack of self-awareness on the amount of food generated; food prices in relation to household incomes; lack of role models and other examples pointing to food waste prevention as

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[152] United Nations Environment Programme Food Waste Index Report 2021, Nairobi, 2021.
[153] Food waste and food waste prevention - estimates - Statistics Explained (europa.eu), Eurostat, 2022.
[154] FAO, *The State of Food and Agriculture. Moving forward on food loss and waste reduction*, 2019; UNEP, *Food Waste Index Report 2021*; Champions 12.3, *Changing behaviour to help more people waste less food – a guide*, 2022; *Combating food waste: an opportunity for the EU to improve the resource-efficiency of the food supply chain* (see note 29, page 5)
[155] Attiq, S., Danish Habib, M., Kaur, P., Junaid Shahid Hasni, M., & Dhir, A., *Drivers of food waste reduction behaviour in the household context*, Food Quality and Preference, 94, 2021, doi:10.1016/j.foodqual.2021.104300; Canali et al. *Drivers of current food waste generation, threats of future increase and opportunities for reduction*, FUSIONS Project. ISBN: 978-94-6257-354-3, 2014.
[156] van Geffen, L., van Herpen, E., Sijtsema, S., van Trijp, H., 2020. *Food waste as the consequence of competing motivations, lack of opportunities, and insufficient abilities.* Resour. Conserv. Recycl. X 5, 100026. https://doi.org/10.1016/j.rcrx.2019.100026.https://doi.org/10.1016/j.rcrx.2019.100026.
[157] Vittuari, M., Herrero, L. G., Masotti, M., Iori, E., Caldeira, C., Qian, Z., ... & Sala, S. (2023). *How to reduce consumer food waste at household level: A literature review on drivers and levers for behavioural change*. Sustainable Production and Consumption.

a social norm[158]. **Lack of opportunity** such as time constraints affecting meal planning and preparation, not having access to technologies supporting food management (e.g., freezing) or to advice on how to store and re-use food safely can lead to food being wasted[159]. **Lack of ability** (knowledge and skills) can also contribute to insufficient food management, leading to food waste[160].

One of the main reasons leading to avoidable food waste in households is food not being used in time[161] including due to the misunderstanding of the meaning of date marking[162]. This results in perishable food products being wasted in larger quantities than other product types[163].

Consumers' motivation and ability to prevent food waste as well as opportunities and barriers in doing so may **vary according to different population groups**. For instance, child pickiness and disgust sensitivity are known drivers of food waste in households with young children[164]. **Cultural norms**, such as cooking more than the family or group of visitors could possibly eat, remain present in many Member States and worldwide.

Moreover, the consumer **trend towards healthier diets**[165] and increased demand for fresher, chilled and convenience foods will result in a greater share of grocery products within the food categories where date marking issues are more likely to drive food waste[166,167]. Consumer **expectations regarding the appearance of food** (such as the size and shape of fruit and vegetables) can contribute to food waste upstream in the food supply chain just as the **food**

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[158] Hebrok, M., Boks, C., 2017. *Household food waste: Drivers and potential intervention points for design – An extensive review*. J. Clean. Prod. 151, 380–392. https://doi.org/10.1016/j.jclepro.2017.03.069;

[159] van Geffen, L., van Herpen, E., van Trijp, H., 2020. *Household Food Waste—How to Avoid It? An Integrative Review, Food Waste Management*. Springer International Publishing, Cham, pp. 27–55. https://doi.org/10.1007/978-3-030-20561-4_2

[160] Bravi, L., Francioni, B., Murmura, F., Savelli, E., 2020. *Factors affecting household food waste among young consumers and actions to prevent it. A comparison among UK, Spain and Italy*. Resour. Conserv. Recycl. 153, 104586. https://doi.org/10.1016/j.resconrec.2019.104586

[161] Champions 12.3, *Changing behaviour to help more people waste less food – a guide*, 2022

[162] Flash Eurobarometer 425 (2015): while 58% of Europeans state that they always check 'use by' and 'best before' labels when shopping and preparing meals, less than half understand the meaning of 'best before' (47%) or 'use by' (40%).

[163] European Commission, Directorate-General for Health and Food Safety, *Market study on date marking and other information provided on food labels and food waste prevention : final report,* Publications Office, 2018, https://data.europa.eu/doi/10.2875/808514.

[164] Danish Centre for Food and Agriculture (DCA), *Consumer behaviour towards food waste in families with children,* DCA Report No. 196, p. 55 (2021).

[165] Moz-Christofoletti, M.A.; Wollgast, J., Sugars, Salt, *Saturated Fat and Fibre Purchased through Packaged Food and Soft Drinks in Europe 2015–2018: Are We Making Progress?,* Nutrients 2021, 13, 2416.

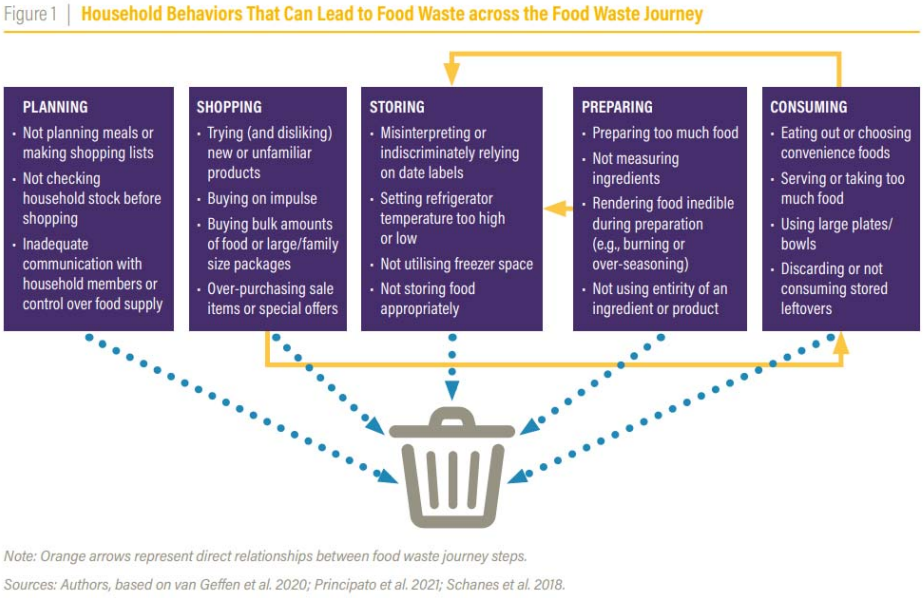
[166] Bumbac, R., *The European food market – increased consumer preference towards convenience and healthy food*. Junior Scientific Researcher, Vol V, No. 2, pp. 53-61.

[167]European Commission, Directorate-General for Health and Food Safety, *Market study on date marking and other information provided on food labels and food waste prevention*: final report, Publications Office, 2018, https://data.europa.eu/doi/10.2875/808514.

environment can also influence consumer food purchases and habits (e.g., availability of 'doggy bags' in restaurants to take home surplus food from meals)[168,169].

Figure 41 provides an overview of the type of behaviours that can lead to food being discarded in the home[170].

Figure 8 – Overview of consumer behaviours leading to food waste



Practices of food business operators at retail and in restaurants/food services can also influence food waste at consumption[171]. At **retail**, marketing strategies (two-for-one deals, for example), may promote food nearing the end of its shelf-life, addressing overstocking problems. However, this may shift some of the food waste from retail to households, where sufficient time to safely consume products is lacking.

In **cafeterias/canteens**, where portion sizes are imposed, food waste is generated that might have been avoided by allowing customers to serve themselves and pay for their serving by weight. In **restaurants,** proposing doggy bags to customers can help both raise awareness regarding the importance of food waste and avoid plate waste. The dynamics of the broader food environment

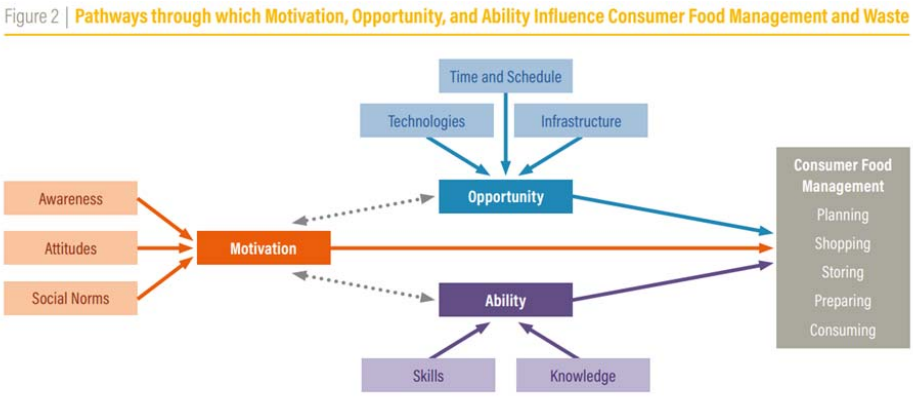
[168] REFRESH, *Policies against consumer food waste*, Background report contributing to "REFRESH Policy brief: reducing consumer food waste" (D3.4), 2019.
[169] HLPE, *Food losses and waste in the context of sustainable food systems*, 2014.
[170] Champions 12.3, *Changing behaviour to help more people waste less food – a guide*, 2022.
[171] Wu, Q., & Honhon, D. (2022). Don't waste that free lettuce! Impact of BOGOF promotions on retail profit and food waste. *Production and Operations Management,* doi:10.1111/poms.13884.
Calvo-Porral, C., Medín, A. F., & Losada-López, C. (2017). Can marketing help in tackling food waste?: Proposals in developed countries. *Journal of Food Products Marketing, 23*(1), 42-60. doi:10.1080/10454446.2017.1244792

through marketing practices, offers and advertisements can also influence food waste at consumption[172].

At the consumer level, the drivers and behaviours that lead to food waste are also impacted by market causes, for instance, the **price of food**. As increased food productivity has, over the years, driven down the price of food, it may be perceived as having a relatively low value. Buying more for convenience is an option when food is relatively cheap, and when food is generally seen as abundant and always available. The **challenge however lies in how to ensure higher perceived value of food, without actually increasing the price of food**. The growing interest in short supply chains (as reflected in the recommendations of the Citizens' panel) may also help combat food waste by closing the gap between producer and consumer and building greater appreciation for food.

Evidence suggests that changing consumer behaviour as regards food waste cannot rely on simple awareness raising but requires a mix of different interventions targeted to address specific behaviours and population groups. There are numerous evidence-based behavioural change models that can be applied to help change food waste-related behaviours. The Motivation-Opportunity-Ability (MOA) model, particularly relevant for food waste prevention (see figure 42 below). According to the model, all three components (motivation, opportunity and ability) must be present to enable a given behaviour and interact with each other in influencing the behavioural outcome.

Figure 9 – Pathways to influence consumer food management and waste



In order to curb consumer food waste, joined-up action involving multiple players is needed, in particular: policy makers, food businesses, non-food businesses (e.g., technology providers), non-governmental organisations (consumer, environmental…) and educators/other influencers (including social media).

Countries which have achieved significant reduction of consumer food waste associate both **public-private partnerships** between government and actors in the food supply chain, committed to a common roadmap for food waste reduction at national level, with a **public behaviour change**

[172] Flanagan, K., Robertson, K., & Hanson, C. (2019). Reducing Food Loss and Waste: Setting a Global Action Agenda. World Resources Institute. https://doi.org/10.46830/WRIRPT.18.00130

campaign[173]. The United Kingdom achieved a 27% reduction in post-farm gate food waste per capita by 2018 relative to its base-year measurement from 2007 (for food excluding its associated inedible parts). The Netherlands achieved, from 2010 to 2022 a 30% reduction at the consumption stage of the food value chain[174,175]. In its **recommendations for action for food waste prevention**[176], the EU Platform on Food Losses and Food Waste highlighted the need to develop and use a wider range of methods to better understand consumer behaviour as regards food waste and design effective solutions. Of particular interest is the increased use and development of audience segmentation in order to design more effective food waste prevention interventions, tailored to address the needs and expectations of specific population groups.

In the EU, the **European Consumer Food Waste Forum**[177] brings together both academics and practitioners to work together to develop solutions and tools to address consumer food waste, and is expected to deliver a best-practice compendium by July 2023. The compendium will target consumers directly, educational institutions, and other relevant target groups, while it will support improving action design, monitoring, evaluation and knowledge sharing regarding food waste prevention interventions, addressing consumers' motivation, opportunity and capability to influence food waste-related behaviour.

Inefficiencies and trade-offs in the food supply chain

In pursuing an economically efficient approach, actors in the food supply chain may not always prioritise efficient use of natural resources and the reduction of environmental impacts. Moreover, issues relating to food business operations both within organisations as well as a lack of cooperation between supply chain actors can lead to food waste. Drivers of food waste in the food value chain include: inefficiencies in the production, handling, storage, processing, packaging, distribution and marketing of food; lack of measurement, diagnosis and corrective action to address food waste in business operations; poor stock management; inaccurate forecasting of supply and demand as well as lack of cooperation between key actors and unfair trading practices (e.g. last minute order cancellations) [178,179].

[173] Champions 12.3. Food Loss and Waste. 2020 Progress Report.
[174] The Netherlands Nutrition Centre Foundation, 2019. Synthesis report on Food Waste in Dutch Households in 2019.
[175] The Netherlands Nutrition Centre Foundation, 2023. Synthesis report on Food Waste in Dutch Households in 2022. From 2010 to 2019 a reduction of 29% in Dutch households was achieved, however between 2019 and 2022, there was a decrease in the pace of reduction, leading to a 30% reduction overall from 2010 to 2022. The decrease in pace may be due to easiest gains having been achieved over the first years, with further reduction requiring a combination of actions and tools to achieve further behavioural change
[176] https://food.ec.europa.eu/system/files/2021-05/fs_eu-actions_action_platform_key-rcmnd_en.pdf.
[177] https://knowledge4policy.ec.europa.eu/projects-activities/european-consumer-food-waste-forum_en.
[178] Ghosh, R., & Eriksson, M., *Food waste due to retail power in supply chains: Evidence from Sweden. Global food security*, Global Food Security, Volume 20, March 2019, pp. 1-8.
[179] Messner, R., Johnson, H. and Richards, C., *From surplus-to-waste: A study of systemic overproduction, surplus and food waste in horticultural supply chains*, Journal of Cleaner Production. Volume 278, 1 January 2021, 123952.

There is a wide diversity of potential causes of food wastage in the food supply chain[180]. Each stage of the food supply chain has its specificity, still some causes originate in more than one stage.

- In the **agriculture (production) sector,** it is important to **distinguish between food losses and food waste.** Natural, unpredictable climatic variations or damage caused by pests may lead to food losses when crops are spoiled. Fruits and vegetables may also be bruised or otherwise damaged during harvesting. Overproduction may also lead to on-farm losses if there is a lack of demand for produce. In the EU, **food waste occurring in primary production** concerns crops that are harvested (or fish/animals after, respectively, catching or slaughter) and which are later discarded. Waste may be generated, for example, as a result of strict quality/size standards imposed by the market. It is especially relevant for fruit and vegetables, where there may be no market for products that do not comply with marketing standards (be they public or private). Handling and storage damage and logistical mismanagement (e.g., poor handling of produce) may also results in food waste.
  Cooperation with actors downstream in the food supply chain is also essential: unpredictable contractual terms and/or last-minute order cancellations by retailers can lead to produce being wasted if no other market opportunity can be found[181]. In 2018, the Commission's impact assessment accompanying the legislative proposal for an EU Directive on unfair trading practices in business-to-business relationships in the food supply chain[182] pointed to their possible impact on food waste. For example, economic operators who are not subject to UTPs may be left with more economic margin to invest in producing in environmentally sustainable and climate-friendly ways and to prevent food waste. Food waste is identified as a common side-effect of particular types of UTPs and addressing the systemic issue within the European grocery supply chain could be an opportunity to address both the commercial losses incurred by suppliers and food waste.
- The **manufacturing and processing sector,** shares some similar food wastage causes to the production side, where lack of market demand or poor demand forecasting can lead to overproduction. Conversely, inadequate processing capacity for seasonal production peaks can also lead to food waste. Also, the need for high quality/size/visual standards may be a cause of food wastage: for example, food sorted out as not suitable for processing and/or excessive trimming to attain certain quality and/or aesthetic standards. Damage caused by technical malfunctions during manufacturing processes (e.g., wrong size or damaged packaging, fish spilled or damaged during canning or smoking) and poor product handling are also causes of food waste. Some by-products from food from manufacturing (processing losses) may also end up as food waste if they are sent to landfill, incineration or composting, although they could

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[180] ECA report SDG Target 12.3 on Food Loss and Waste, 2016, 2019 Progress Report: an annual update on behalf of Champions 12.3; SOFA, 2019; Impact Assessment on measures addressing food waste to complete SWD (2014) 207 regarding the review of EU waste management targets.

[181] European Court of Auditors (2016). *Combating food waste: an opportunity for the EU to improve the resource efficiency of the food supply chain.*
Feedback (2017). *Causes of food waste in international supply chains.* https://feedbackeurope.org/wp-content/uploads/2017/02/Causes-of-food-waste-in-international-supply-chains.pdf
Roels K. & Van Gijseghem D. (2017) The impact of cosmetic quality standards on food losses in the Flemish fruit and vegetable sector, summary report, Department of Agriculture and Fisheries, Brussels. D/2017/3241/301

[182] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018SC0092&from=EN.

also be processed into animal feed (in compliance with food safety and animal health regulations) or used for industrial processes.
Food manufacturers and processors may also be subject to unfair trading practices such as last-minute order cancellations or, depending on their contractual terms, be forced to take back products that were not sold.

- In the **retail and other distribution** sector, stock management related issues are a key cause of food waste, particularly in relation to shorter shelf-life products, with difficulties in anticipating demand resulting in overstocking. This is linked to storage issues, with meat, fish and dairy products particularly vulnerable to temperature changes during transportation, storage and in-store, risking premature spoilage and impacting food safety. Variability in demand, products not sold despite 'mark down' and products sorted out due to cosmetic requirements are all reasons for food wastage at retail level.
  Supply chain management systems can also affect food waste. The length of remaining shelf-life on a product delivered to the retailer is a key factor driven by the stock control function of date marks ('use by' and 'best before'). While ensuring sufficient available shelf-life at retail and consumption is important, the setting by retailers of strict Minimum Life On Receipt (MLOR) criteria may result in product returns and food waste[183].
- In the **food service** sector similar logistical issues can cause food waste, with difficulty in anticipating number of clients leading to overstocking or cooking of surplus food. In addition, portion sizes and the 'one size fits all' approach have been identified as a significant cause of food waste within this sector. In relation to leftovers, the practice of taking leftovers home from restaurants is not yet as widely accepted across Europe as it could be. Catering in institutions such as hospitals creates particular food waste problems because individuals have specific needs and often have little control over-eating times, portion sizes or meal choices.
- As part of the food supply chain, **food banks and other charity organisations,** which collect surplus food, store and redistribute it to people in need, they may also generate food waste. This can happen due to incorrect storage and handling as well as due to logistical challenges linked to fluctuating demands of beneficiaries. Moreover, food banks may receive donations of products with insufficient shelf life, and food waste generated if products cannot be redistributed before the date has passed. At EU level, the European Food Banks Federation is leading efforts to establish an online Observatory on Food Donation[184], where food banks across Europe can report on their operations (e.g., quantities of redistributed food, number of volunteers etc.), including their food waste levels.

Several companies from the middle part of the food supply chain have committed to taking actions to reduce food waste, as part of their commitments to the EU Code of Conduct on Responsible Food Business and Marketing Practices[185]. The EU Code of Conduct contains 7 aspirational objectives that companies can set to improve their sustainability performance; the Code's second aspirational objective being the prevention and reduction of food loss and waste at consumer level,

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[183] European Commission, Directorate-General for Health and Food Safety, *Market study on date marking and other information provided on food labels and food waste prevention: final report,* Publications Office, 2018, https://data.europa.eu/doi/10.2875/808514.
[184] https://lp.eurofoodbank.org/feba-training-and-skill-sharing-sessions/data-collection-2020/.
[185] EU Code of Conduct on Responsible Food Business and Marketing Practices (July 2021).

within internal operations and across value chains. 40% of the signatory companies made commitments under this objective, mainly to minimise food loss and waste within their operations and across the supply chain, although most of these re-state the Code's aspirational target of halving food waste by 2030 without providing details on how to achieve this.

Nonetheless, there are also examples of **documented progress** in reducing food waste. The International Food Waste Coalition (IFWC), which represents key players in Europe's hospitality and food service sectors, launched a voluntary agreement to reduce food waste and developed a methodology for food waste measurement and reporting. New data reported by IFWC members in 2022[186] shows that food waste has dropped by more than 20% across Europe's hospitality and food service sector since 2019, representing an average of 108 grams of waste per cover. The results show that, despite the negative impact of the pandemic on the food services and hospitality sector, prevention measures such as forecasting, planning, consumer engagement and food redistribution are driving a sustainable trend towards more effective food waste reduction.

Lack of understanding and certainty as regards the implementation of food safety standards

Lack of understanding and certainty as regards the implementation of food safety and quality standards may lead to situations where food that is still safe for human consumption is unnecessarily removed from the food supply chain.

In the **manufacturing and processing sector**, and in some instances also in retail, food waste may occur due to the misunderstanding of date marking set out in EU food labelling rules[187]. According to these, it is the responsibility of the food business operator to decide– with the exception of table eggs and poultry meat – whether a pre-packed food product is marked with the date of minimum durability or the 'use by' date and the length of shelf-life. In doing so, food business operators are required to ensure food safety, and tend to act cautiously to take account of differences in storage conditions within the food supply chain and households. Assessing the length of shelf-life for some products can be a complicated exercise: with more certainty – and an easier applicability – of this assessment, food waste may be avoided for such products.

Mainly in the **retail and other distribution** sector, the traceability requirements for food safety purposes have been raised as a potential cause for food waste. Operators must at all times be able to identify from whom (suppliers) and to whom a product has been supplied (i.e., buyers or recipients of donated food such as food banks, except final consumers). Additional traceability requirements are imposed for foods of animal origin. Particularly the requirement to be able to trace a product forward in the chain is regarded by some retailers as an additional administrative burden, and thereby an obstacle for the donation of surplus food. Usually, retailers do not need to comply with this requirement as they mostly sell their products to final consumers. However, food safety must be ensured throughout the food supply chain, including food donation. It is therefore crucial to ensure full traceability to prevent and/or contain a possible food safety incident. As a growing number of retailers engage or wish to engage in food donation activities, the perceived

[186] https://internationalfoodwastecoalition.org/wp-content/uploads/2022/03/IFWC_FW-Report_Final.pdf.
[187] Regulation (EU) No 1169/2011 on Food Information to Consumers

obstacle has been recently raised by the EU Fit for Future Platform[188]. In its opinion, the Platform suggests that the Commission explore the possible benefits of updating the EU Guidelines on Food Donation.

Lack of evidence-based, coordinated approaches in Member States[189]

While Member States have committed to reaching SDG Target 12.3, overall, **action taken so far at national level is insufficient and not at the level and scale required** all Member States have some actions in place to prevent food waste; however, the level of ambition, the degree to which measures have been implemented, and results obtained vary considerably. Furthermore, the **lack of evidence-based, coordinated approaches** in Member States means that the systemic causes of food waste are not adequately addressed and that food waste is not decreasing at the pace and scale required.

The primary focus of food waste prevention should be to act at the source by avoiding the generation of surplus food at each stage of the food supply chain (i.e., production, processing, distribution and consumption) and, if such surplus arises, to recover them and ensure the highest value use of food resources, in line with the waste prevention hierarchy. Food waste prevention therefore requires an integrated approach, coordinated by various national authorities and involving all actors along the food value chain, including consumers, as well as NGOs and academia.

In this regard, the United Nations Environment Programme[190] calls on governments to follow the "Target-Measure-Act" approach promoted by the high-level coalition Champions 12.3[191] as a proven way (for both governments and companies) to achieve rapid and concrete results regarding food waste prevention. Targets set ambition and can help guide effective action based on food waste diagnostics (that is, carrying out a baseline assessment of food waste levels and "hotspots" in order to identify corresponding solutions). In 2022[192], the Champions 12.3 report that global progress by governments and companies on achieving SDG Target 12.3 is slower than needed, which is also reflected in the state-of-play in the EU.

The status of food waste prevention policy implementation was established by extracting information for each Member State from the EU Food Waste and Prevention Hub (EU Hub), complementing the available information with what was reported in the survey sent to Member States, conducted during summer 2022 as part of targeted consultations to support the impact assessment (for further details, see Synopsis Report). Additional information was extracted also from surveys carried out in 2020: by the Commission, on the EU Platform recommendations for

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[188] EU Fit for Future Platform, opinion adopted 5 December 2022.
[189] This assessment is based on: De Laurentiis, V, Mancini, L, Casonato, C, Boysen-Urban, K, De Jong, B, M'Barek, R, Sanyé Mengual, E, Sala, S. *Setting the scene for an EU initiative on food waste reduction targets*. Publication Office of the European Union, Luxembourg, 2023, doi: 10.2760/13859, JRC133967
[190] United Nations Environment Programme (2021). Food Waste Index Report 2021. Nairobi.
[191] Champions 12.3 is a coalition of executives from governments (including Commissioner Kyriakides), businesses, international organizations, research institutions, farmer groups, and civil society dedicated to inspiring ambition, mobilizing action, and accelerating progress toward achieving SDG Target 12.3 by 2030.
[192] SDG Target 12.3 on Food Loss and Waste: 2022 Progress Report | Champions 12.3 (champions123.org)

action; by the German Presidency, to sound Member States for their contributions in preparation of a progress assessment on implementation of the 2016 Council Conclusions on Food Losses and Food Waste. Finally, findings from a review of Member States' Country Profiles by the European Environment Agency, based on Member States' submission to the Commission, as part of the legal obligation for Member States to send updates on their National Waste Prevention Programmes (NWPP) by 5 July 2020 (following the 2018 revision of the Waste Framework Directive) were also considered.

Member States' feedback and description of their food waste prevention initiatives are varied and come from different sources, including their own updates on the EU Hub[193], making the exercise of an overview difficult. In many cases, the distinction between the political commitment to the SDG Target 12.3 and the concrete implementation is difficult to discern. The categorization of the level of Member States' policy implementation described below is based on the availability of evidence concerning related activities, both on the Hub and institutional documents, of commitment to specific policy objectives, clarity in charting a consistent action plan and the timeline of implementation.

While the majority of the Member States (20) have expressed a commitment to SDG Target 12.3 (with 3 doing so in the last year), the extent to which this commitment is matched by similarly ambitious targets is uncertain. **Three front-runner Member States (**Netherlands, Germany and France) **have actually taken an evidence-based approach in setting targets, implementing actions to address specific hotspots, and monitoring their effectiveness**, **following the recommended "Target-Measure-Act" approach.**

While the majority of other Member States have actions in place, it seems that only 9[194] of these have developed national strategies/roadmaps or plans in line with the SDG Target 12.3, however with limited or partial evidence of monitoring and evaluation of their effectiveness. Another 11 Member States[195] report on actions undertaken at national level; however, these appear to be still at an early stage of development and/or are limited to certain areas only (e.g., voluntary agreements, redistribution and awareness campaigns), whilst monitoring and evaluation of actions are either not defined or unclear. Significantly, for this group of Member States, overall coordination of efforts at national level is unclear. For the remaining 4 Member States[196], actions have been implemented only very recently, and measures are sporadic and/or limited, with little or no documentation of results available. **Overall, however, the situation in the EU – based on the nature and level of activity – shows that only three Member States are well positioned to make significant progress in achieving SDG Target 12.3.**

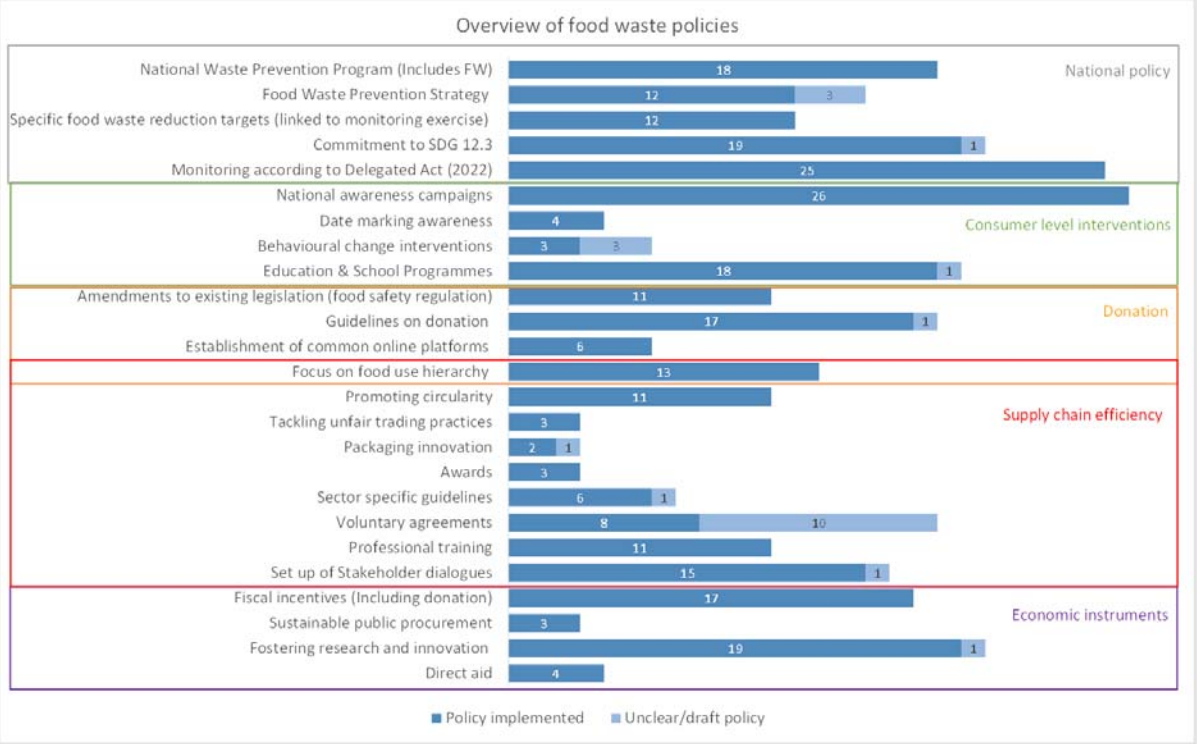
All Member States have adopted varied legislative and non-legislative national measures to reduce food loss and waste and continue to integrate them in their national strategies or relevant legal frameworks as part of an ongoing process to reduce food loss and waste. Generally, it can be

[193] Cyprus and Malta did not submit text to the MS HUB.
[194] Member States with mid-to-high level actions: Austria, Belgium (particularly Flanders and Brussels capital), Croatia, Finland, Ireland, Italy, Portugal, Spain, and Sweden.
[195] Member States with low-to-mid level actions: Bulgaria, Czechia, Denmark, Estonia, Greece, Hungary, Latvia, Lithuania, Luxembourg, Slovakia and Slovenia.
[196] Member States with low level actions: Cyprus, Malta, Poland and Romania.

affirmed that the policy actions that are implemented mostly concern non-regulatory approaches, prioritising awareness raising and educational initiatives (towards citizens and, to a lesser extent, economic operators) with some undertaking more structured stakeholder engagement approaches through the establishment of "voluntary agreements" with actors in the food supply chain (e.g., Austria, Belgium, Denmark, Germany, Finland, Greece, Ireland, Hungary, Poland, Portugal and Sweden). Fewer Member States have taken legislative measures including umbrella legislation aiming to reduce food waste across the food supply chain (e.g., France, Italy and draft legislation in Spain); specific legislative measures imposing obligations as regards food donation (e.g., Czech Republic, France, Hungary, Poland). Economic instruments are also employed, especially through fiscal exemptions for donated surplus food, while direct financial aid is explicitly cited by France, Croatia and Netherlands (support to food business operators) and by the Czech Republic (as regards support to food banks).

Figure 43 shows the breakdown of national policies in detail and highlights the variability in the political response of Member States to food waste prevention: the actions are broadly divided into national policy (along with monitoring and targets); consumer level actions; facilitation of food surplus donation; supply chain efficiency and economic instruments. The lighter blue bars represent the Member States that cite the specific policy actions, but which are either at a draft stage or the implementation is not clear (absence of clear commitments).

Figure 10 – Overview of food waste policies and actions at MS level (apart from the category "Monitoring according to Delegated Act (2022)" the total reference number is considered to be 28, as the regions of Flanders and Wallonia were mapped separately)



A front runner outside the EU, demonstrating the "Target-Measure-Act" approach is the UK. The textbox below illustrates the main actions taken to date by the UK.

The "Target-Measure-Act" approach in UK (non-regulatory)

- **Overall strategy and roadmap:** Target in line with SDG Target 12.3 vs a UK baseline of 2007.
- **Food waste diagnosis and evidence-based approach:** WRAP has regularly published estimates or progress reports on food waste reduction since 2011.
- **Governance:** The Waste and Resources Action Programme (WRAP) a climate NGO, was established (2000) and has run all major food waste prevention actions (listed below) in the UK and supported from the UK Government. Many actions are also part of the UK resources and waste strategy (2018).
- **Supply Chain Engagement**
  - The **Courtauld Commitments** is an evolving series of **voluntary agreements**, funded by the UK governments and the food sector, delivered by WRAP (2005, 2010, 2013, 2015, 2021 – the current agreement running to 2030). In 2012, an independent voluntary agreement was launched for the **hospitality and food service sector**, covering approx. 25% of the sector.
  - **The Food Waste Reduction Roadmap** was launched as the key delivery mechanism for the food waste target for the Courtauld Commitment 2030 and in which food businesses are urged to commit and implement '**Target-Measure-Act'** principles to ensure they future-proof their business for potential regulatory requirements (2023).
  - Launch of the "**Guardian of Grub"** initiative, reducing waste from kitchen and plate by showcasing best practices and making business cases (2019).
  - The **Food Waste Reduction Fund** of £500,000 provided by the Department for Environment, Food and Rural Affairs, established to finance redistribution initiatives, requiring partnerships between FBOs and NGOs (2019).
- **Consumer behaviour:**
  - **Nationwide Consumer campaign** "Love Food Hate Waste" (2007-2012), succeeded in reducing more than 21% food waste from the hotspot of households.
  - The **Food Waste Action Week** (2021), an annual event bringing businesses, government organisations and global partners together to raise awareness and

National policies & monitoring

A distinction can be made according to the nature of the **national policies** introduced by each Member State: national food waste prevention strategies are mapped separately from national waste prevention programmes, which also include food waste prevention. The difference lies in the policy implementation mechanism, as the former is associated with a greater level of ambition and relevance, often encompassing several policy areas and engaging multiple stakeholders, while the latter is the consequence of the updated Waste Framework Directive calling for establishment of national food waste prevention programmes. 15 Member States have put in place specific national food waste prevention strategies, three of which are either in a draft stage or have unclear implementation status, while in 18 Member States food waste prevention is an action within a

national waste prevention plan. In some cases, Member States (France, Germany, Ireland, Portugal, Slovenia) have implemented both. Finally, some Member States have laid down legislative frameworks regarding food waste prevention (e.g., France, Italy), with such draft legislation in progress in Spain.

Monitoring of food waste levels according to the Delegated Act 2019/1597 was submitted in the course of 2022 by all Member States except Latvia and Romania. 18 Member States also refer clearly to monitoring as a continuous policy action in their respective web pages under the EU Food Loss and Waste Prevention hub.

Very few Member States provide documented evidence of food waste reduction achieved linked to actions taken and/or targets set at national level. Some examples are cited below:

- The Netherlands reported a reduction at retail[197] (3.6% over 4 years) and household level (30% from 2010 to 2022).
- In France, an evaluation of the impact of the Garot Law, obliging certain retailers amongst others to donate surplus food, showed both an increase in the number of retailers undertaking food donation as well as an increased share of donated surplus food. Following the evaluation, France extended, through the Egalim law, the scope of food donation obligations to collective catering and operators in the food and industry sector (in 2019) and the wholesale sector (in 2020).
- Through an ambitious national strategy for food waste reduction, Germany has set targets and adopted various measures to meet the targets, including stakeholder dialogue forums, voluntary agreements and a focus on addressing hotspots such as household waste with federal-led awareness campaigns. Monitoring of food waste is conducted both at national level and under the dialogue forums.

Figure 11– illustrates in a timeline the actions taken by The Netherlands addressing identified hotspots

[197] WUR, 2022. Minder voedselverspilling in supermarkten.

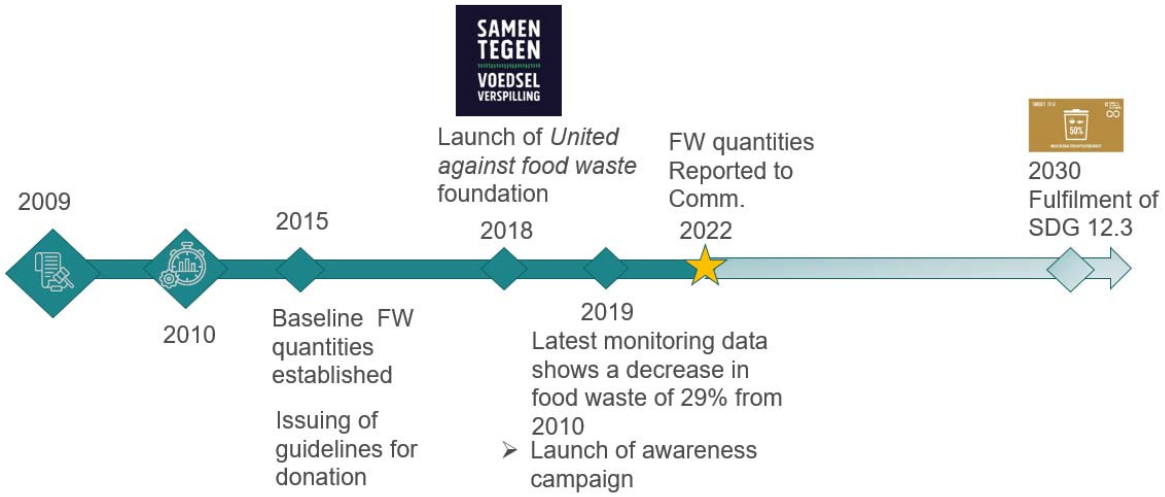


Figure 12– illustrates in a timeline the actions taken by France using strategy and legislative measures to reduce food waste

The apparent lack of evidence reported by Member States on the success of their strategies in reducing food waste at national level may indicate the need to **further emphasise and promote the use of measurement tools** and **evaluation frameworks** to support Member States and stakeholders in adopting a more evidence-based approach to inform their decision-making.

From the analysis it emerges that a few countries (Netherlands, France, Germany) can be considered pioneers in food waste prevention, having put the issue on the policy agenda since the early 2010s, while the majority have implemented strategies and related actions within the last 3 to 5 years. The duration of actions, combined with central coordination of actions, have enabled

certain Member States to establish capacity for monitoring and evaluation of their policy actions, whilst those Member States who only recently started their coordinated and dedicated actions do not yet have the basis for demonstrating or documenting the effectiveness of their efforts.

Policy actions aimed at consumers

Food waste at the consumption stage is the hotspot in food supply chains across Europe, therefore actions targeting consumers are especially important. However, policies implemented to target consumer food waste rely mostly on **awareness campaigns** (implemented by 26 Member States), whose effectiveness in fostering **behaviour change** is debatable[198]. Furthermore, it is often unclear how awareness campaigns are designed, who specifically is targeted, whether their outreach is monitored, and effects evaluated. As part of these efforts, a number of Member States have put in place awareness campaigns specifically addressing misunderstanding of date marking, which is a driver of consumer food waste and often included in consumer-targeted messages on food waste prevention. Behavioural change interventions, meaning those actions that go beyond the mere provision of information and aim to elicit changes in consumers' attitudes and behaviours are concretely implemented by at least three Member States (Germany, Netherlands, and Denmark) with three others recognizing the relevance of such interventions but without a detailed action plan in place. **School programmes** are also a popular policy initiative, implemented by 18 Member States by including food waste education in school curricula, either nationwide or through pilot projects.

Facilitation of donation

All MSs have taken different measures at national level to encourage food donation, which is often the first step in the establishment of national food waste prevention programmes. Some have taken measures and/or established guidance to clarify the roles and responsibilities of food business operators and **food banks and other charity organisations** or setting up stakeholder fora. Some Member States (e.g., Czech Republic, France, Poland and Hungary) have made donation of surplus food mandatory for specific sectors, typically retail. In fewer cases (e.g.: Sweden, Ireland, Finland, Portugal, Romania, and Netherlands), redistribution is facilitated by the introduction of **digital tools** to organize supply and demand of surplus food. 13 Member States also employ fiscal incentives through the reduction or exemption of VAT on donated food. In adopting the Waste Framework Directive, 13 Member States (e.g., Austria, Bulgaria, Czech Republic, France) specifically focused on the food use hierarchy, which foresees human consumption as the most favourable destination of surplus food that would have otherwise gone to waste, therefore the category is included in between food donation and supply chain efficiency.

[198] Reynolds, C., Goucher, L., Quested, T., Bromley, S., Gillick, S., Wells, V. K., Evans, D., Koh, L., Kanyama, A. C., Katzeff, C., Svenfelt, Å., & Jackson, P. (2019). Review: Consumption-stage food waste reduction interventions – What works and how to design better interventions. *Food Policy*, *83*, 7–27. https://doi.org/10.1016/j.foodpol.2019.01.009

Supply chain efficiency

Most Member States have put in place structured processes to engage and consult with different actors in the food supply chain and other stakeholders (e.g., **platforms, voluntary agreements**…). eight Member States have put in place **voluntary agreements** between public and private sector actors to define a common roadmap for food waste prevention, while 10 Member States are either in the process of establishing one or do not have a clear implementation pathway. Other Member States have put in place efforts to facilitate stakeholder collaboration through platforms specific to a supply chain stage (e.g., retail). Initiatives to improve supply chain efficiency and prevent food waste from all stages of the food supply chain include a variety of policy instruments: issuing guidelines for specific stages and sectors (6 Member States), enabling professional training (11 Member States), promoting circularity and industrial synergies to increase the correct application of the food use hierarchy (13 Member States) and, in a few cases (three Member States), legislation targeting Unfair Trading Practices (implementation of Directive (EU) 2019/633).

Economic instruments

17 Member States employ fiscal instruments to incentivise food waste prevention (often focussed on facilitation of food donation). Other types of support, such as fostering research and innovation, is also provided to help players take action in their operations. Direct financial aid to stakeholders to set up waste prevention initiatives is also mentioned by four Member States (France, Croatia, Czech Republic and The Netherlands), sometimes related to the direct financing of research and innovation projects. Sustainable public procurement and integration of food waste-related criteria for tenderers are indicated by three Member States only and without very clear information regarding the actual uptake in public catering.

Evaluation of Member State-level policies

Evaluation of national strategies is scarce, especially in terms of **quantitative KPIs**: most strategies have been implemented in the past 2 to 5 years, and it is not clear whether they are fully implemented or represent more "aspirational" objectives. Sweden, Netherlands, Austria, France and Germany seem to have established the capacity, or at least the awareness of the need for evaluation, together with a more transparent dissemination of monitoring and evaluation findings. France provides an evaluation of its legislation on facilitation of food waste redistribution[199].

In the Netherlands, the organization "Samen tegen Voedselverspilling" provides information on the success of its voluntary agreement and various initiatives linked to it; furthermore, through the collaboration between the organization and educational institutions scientific literature[200] is available on some of the initiatives conducted in this country. Austria has published a qualitative

[199] EY consulting (2019). Evaluation of the application of the provisions of the law of 11 February 2016 on the fight against food waste, and the implementing decree of 28 December 2016.

[200] de Visser-Amundson, 2020. A multi-stakeholder partnership to fight food waste in the hospitality industry: a contribution to the United Nations Sustainable Development Goals 12 and 17. *Journal of Sustainable Tourism*, *0*(0), 1–28.; van Dooren et al., 2020. Development and Evaluation of the Eetmaatje Measuring Cup for Rice and Pasta as an Intervention to Reduce Food Waste. *Frontiers in Nutrition*, *6*.

evaluation of its past food waste prevention strategy (which ran from 2013 to 2019) but does not provide information in terms of food waste quantities associated to specific actions. Germany has developed a dedicated platform for sharing information on the progress of its stakeholder dialogues, but as the food waste prevention strategy is quite recent, there is no evidence yet of its performance. In Denmark, the voluntary agreement run by the Danish Think Tank "One\Third" has published a report in which the development of food waste generated by its members have been monitored from 2015 to 2020[201].

[201] One\Third publikations: Danmark mod madspild udviklingsrapport 2015-2020.

ANNEX 8: OTHER INTERVENTION AREAS

The preparatory stages of this initiative, including the Call for Evidence and the PC, looked into other areas governed by the WFD as listed below.

- Waste prevention practices and performance in view of its paramount importance in the waste hierarchy and
- Waste separate collection systems and their importance in ensuring high capture and purity rates of waste destined for reuse and recycling. The preliminary analysis shows that further monitoring data is necessary to assess the necessity of EU action and therefore, as in the case of waste oils and waste prevention, it is considered premature for the Commission to propose legislative action.
- Waste oils in view of Article 21(4) of the WFD mandating the Commission to assess the feasibility to take measures at EU level to improve the management of waste oils in line with the waste hierarchy, including by setting EU recycling targets.

Waste prevention

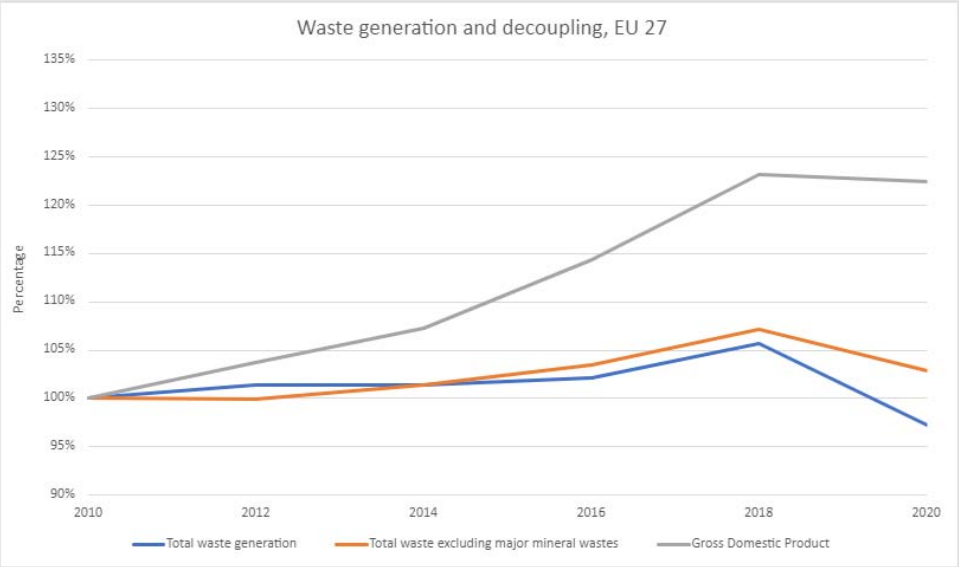
Preventing waste is first step of the waste hierarchy, above reuse and recycling. It offers the best environmental benefits and some economic benefits as well. The WFD, as well as EGD, CEAP and ZPAP, national environmental legislation and other strategic documents define waste prevention as the priority in waste management. Article 9(9) of the WFD includes a mandate for the Commission to assess, by December 2024, the feasibility of introducing EU level measures to encourage reuse of products and other waste prevention measures as well as setting waste reduction targets. Therefore, the Commission, with the support of the EEA commissioned and published studies[202] and consulted the stakeholders as part of the stakeholder process supporting this initiative.

Findings: Despite the evolution of the EU waste policies and acquis, particularly of the WFD, there remains an ongoing, albeit reducing trend for linear patterns of consumption. In 2018, all economic activities in the EU generated 2 400 million tonnes of waste, equivalent to 5 tonnes per capita and representing a 5.1% increase since 2010 as illustrated in Figure 46. From 2018 to 2020, there is an observable drop in waste generation driven by the reduction in mineral waste from mining and quarrying and from construction activities. For total waste excluding major mineral wastes, the downwards trend 2018-2020 is mainly driven by a reduction in combustion waste (around -30% for 2018-2020). The reduction in combustion waste is closely linked to the reduction in the consumption of solid fossil fuels (around -30% for 2018-2020)[203]. The 2020 data point was probably also impacted by the COVID-19 pandemic and the related interruption of many economic

[202] European Commission, Directorate-General for Environment, Karigl, B., Neubauer, C., Kral, U., et al., *Scoping study to assess the feasibility of further EU measures on waste prevention: final report,* Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2779/21588.
[203] Eurostat dataset 'Supply, transformation and consumption of solid fossil fuels ' (Eurostat - Data Explorer (europa.eu).

activities. As waste generation is historically linked to GDP, it likely that waste generation will go back to pre-pandemic levels when the economy is growing again.

Figure 13 – Waste generation and decoupling, EU-27 (%, with 2010 base)



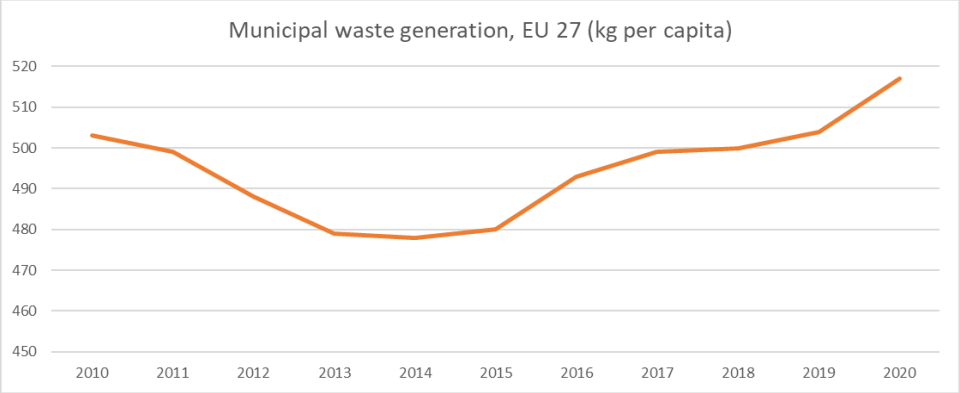
Source: Eurostat 2022

The EEA reviews of the EU's progress on waste prevention[204] and the decoupling of waste generation from economic growth[205], show that the EU-27 is not set to meet its policy goal of reducing waste generation. This points to the need to gather further data in the coming years to determine whether the provisions of the 2018 waste package that are being implemented in the Member States, can help maintain, at least partially, the achieved decrease in waste generation.

The data for 'household and similar waste' is not a good indicator of waste generation/prevention, as it only gives the amounts of mixed household and similar wastes and does not include recycled materials from households and similar sources. Therefore, the amount of 'household and similar wastes' goes down when more of the household waste is recycled. 'Municipal waste generated per capita' is a better indicator for waste generation and as shown in Figure 47, it has declined from 2010 to 2014 but then increased to 517 kg/capita in 2020 despite the economic crisis. However, the 2020 is also influenced by changes in reporting methodology in some Member States due to switching to the new definition for municipal waste in the Waste Framework Directive that will influence the EU-27 average. 20 out of 26 Member States (since CY did not yet respond) are now using the common methodology established under the '2018 waste package'. For example, data for Belgium and Austria went up dramatically from 2019 to 2020 (BE from 416 to 746 kg/cap, AT from 588 to 834 kg/cap), and the 2020 data are flagged as 'break in series', meaning that there is a new reporting methodology.

[204] Waste prevention: where do European countries stand? — European Environment Agency (europa.eu)
[205] Waste prevention: decoupling waste generation from economic growth — European Environment Agency (europa.eu)

Figure 14 – Municipal waste generated, kg per capita 2010-2020, EU-27



Source: Eurostat 2022

To fine tune the projections, the study team checked the indicator and data series for data gaps and trends in individual Member States. As the economic situation varies widely across the EU-27, waste generation varies from country to country. Consequently, projections were re-calculated on a country-by-country basis for the selected categories streams. An overview of the results for the selected waste categories for the period up to 2035 is provided in the Eunomia / UBA study but has not been included in this interim report as the results will likely be updated to reflect the ongoing work of the JRC[206].

The amendments to WFD adopted in 2018 by Directive (EU) 2018/851 introduced several new obligations on the Member States to improve their efforts in achieving decoupling of waste generation and economic growth. Member States are still in the process of transposing and implementing Directive (EU) 2018/851 in relation to waste prevention to take measures and adopt Waste prevention Programmes, including on Food Waste, and improve the monitoring of waste prevention, as well as other requirements that have an impact of waste generation, such as separate collection of waste obligations and quantitative targets for waste management operations. About half of the Member States have not yet aligned their Waste Prevention Programmes (WPP) to Directive (EU) 2018/851. Almost all EU-27 countries have some sort of quantitative target (25 countries) and quantitative indicators (22 countries) related to waste prevention. However, the targets and indicators vary widely. Some targets and indicators are, for example, more related to waste management than to waste prevention. This complicates the monitoring of waste prevention implementation progress. Since a comprehensive waste prevention strategy requires looking at a complex set of measures and levers and incentive mechanisms, the monitoring of impacts is also complex, and it is not possible to assign an impact to each individual measure. Furthermore, such measures take a considerable time to take up; therefore, impacts are best measures in longer periods of 3 to 5 years. The first set of Member State data on reuse of products, an important source of

[206] JRC, 2023 under development

information on the waste prevention monitoring, will be reported to the Commission by June 2023 in accordance with Article 37(3) of the WFD.

Regarding municipal waste, the Commission is pursuing a parallel initiative on the revision of the PPWD and one of the key objectives of that revision is to significantly reduce the generated packaging waste. This will be attained through several measures on the design of packaging for reuse, regulatory measures setting waste prevention and reuse targets for certain types of packaging as well as rules on the separate collection of packaging waste. Through this initiative the Commission will address about a third of the municipal waste generated.

With regard to waste other than municipal waste, the Commission has commissioned studies, that show that further analysis of the wider economic sectors generating around 90% of the waste are still needed to identify the need for EU level action.

Conclusions: The assessment of the information available to the Commission in support of possible measures to reduce waste generation show that there is still need for further monitoring data to assess the feasibility and necessity for EU level action because:

- Member States are still in the process of implementing Directive (EU) 2018/851 and the monitoring of waste prevention measures impacts should be done over a significantly longer period than the regular annual reporting periods.
- There is insufficient data on sectors producing waste other than municipal waste to complete an assessment assessing the feasibility and necessity of additional EU level measures. Also, the first set of data on reuse of products would only become available to the Commission by mid-2023.
- The EGD, CEAP and ZPAP and WFD objectives to significantly reduce waste and residual waste generation have been pursued by streamlining waste reduction objective in all new legislative initiatives of the past years: Batteries (2020), Waste Shipments (2021), industrial emissions (2022), ESPR (2022) and Packaging (2022). The impact of these measures should be assessed following the conclusion of the inter-institutional negotiations, which are not yet concluded. Most environmental impacts of products' end-of-life management are design driven. The ESPR proposal is expected to have the significant impact on the waste prevention potential. The Packaging and Packaging Waste Regulation proposal and setting quantitative targets on food considered as part of this initiative will address 60% of municipal waste generated.

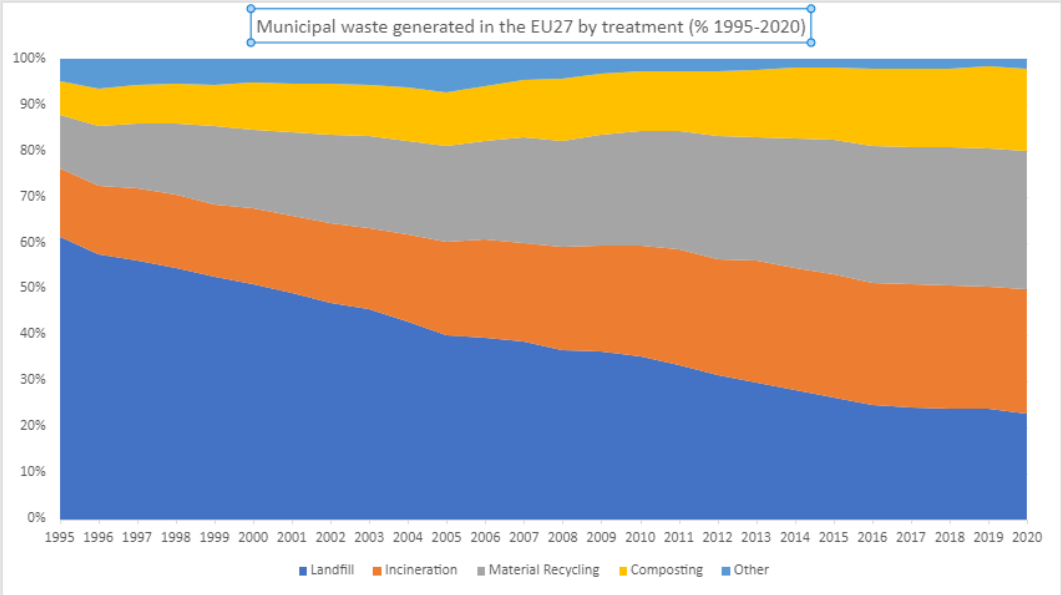
The EEA will adopt in 2023 an EU monitoring framework that sets out waste prevention monitoring indicators at EU level and guide the Union level performance assessment in decoupling waste generation from economic growth. To fulfil the obligation Article 9(9) of the WFD to assess the feasibility of introducing EU level measures to encourage reuse of products and other waste prevention measures as well as setting waste reduction targets, the Commission intends to continue the monitoring of the data. The rationale for the need to act on food and textiles sectors are explained in this impact assessment report.

Waste separate collection to improve preparation for reuse and recycling performance

Findings: While, encouragingly, waste treatment in Europe has largely evolved towards the preferred options in the waste hierarchy, further efforts are needed to achieve greater levels of

circularity of the Union economy in line with the existing Union targets as well as to contribute to the Union's climate, resilience and strategic independence objectives. At Union level, recycling or recovery targets are set for municipal waste, construction and demolition waste, packaging waste, batteries waste, end-of-life vehicles, waste electric and electronic equipment. According to data published by Eurostat, in 2018, only 38% of total waste and 48% of municipal waste is recycled. This means that the rest was disposed of (incinerated or landfilled), losing the potential recyclable materials in that waste with subsequent environmental and economic costs.

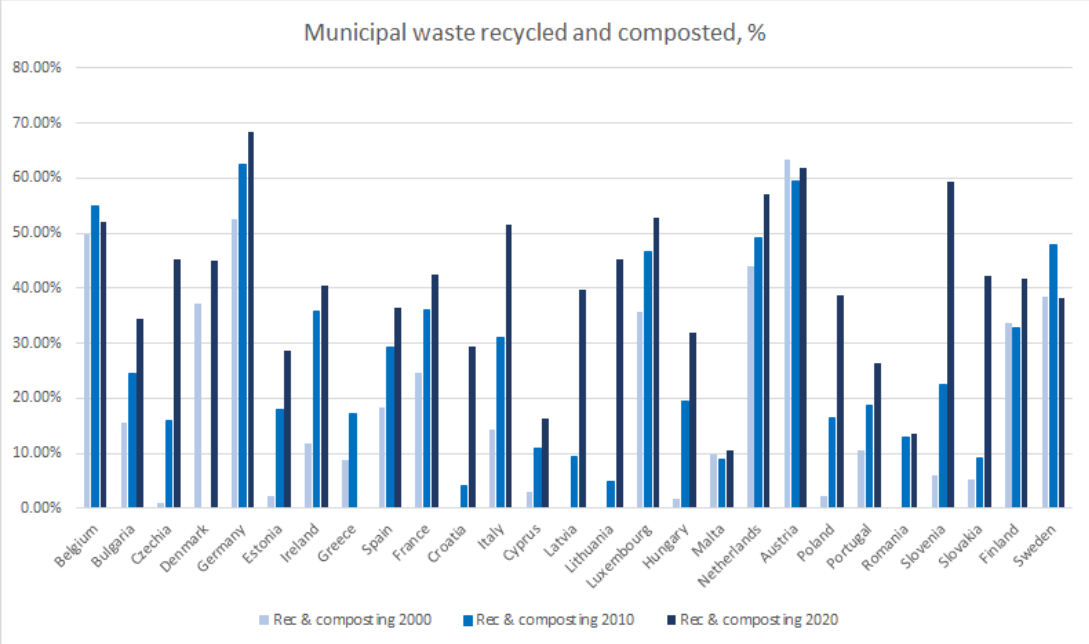
Figure 15 – Municipal waste generated in the EU27 by treatment (%, 1995-2020)



Source: Eurostat

There is also a large variation in the preparing for reuse and recycling rates of municipal waste achieved by the Member States (see Figure 49).

Figure 16 – Prepare for reuse and recycling rates of municipal waste in Europe (%)



Source: Eurostat

NB: due to methodology differences, data between countries and years may not be directly comparable

The preparatory work for the 2022 EWR on waste identifies 19 Member States at risk of not reaching the 2025 preparing for reuse and recycling of 55% set in the WFD and/or the PPWD. The EWR, developed in close dialogue with Member State administrations, identifies that the main drivers for low performance on preparation for reuse and recycling are insufficient source segregation and separate waste collection, particularly of dry recyclables and bio-waste, a lack of sorting and recycling infrastructure, overreliance on MBT plants and landfilling and ineffective incentives (including fees and ban on landfilling untreated waste) for different levels of governance, waste operators and citizens to reduce, sort and recycle waste.

Recent studies highlight the added value of reinforced source segregation and separate waste collection[207][208][209][210][211]. Separate collection is the first essential step to promote the reuse of products, to yield optimal recycling results, and to lessen the risk of cross-contamination of waste

[207] Bel, J.-B. and ACR+, *D4.5. Guidelines for successful implementation. Guidelines for improving local waste collection systems,* 2020, https://www.collectors2020.eu/wp-content/uploads/2020/12/COLLECTORS_D4.5Guidelines-final.pdf.
[208] Bel, J.-B., ACR+ & Flanagan, B., Eurocities, *D4.6. Policy recommendations & development needs related to the waste framework conditions. Policy recommendations,* 2020, https://www.collectors2020.eu/wp-content/uploads/2020/12/COLLECTORS-D4.6_Policy-recommendations-final.pdf.
[209] European Commission, Directorate-General for Environment, Dubois, M., Sims, E., Moerman, T., et al., *Guidance for separate collection of municipal waste*, Publications Office, 2020.
[210] European Commission, JRC Publications Repository, *Best Environmental Management Practice for the Waste Management Sector,* 2018, https://publications.jrc.ec.europa.eu/repository/handle/JRC111059.
[211] European Commission, Directorate-General for Environment, Weißenbacher, J., Dollhofer, M., Herczeg, M., et al., *Assessment of separate collection schemes in the 28 capitals of the EU: final report*.

streams where unrecyclable waste hampers the recycling of recyclable waste. Waste collection systems across the Union are very diverse. Some of their elements are determined based on certain local conditions as well as of overall waste management choices in the Member States. Nevertheless, there are certain principles and practices that deliver better environmental outcomes. These best practices are subject to several studies and are currently being analysed by the JRC to draw best practices and practical guidance.

As explained in Recital 41 of Directive (EU) 2018/851 amending the WFD, existing provisions require EU Member States to collect paper, metal, plastic and glass separately in order to increase preparing for reuse and recycling rates, enable high-quality recycling and boost the uptake of quality secondary raw materials. In addition, Member States will be required to set up further separation of certain waste streams: bio-waste shall be separated by 2024 and hazardous household waste and textiles shall follow by 2025. These requirements aim to ensure that increasing waste fractions are separately collected to facilitate their preparation for reuse and recycling.

Packaging waste fractions of paper, plastic, metal and glass, which represent the most important waste fraction of municipal waste that is subject to the separate collection obligation are also subject to a *lex specialis* legislation in the PPWD. The proposal revising this Directive aims to improve the capture rate and the purity rate of the separately collected fractions through regulatory measures mandating certain best performing separate collection practices at EU level, namely, the application of deposit return systems for beverage packaging as well as labelling of packaging to instruct the consumer on how to dispose of the packaging waste to enable its reuse or recycling. The recycling performance are also to be improved considerably through the revision of the packaging design requirements to ensure that all packaging is recyclable in an economically feasible way.

Conclusions: The Commission will complete this strand of work with the following outputs:

- Support the inter-institutional negotiations between the European Parliament and the Council in view of a swift adoption of the Packaging and Packaging Waste Regulation based on the Commission's legislative proposal of 30 November 2022 (COM(2022)677) final) mandating certain best practices on separate collection of waste at EU level and introducing a product and waste container labelling system to ensure effective consumer participation in the separate collection systems as well as ensuring a reduction of packaging waste as a result of increased re-use that is subject to re-use targets.
- Adopt a JRC technical report with recommendations on the best practices in separate collection of waste and quality management systems that deliver efficiencies in the downstream waste management chains and lead to high quality secondary raw materials (Q2 2023).

Waste oils

Article 21(4) of the WFD sets a mandate for the Commission to assess the feasibility of additional EU regulatory measures to improve the treatment of waste oils, including quantitative targets on the regeneration of waste oils. The Commission analysed the management of waste oils in the EU, including their collection and regeneration rates in Member States. There are two major types of competing uses for waste oils: they can be used to make new base oil (after regeneration) or to obtain energy, either by directly burning the waste oil (e.g., in a cement kiln or an incinerator) or

after its conversion into a processed fuel, for use in industrial boilers or in transport (e.g. as fuel for ships). These can substitute virgin material obtained from crude oil.

The EU produces a total of about 8.7 million tonnes of base oil per year. About 4 Mt is directly exported and the rest is used for domestic production of lubricant oils and additives. In 2017, the EU produced about 6 Mt of lubricating oils. About two thirds (4.3 Mt) were placed on the EU-28 market and the rest was exported.[212] Provisions that require the separate collection of lubricant and industrial waste oils have been in place for decades.

In the EU, on average, 61% of mineral and synthetic lubricant and industrial oils collected are regenerated (recycled) into base oil. The remaining collected waste oil is converted into fuels (24% of collected WO), co-incinerated in cement or lime kilns (11%) or burnt in a hazardous waste incinerator. These processes are lower in the waste hierarchy and as illustrated by the LCA results, generally, are understood to have a lower overall environmental outcome. However, the 2018 collection rates of Member States range between 38 and 100 % according to GEIR[213].

The RDC report procured by the Commission[214], analyses measures that could lead to an increase in the collection rates of waste oils in the EU. It forecasts the EU-27's waste oil generation up to 2050 (the baseline) with two modelling approaches:

- based on lubricant demand growth forecasts by McKinsey & Company[215]; and
- based on the same demand growth and considering the EU regulatory targets that aim to decrease GHG emissions from passenger vehicles and light-commercial vehicles.

The second model uses fleet composition and evolution estimates developed in support of the impact assessment for the Commission's 'EURO7 standards' proposal[216] and data from Raj Shah et al. (2021)[217]. These assume that the demand for lubricant in the EU electric and fuel cell fleet will be 10 % of that from a conventional fleet with a downward trend on the consumption of engine oils in the EU. Starting from 2036, it is assumed that the waste oil generation coming from the automotive sector decreases gradually from its 2035 level to 32.5 % in 2050 due to EU regulations aiming to ban combustion engine cars from 2035 onwards. According to these estimates, the EU-27 waste oil generation will be between 1.7 and 2 million tonnes in 2050.

In addition, RDC develops a collection cost model for waste oils and estimates the costs for EU Member States to determine the additional costs to increase collection to a given target value. The

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[212] European Commission, Directorate-General for Environment, Stahl, H., Merz, C., *Study to support the Commission in gathering structured information and defining of reporting obligations on waste oils and other hazardous waste : final report,* Publications Office, 2020, https://data.europa.eu/doi/10.2779/14834

[213] Groupement Européen de l'Industrie de la Régénération. https://www.geir-rerefining.org/.https://www.geir-rerefining.org/.

[214] Under contract 090202/2022/867657/SFRA/ENV.B.3

[215] Lubricating oil growth opportunities to 2035 | McKinsey

[216] Commission proposes new Euro 7 standards (europa.eu), Commission proposes new Euro 7 standards (europa.eu), EUR-Lex - 52022PC0586 - EN - EUR-Lex (europa.eu)

[217] Shah, Raj, et al. "Recent trends in batteries and lubricants for electric vehicles." Advances in Mechanical Engineering 13.5 (2021): 16878140211021730.

costs are associated to transport, storage and analysis and are described in further detail in the referred report.

In addition, the findings from a study by the JRC (which will be published following the adoption of the Commission proposal) to quantify the potential life cycle environmental and socio-economic effects of waste oil treatment (JRC, 2023). The modelling of the two studies was aligned in order for the baseline to be consistent. The baseline scenario of base oil demand and the resulting waste oil generation and their treatment (regeneration, conversion to fuel, energy recovery) until 2045 are based on extended projections from Bau et al. (2018) on lubricant oil demand to the year 2045, taking into account EU emission standards. EUROSTAT's [wasgen] database was used to validate the projections on waste oil.

The LCA was carried out in accordance with the guidelines of the ISO 14040/14044 standards (ISO, 2006a, 2006b[218]) and follows the established practice for waste management LCA (Clift et al., 2000; Finnveden, 1999; Joint Research Centre, 2012). Specific methodological and modelling rules of the Environmental Footprint (EF) Method relevant to the goal and scope of the study were also applied (European Commission, 2021). The functional unit (FU) of both the Life-cycle Assessment (LCA) and Life-cycle Costing (LCC), i.e., "the management of a unit-quantity of waste lubricant oil in the EU, defines qualitatively and quantitatively the service under assessment, to be used as a reference to quantify potential impacts and as a basis for comparison.

The assessment of the investigated waste management scenarios and technologies is conducted with the support of the LCA software EASETECH v3.4.0 (Astrup et al., 2012; Clavreul et al., 2014), specifically developed to assess waste management technologies and systems. This tool was applied to model the different waste management activities and processes included in each scenario, and to calculate the respective potential environmental impacts and life cycle costs. Life cycle inventory and economic data on the various waste oil management technologies/processes were collected for the JRC by a contracted consortium formed by Ifeu and RDC Environment. The LCC adheres to state-of-the-art LCC methodology as presented in Hunkeler et al. (2008) and Martinez-Sanchez et al. (2015). The LCC and LCA share the same object, scope, functional unit, and system boundaries. For the former, differently than the LCA where a zero-burden assumption was taken, the waste oil was assigned a price to reflect different qualities (represented in the default and sensitivity analysis). The cost assessment includes two types of costs: internal costs and externalities (external costs). Internal costs include budget costs and transfers; strictly speaking, budget costs are costs incurred by the different actors involved in the management chain of the waste oil (collectors, operators, transporters, etc.), while transfers refer to money redistributed among stakeholders (taxes, subsidies, value added tax - VAT, and fees). Externalities are non-monetary transactions representing the costs caused by each emission to society, reflected by the so-called shadow prices of emissions as proposed in Bijleveld et al. (2018). These include prices for air/soil/water emissions but not for disamenities such as nuisance, noise, odour, congestions, or other similar social effects.

For the overall assessment the JRC study distinguishes two types of LCC: the conventional LCC (CLCC) describes the financial cost as the sum of budgets costs and transfers, i.e., internal costs, of managing the waste oil, and thus represents a classic financial assessment. The societal LCC

[218] ISO - ISO 14040:2006 - Environmental management — Life cycle assessment — Principles and framework

(SLCC) sums internal and external costs, both expressed as shadow prices to quantify the total cost incurred by society, thus reflecting a socio-economic assessment. For the specific shadow price of CO_2 the JRC used the updated figure suggested by CE Delft and DG MOVE for 2030, i.e. 100 euro/tonne CO_2 that is recommended as a default value (van Essen et al., 2019; Bijleveld et al., 2018). The LCC was implemented using the software EASETECH v3.4.0 (Astrup et al., 2012; Clavreul et al., 2014).

In the study, five sensitivity analyses were performed to test important framework assumptions: with the first **(SA1 – Energy**), the sensitivity of the results to the average energy mixes applied in the model (e.g., average electricity, heat, and fuel mix at the kiln) was tested. The second sensitivity analysis **(SA2 - Waste quality)** tested the sensitivity of the results to the specific waste oil quality (physico-chemical composition). The third sensitivity analysis **(SA3 – Crude oil price)** tested the effect of crude oil prices on the LCC results. In the fourth sensitivity scenario (**SA4 – Intra EU emissions**), we only consider emissions that take place within EU countries. Finally, in the fifth sensitivity analysis (**SA5 – EU ETS**) assumes that GHG emissions are already covered by the EU ETS or by effort sharing regulations.

The study also analysed the associated uncertainties. In its study, the JRC applied the analytical method developed by Bisinella et al. (2016) and available in the EASETECH LCA model to propagate input-data uncertainties and calculate the overall result's uncertainty. Only uncertainties related to the technology input-output data (e.g., energy and chemical consumption, emissions, output products) are addressed in the study. The analytical (or stochastic) uncertainty produces a range around the 'default' result value. While this information is valuable when looking at a single scenario and the variability of its performance, often it is the case that two scenarios show overlapping uncertainty bars (ranges around the 'default' result), which makes it impossible to say when, or if, one is better than the other. For this purpose, the study performed **discernibility analysis** using the tools available in the EASETECH LCA model. Applying **Monte Carlo simulations** on two scenarios simultaneously, e.g., hydro-treatment versus solvent extraction, (i.e., a pair-wise comparison), the discernibility analysis quantifies the number of occurrences for which one scenario is better than the other under the parameter uncertainties considered in the study. The number of 1000 Monte Carlo iterations (runs) was set for this purpose, i.e., scenarios are compared in a pair-wise mode 1000 times by varying randomly their parameters under the given uncertainty ranges. The choice is a compromise between the need for a population of results propagated via Monte Carlo sampling and the related computational effort (beyond this number, significant computational time/efforts were observed).

Collection and regeneration rates of waste oils seem to depend on multiple drivers, often related to the national context and detailed implementation of measures at the national level. These include collection and treatment costs, especially for small producers, the density and remoteness of certain areas where collection services are less frequent or more costly, the effectiveness of awareness raising, and the enforcement mechanisms in place.

The economics of waste oil regeneration can be less advantageous than the different energy recovery options, especially in case of lower quality waste oils. Regeneration to base oil is also more complex and requires more treatment / technology than producing a mildly treated distillate oil that can be burnt as fuel. Competition from other fuel uses (e.g., cement kilns, boilers) and particularly the increased demand for low sulphur fuel in bunkering sector (fuel for ships) is another relevant variable.

The assessment of these studies, as well as the first set of reports on waste oils submitted by Member States in 2022 show that it is premature to propose action at EU level and therefore no measures on waste oils, additional to those already in place, should be proposed now.

The main arguments supporting this conclusion are:

- Evidence provided by LCA/LCC analysis indicates that although in general regeneration is advantageous over energy recovery from the environmental and societal point of view, this conclusion is not very robust in some cases, when comparing different regeneration treatments and treatments to produce fuel.
- There is no clear correlation between having a mandatory EPR system covering the collection of waste oils and higher collection or regeneration rates.
- There is a lack of a robust dataset regarding the performance of the different Member States in terms of waste oil generation, collection and treatment. The first data submitted by Member States in 2022 (for reference year 2020) presents gaps and inconsistencies.

In view of the obligation in Article 21(4) of the WFD, the Commission intends to adopt a report addressed to the European Parliament and the Council reflecting on the analysis summarised above and sharing best practices in sustainable management of waste oils (PLAN/2022/2112).

ANNEX 9: OBJECTIVES

As shown in Figure 2 in Annex 7, there are several specific objectives logically linked to the main identified problem and its drivers.

Textile waste objectives

In identifying the key problem drivers two specific objectives have been defined to address the resulting problems.

The first objective is to **reduce textile waste generation, primarily by encouraging reuse and raising consumer awareness of the negative impacts on the environment associated with textile production and waste management**. Indeed, the EU Textiles Strategy's objective is "create a greener, more competitive sector that is more resistant to global shocks". Textile products placed on the market should be durable, repairable and recyclable, to a great extent made of recycled fibres, free of hazardous substances, and produced in respect of social rights and the environment. These objectives are already being pursued by the ESPR legislative proposal of the Commission.

The second is to make sure that the **textile waste that is generated is treated as high up the waste hierarchy as possible, prioritising waste prevention, preparation for re-use and recycling over incineration and disposal**.

Food waste

The first specific objective of the initiative is to **assign clear responsibility to Member States for accelerating reduction of food waste** along the food supply chain and in households, **in their respective territories**, and thus make a solid contribution towards achieving SDG Target 12.3.

As second specific objective, the initiative also seeks to **ensure sufficient and consistent response by all Member States to reduce food waste**, in line with that of front-runners. This should lead each Member State to take ambitious action – deploying the most effective measures, tailored to its specific national situation – and aiming to support consumer behavioural change as well as strengthen coordination of actions between actors across the whole food value chain as well as with other relevant actors (e.g., academia, NGOs, financial institutions…).

In order to facilitate systemic action, Member States will need to **ensure an enabling institutional, policy and regulatory framework** that can adapt to evolving needs of key players. Findings from the public consultation showed strong agreement of respondents with the effectiveness of taking such food waste prevention measures, with the vast majority agreeing with the setting of EU-level legally binding food waste reduction targets (74% - 488 replies)[219].

[219] Further details are presented in Annex 2 – public consultation.

ANNEX 10: POLICY OPTIONS

This section presents the policy options in two separate sections, one for textiles and one for food waste.

1- Textiles

This section presents the options available to reach the objectives described in Annex 9. To do so, the study teams have developed a series of measures that will cause direct and indirect changes and that can address the different problems and problem drivers identified.

The measures were screened for feasibility and the options were assessed against the baseline, which is described below.

Options and measures

The following policy options have been identified that could achieve the two specific policy objectives. These options have been derived and verified following broad discussions with the stakeholders, including Member States, industry and environmental NGO representatives. Alongside the baseline which entails the maintenance of existing policy provisions, the following options have been considered:

- **Baseline**

Ongoing implementation of the current legislation as well as a realistic expectation of impacts of policy instruments currently in negotiation – this is the baseline or reference scenario (see for more information Annex 7 – how will the problem evolve?).

- **Option 1**

Supporting Member States to ensure full implementation and enforcement of the current WFD provisions by taking regulatory measures based on existing mandates granted to the Commission to adopt secondary legislation and by adopting relevant guidance documents.

- **Option 2**

Proposing an amendment to the primary legislation to improve the waste management performance in line with the waste hierarchy. These will establish new operational obligations on the Member States and economic operators.

- **Option 3**

Proposing an amendment to the primary legislation by establishing binding waste management performance targets for the Member States and economic operators.

Under each of these options, several measures have been considered to achieve the general and specific objectives. The first list shown below is a long list of measures that were considered in the first instance alongside the objective(s) they contribute to. The measures shown with no shading are those that have been taken forward to a more detailed assessment. Those shaded in grey have been discarded as explained in the next section.

Option 1 measures: Supporting Member States to implement and enforce current provisions

1.1 Clarifying definitions in relation to textiles and textile waste through guidance

- **Defining textiles: Alternative 1,** Align definition to Textiles Labelling Regulation; **Alternative 2,** Align definition to CN codes; **Alternative 3,** Align definition to Textiles Labelling Regulation and take a sub-set of CN codes to clearly define the scope of operational measures.
- **Defining textile waste: Alternative 1,** All separately collected textiles to be considered waste; **Alternative 2,** All separately collected textiles to be considered waste only after sorting.

1.2 EU-wide waste prevention monitoring framework: Set measurable indicators in relation to textile waste prevention that are more consistently applied by Member States.

1.3 Providing Member States with guidance and support in dialogue on the management of textile waste between actors involved: Guidance on a range of topics related to textile waste for which problems have been identified, further develop existing platforms, issuing recommendation on EPR for textiles.

Option 2 measures: Setting additional regulatory requirements to improve performance

2.5 Setting sorting obligations for separately collected textiles: Ensure that all separately collected textiles are subject to a sorting operation with the objective of identifying fractions suitable for re-use and preparation for re-use, as a priority, as well as fractions suitable for recycling. Legally operationalise measure 1.1.

2.6 Adopting end of waste criteria: Pursue the adoption of the implementing act setting harmonised EU end-of-waste criteria following the development of technical criteria by JRC. Harmonises the sorting requirements in measure 2.5.

2.8 Setting requirements for shipments of textiles for re-use: Facilitate the enforcement of illegal shipments of waste disguised as non-waste.

2.9 Mandating the use of EPR for textiles: Implement the polluter pays principle by securing the necessary funding to manage used textiles according to the waste hierarchy from producers.

2.14 Improving reporting obligations for textiles: Clarify existing and add new reporting requirements to improve the knowledge base at EU level and enable proper monitoring of the environmental impact of the textile industry.

Option 3 measures: Prescribing performance targets

3.1 Setting an EU textile waste reduction target: Reduce the amount of textile waste generated, EU level target to ensure coherence between the different Member States and to harmonise industry effort towards reaching the target.

3.4 Setting a preparation for reuse target for textiles: Checking, cleaning, or repairing, recovery operations, by which textile products that have become waste are prepared so that they can be reused without any other pre-processing, improve the reuse of textiles for MSs by setting a realistic preparation for reuse target.

3.5 Setting a reuse target for textiles: increase the amount of textiles reused.

3.6 Setting a collection target for textiles: Improve separate collection rate for textiles thereby increasing reuse rates, recycling rates and decreasing disposal rates **Sub-measure 1,** Setting an EU-wide quantitative target on separate collection; **Sub-measure 2,** Member

States defining preparation for reuse targets based on a common framework set by the WFD.

3.7 **Setting a target for textiles found in residual waste:** Improve separate collection system for textiles if the MSs find excessive textiles contained in the mixed household waste.

3.8 **Setting a recycling target for textiles:** Increase the recycling capacity of the MSs by setting a realistic recycling target that takes into account likely changes in recycling capacity and technologies, target at EU level to ensure coherence between MSs and to harmonise industry efforts towards reaching the target.

Some additional measures considered on textiles waste were discarded mainly because they are not proportional or coherent with other EU policies. These measures relate to supporting the upscale of circular business models (1.5); providing instruments and indicators to decrease the overconsumption of textiles (1.6); sharing of best practices on promoting repair services, second-hand shops and shopping centres (1.7); discouraging discount vouchers in product take-back schemes and encourage repair vouchers (1.8); advertising and marketing practices for waste prevention (1.9); establishing an EU-wide consortium of PROs to ensure that all stakeholders abide by the same rules and to exchange experiences (1.10); supporting dialogue and collaboration across the sector (1.11); establishing minimum requirements on separate collection for textile reuse (2.2); establishing minimum requirements on separate collection for textile recycling (2.3); defining textile sorting instructions for citizens (2.4); defining textile sorting instructions for sorters and waste operators, including at collection stage (2.5); setting sorting obligation for residual waste before final treatment (2.8); supporting Member States and investing in the upscale of infrastructure for collection, sorting, preparing for reuse and recycling (2.11); setting a lower VAT for repair and reuse of textiles (2.12); setting a lower VAT or no VAT for recycled fibres (2.13); setting a standardised and consistent tracing and identification system for textile reuse and recycling throughout the European Union and beyond (2.14); setting a target for second-hand market share (3.2); setting a resource use reduction target (3.3); target for maximum textile waste landfilled or incinerated (3.9); banning the incineration of textiles waste (3.10); banning the landfill of textiles waste (3.11); ban the destruction of unsold textile products (3.12). More information on the discarded measures can be found below.

Discarded textiles measures

The following measures were discarded through the application of the key criteria for screening the viability of options according to the Better Regulation Toolbox, namely:

Legal feasibility – the need to ensure that measures remain within the limits of the competencies of the EU Treaties as well as respecting obligations under those Treaties and ensuring respect of fundamental rights as well as already existing legal obligations in EU law.

Technical feasibility – technological and technical constraints that may restrict the implementation, monitoring or enforcement of measures.

Previous policy choices – where measures have been ruled out by previous policy choices or mandates then unless there is compelling evidence to the contrary of those previous decisions these measures should be discarded.

Coherence with other EU policy objectives – measures may be ruled out due to poor coherence with other general EU policy objectives.

Effectiveness and efficiency – some measures would with certainty achieve a worse cost-benefit balance than some alternatives and can be ruled out accordingly.

Proportionality – some measures may clearly restrict the scope for national decision-making over and above what is needed to achieve the objectives satisfactorily.

Political feasibility – measures that would clearly fail to garner necessary political support can be discarded, albeit if the measures are superior to others, then a minimal assessment should be performed.

Relevance – measures that do not address the needs of the policy intervention should not be retained.

Identifiability – when two measures are unlikely to differ materially in terms of their impacts or distribution only one should be retained.

Table 9 – Discarded measures in each option

Measure number	Title and description	Criteria requiring measure to be discarded and detail behind decision
1.4	Supporting the upscale of circular business models According to the EEA[220] to implement and upscale circular business models, the following elements are required: 1) Circular goals, such as reuse, repair and recycle, need to be agreed on by policymakers. 2) New business models need to be developed through innovation by companies. This is called business model innovation. 3) Technical and/or social innovation in companies and society need to go hand in hand with business model innovation. More specifically in relation to textiles there are three main circular business model types (1) models to increase textile longevity and durability (repair by commercial or social enterprises) (2) access-based models (renting and leasing) offered by social or commercial enterprises; (3) textile collection (by commercial enterprises or local governments)	**Coherence with other EU policy initiatives** – the Commission's Strategy for sustainable and circular textiles already foresees a number of measures in relation to support to circular business models including in relation to sharing best practices through the likes of the European Circular Economy Stakeholder Platform. Furthermore, support in relation to funding are specifically addressed in that strategy. Additional action taken under the WFD has the potential to set up competing and incoherent measures looking to address the same problem. Rather it would be preferable to await the results of these other ongoing policy initiatives to identify if additional action is required under the WFD at a later date. **Identifiability** – measures related to textiles collection, resale, recycling and reuse are addressed in support to Member States through guidance and

	and resale; and (4) recycling and reusing materials. This measure would look to provide support to each of these business models for textiles in the EU through the sharing of best practices, highlighting sources of information and sources of funding.	an online platform under measure 1.3.
1.5	Providing instruments and indicators to decrease the overconsumption of textiles One of the key challenges in relation to textile waste is the consumption of textiles in the first place. Under this measure specific indicators would be developed to measure consumption of textiles and, on the basis of the data collected, to consider specific instruments to counter overconsumption identified. The dataset to be used in relation to consumption would come from PRODCOM and COMEXT data targeting textile products, with trends in consumption measures against these data sources. Defining the indicator of what constitutes overconsumption is likely to be challenging. For example, if the global average for textile fibre consumption per capita was used as a marker for what is required, on average, per person the value would be 12.5kg per capita[221]. According to the EEA[222], European consume on average 26kg of textiles per person per year. The target to address overconsumption within the EU could be, therefore, to reduce consumption by 52% from 2015 figures per capita.	**Coherence with other EU policy initiatives** – Whilst the development of an indicator for textiles consumption could work, developing measures to specifically address consumption are already being considered under other EU instruments as specified in the Commission's Strategy for sustainable and circular textiles. Additional action taken under the WFD has the potential to set up competing and incoherent measures looking to address the same problem. Rather it would be preferable to await the results of these other ongoing policy initiatives to identify if additional action is required under the WFD at a later date.
1.6	Sharing of best practices on promoting repair services, second-hand shops and shopping centres. Under this measure best practice examples for the reuse sector would be shared between Member States including on assessment of capacity needs and siting of services to promote	**Legal feasibility –** Measures related to national development control do not fall within the competence of the EU Treaties and this measure is considered not legal feasible.

	repair, reuse and second-hand sales (e.g. French directory on reparation providers). Member States would be asked to provide information as to how needs are assessed, how services are sited and the support provided to such services to improve reuse of textiles.	
1.7	Discourage discount vouchers in product take-back schemes and encourage repair vouchers. Recognising that take-back vouchers do not necessarily ensure that the materials taken back are reused or recycled in the textile sector[223] this measure would encourage the issuance of repair vouchers enabling the clothes that would otherwise be taken back to be repaired to enable their reuse either by the original owner or in the second-hand market.	**Proportionality** – This measure is likely to restrict national decision making in the textiles reuse and recycling sector by obliging all to apply a discount voucher system that may not be compatible with other existing or planned schemes e.g. extended producer responsibility. **Political feasibility** – it is considered that an intervention of this scale in the textiles market would be very unlikely to garner sufficient support of Member States to be agreeable as noted in consultation with Member States where this measure was ranked as the lowest in the possible interventions that could be used at the EU level.
1.8	Advertising and marketing practices for waste prevention Under this measure specific advertising and marketing practices would be encouraging the sharing of best practice between Member States in undertaking such awareness raising campaigns whilst at the same time developing an EU advertising campaign in relation to textile waste reduction for consumers.	**Coherence with other EU policy initiatives** – The Commission's Strategy for sustainable and circular textiles already notes the work that will be undertaken to address changes in textile consumption and production patterns under the motto #ReFashionNow via the European Circular Economy Stakeholder Platform, European Bauhaus, the Sustainable Consumption Pledge as well as the European Year of Youth. In January 2023, the Commission will launch the "Reset the Trend" awareness raising campaign. In the context of multiple crises, including planetary and cost-of-living crises,

		the campaign will illustrate the environmental, social, economic, health-related benefits of the EU Textiles Strategy, as well as the textile sector's potential for saving resources, tackling pollution and contributing to the EU's climate objectives. In particular, the campaign will engage young citizens to make fast fashion "out of fashion" and encourage them to play their part in making fashion more durable, reusable, repairable, recyclable, ethical and sustainable.
1.9	Establishing an EU-wide consortium of PROs to ensure that all stakeholders abide by the same rules and to exchange experiences. Under this measure in order to standardise the approach to PROs for textiles under any EPR that Member States may choose to apply an EU wide consortium of PROs would be created to ensure that stakeholders face the same rules and experiences in application are shared universally amongst all PROs.	**Political feasibility** – the nature of EPR schemes and PROs has been left to individual Member States to determine for themselves for the likes of packaging and batteries. Given the different PROs that exist under these schemes it is considered that developing an EU-wide consortium would be unlikely to be politically acceptable to the EU Member States.
1.10	Supporting dialogue and collaboration across the sector Under this measure dialogue between all actors in the textiles sector, including producers, reusers and textile waste managers would be promoted through either an online platform, a stakeholder group that meets together or a mix of both.	**Coherence with other EU policy initiatives** – The Commission's Strategy for sustainable and circular textiles already notes the work that will be undertaken to address stakeholders dealing with textiles via the European Circular Economy Stakeholder Platform, European Bauhaus, the Sustainable Consumption Pledge as well as the European Year of Youth. This measure would duplicate this action and is, therefore, incoherent with the already existing EU policy.

Measure number	Title and description	Criteria requiring measure to be discarded and detail behind decision
2.1	Establishing minimum requirements on separate collection for textile reuse This measure would entail establishing harmonised rules at the EU-level for separate collection-for-reuse models in Member States. Whilst the collection systems should be tailored to the reality of each MS and its regions, high-level minimum requirements would be included in the WFD to ensure that collection schemes and facilities safeguard the reusability of textiles during collection, transport and storage. Member States would be required to specify minimum requirements addressing inter alia: • Setting a quantitative target for separate collection, based on their understanding of current national situation. • Collection to be organised in a way that preserves textile quality and ensures the management of collected textiles for reuse. • Avoiding contamination of collected textiles by water or other liquids to prevent contamination inhibiting reuse • Collection vehicles to protect textiles from water or other liquids to prevent contamination inhibiting reuse. • Incoming collected post-consumer textile waste to be stored in a way that prevents contamination by water or other liquids to prevent contamination inhibiting reuse.	**Proportionality** – the details envisaged would be set at a level that is likely to interfere with systems already in place in Member States as well as setting measures that are better dealt with at the Member State level. **Political feasibility** – the level of detail foreseen is likely to significantly interfere with the systems in place and be politically unacceptable to Member States accordingly. **Relevance** – The measure looks to address aspects of separate collection that are generally already addressed in relation to the economic models already applied i.e. it is in the interests of those separately collecting textiles to prevent their contamination and specifying such measures at the EU level is unlikely to change approaches significantly accordingly.
2.	Establishing minimum requirements on separate collection for textile recycling The focus would be on establishing harmonised rules at the EU-level for separate collection for recycling models in Member States, considering the separate collection obligation as of 2025. Similar minimum requirements would be set with recycling as the main aim in relation to	**Proportionality** – the details envisaged would be set at a level that is likely to interfere with systems already in place in Member States as well as setting measures that are better dealt with at the Member State level. **Political feasibility** – the level of detail foreseen is likely to

	targets for collection, the manner of collection and the safekeeping of textile materials following collection to enable their recycling. An additional consideration that was discarded early on related to consideration of requiring as part of the separate collection of textiles two separate bins – one for recycling and one for reuse.	significantly interfere with the systems in place and be politically unacceptable to Member States accordingly. **Relevance** – The measure looks to address aspects of separate collection that are generally already addressed in relation to the economic models already applied i.e. it is in the interests of those separately collecting textiles to prevent their contamination and specifying such measures at the EU level is unlikely to change approaches significantly accordingly. **Effectiveness and efficiency:** The consideration of requiring as part of the separate collection of textiles two separate bins was discarded because of: • The practicalities of changing the approach currently applied across the EU whereby 85% of separately collected textiles are collected in single bins. • The determination that citizens are generally unable to distinguish between textiles suitable for reuse and those suitable for recycling. • The need for sorting to take place in nearly all cases to determine fractions suitable for reuse, recycling or other treatment.
2.	Defining textile sorting instructions via a textile label for (1) citizens and (2) sorting operators (1) This measure would entail labelling all textiles that are likely to be able to be reused and recycled with a label indicating that such materials should be discarded by citizens in separately collected waste rather than in residual waste. This would follow the type of labelling approach used in several countries to	**Coherence with other EU policy initiatives** - The development of measures to specifically address the lifecycle of textiles through digital product passport (DPP) are already being considered under other EU instruments as specified in the Commission's Strategy for sustainable and circular textiles, namely, there is a mandate for the development of DPP for textile

	inform consumers of what should be separated from residual waste. (2) This measure would also entail labelling of textiles to include information that would enable recognition of the material composition to enable sorting (in particular automatic sorting) for recycling.	products under the ESPR and the textile labelling Regulation which is currently under review. These tools would be the most appropriate to consider the feasibility and necessity to embed certain information on the composition of textiles in the textile products upon their placing on the market that would facilitate also the end-of-life treatment of textiles, in particular, to align with the progress in research and development projects on automatic textile sorting for recycling. **Effectiveness and efficiency –** The effectiveness of a labelling informing citizens on how to discard textiles is considered very low because all textiles should be subject to a separate collection obligation. In view of the complexity to assessing the re-usability or recyclability of textiles which is to be carried out by professionals based on the actual state of the textile at the point of sorting, citizen is not capable to make those decisions. The citizen may be more effectively informed about his role in separate collection through information campaigns by separate collection operators. Furthermore, removal of label or its fading during use stage also limits the effectiveness of this measure. For professional sorters, labels are reported as not the key source of information for their activities.
2.7	Setting sorting obligation for residual waste before final treatment. Under this measure, Member States would be required to ensure that materials found in residual waste are sorted prior to determining their final destination.	**Technical feasibility –** It can be considered that there is insufficient capacity for sorting (either manual or automated) of all residual waste at EU level. **Effectiveness and efficiency –** The costs of requiring sorting for all

		residual waste before the EU for all textiles would be prohibitively expensive. **Political feasibility –** Due to the difficult technical and economic feasibility of the measure, it is unlikely to garner the necessary political support.
2.10	Supporting Member States and investing in the upscale of infrastructure for collection, sorting, preparing for reuse and recycling. Under this measure specific funding would be provided to upscale infrastructure for collection, sorting, preparing for reuse and recycling. This would address a call from stakeholders to ensure that sufficient EU financial support is given to these activities for which the commercial costs and benefits are currently deterring investment. Funding would be provided under the Directive directly, with a mechanism put in place to identify where investments should be made to best effect. Funding would come from the existing EU budget.	**Coherence with other EU policy initiatives –** The Commission's Strategy for sustainable and circular textiles already proposes support for technological innovation for circular fashion business models under LIFE with support to also be provided under the European Regional Development Fund. A separate support and investment model under the WFD would be incoherent with this already existing policy. Furthermore, additional action taken under the WFD has the potential to set up competing and incoherent measures looking to address the same problem. Rather it would be preferable to await the results of these other ongoing policy initiatives to identify if additional action is required under the WFD later.
2.11	Setting a lower VAT for repair and reuse of textiles Under this measure a lower VAT level would apply for repaired and reused textiles than for virgin textiles.	**Coherence with other EU policy initiatives –** Council Directive 2006/112/EC already sets the rules on a common system of value added tax across the EU. Specifying different measures with the WFD would be incoherent with this already existing EU policy. Further, taxation falls outside of the scope of EU competence.
2.12	Setting a lower VAT or no VAT for recycled fibres Under this measure a lower VAT level or no VAT would apply for recycled fibres.	**Coherence with other EU policy initiatives –** Council Directive 2006/112/EC already sets the rules on a common system of value added tax across the EU. Specifying different

		measures with the WFD would be incoherent with this already existing EU policy. Further, taxation falls outside of the scope of EU competence.
2.13	Setting a standardised and consistent tracing and identification system for textile reuse and recycling throughout the European Union and beyond Under this measure textiles sent for reuse and recycling would be traced using specific information included with the textiles themselves. This would enable full understanding of the nature of the textile volumes that are being generated across the EU, the fate of those materials and the changes in approach over time by Member States in the management of textile waste. The track and trace system would be developed at the EU level and applied by Member States digitally.	**Effectiveness and efficiency –** The costs of enacting a track and trace system across the EU and beyond for all textiles would be prohibitively expensive. Whilst data would be comprehensive and comparable across all Member States the costs would outweigh any benefits obtained from such detailed data. **Proportionality -** standardised and consistent data flow on textiles collected, reused, and recycled would be ensured through less onerous means under the measure on reporting 2.14, facilitated by the EPR scheme under measure 2.9. Furthermore, there are cost saving opportunities to managing data flows on textiles placed on the market by making use of the DPP data availability which is to be developed under the ESPR for textiles.

Measure number	**Title and description**	**Criteria requiring measure to be discarded and detail behind decision**
3.2	Resource use reduction targets Under this measure resource reduction targets would set in relation to the textiles sector, requiring the resources used in production of textiles are reduced over time. Targets would be set as a percentage of textiles produced with a reduction in resources used per kg of product expected to see a decline over a time period to be specified in the WFD.	**Coherence with other EU policy initiatives** – The EU Textiles Strategy already announces the establishment, subject to the necessary impact assessment, of ecodesign requirements in the context of the implementation (via a Delegated Act) of the Ecodesign for Sustainable Products Regulation, which is being negotiated by co-legislators. The strategy also indicates

		that providing support to industry in improving resource efficiency will be provided through the Transition Pathway for the Textiles Ecosystem.
3.6	Targets for second-hand market share Under this measure Member States would be expected to meet targets for the second-hand textiles market share as a total of textiles sold. The global textile market size is valued at USD993.6 billion[224] with the second-hand apparel market valued globally at USD96 billion[225]. A target for the second-hand market share would look to set a target higher than the current 10% market share for a future point to be achieved by all Member States and would be measured via reporting against a dataset allowing weight sold per capita per year to be calculated against total market share. The target would be as weight (kg) per capita per year.	**Proportionality** – It is considered that this measure would be disproportionate to the problem looking to be addressed and may have unintentional consequences for the textiles sector by artificially changing the nature of the market without necessarily increasing reuse of textiles. **Political feasibility** – It is considered that this measure would fail to garner necessary political support as it would constrain consumer behaviour and would inhibit level-playing field between the reuse sector and other textile producers. **Political feasibility** – Member States are unlikely to accept a measure that determines the nature of the textiles sector within their territory.
3.7	Targets for textiles in residual waste The objective of this measure would be to drive Member States to improve their separate collection system for textiles if they find excessive textiles contained in the mixed household waste. The measure would entail setting a maximum share (either in terms of weight, items or value) of textiles found in residual waste. Member States would carry out compositional analyses to determine the volume of textiles found in residual waste at national level and should set a target requiring improvement on that figure.	**Proportionality** – It is considered that this measure would be disproportionate to the problem looking to be addressed in view of the proposed scope of the separate collection obligation, sorting obligation and EPR requirements in measures 1.1.1.3, 2.5 and 2.9. Measure 2.9 envisages EPR schemes to adapt their collection networks and awareness raising activities where compositional analysis show textiles presence in residual waste.

[226] Directive 94/11/EC relating to labelling of the materials used in the main components of footwear for sale to the consumer. OJ L100, 19.4.1994, p.37

[226] Directive 94/11/EC relating to labelling of the materials used in the main components of footwear for sale to the consumer. OJ L100, 19.4.1994, p.37

3.9	Target for maximum textile waste landfilled or incinerated Under this measure the Commission would propose a maximum target for separately collected textile waste that are landfilled or incinerated.	**Effectiveness and efficiency –** Since there is always going to be a fraction of textiles that are dirty or otherwise compromised and their disposal with reusable and recyclable fraction would undermine their reuse or recovery, this measure does not appear practicable. It is also already addressed under the existing WFD and Landfill Directive that prohibit incineration or landfilling of separately collected waste for recovery. in addition, it could bring an unwanted situation that a MS with a low rate of separate collection (focussing on reuse) but of very high-quality would likely also have a low rate of incineration and landfill. This MS would likely fulfil the proposed target. However, the objective of moving up the waste hierarchy would not be achieved. It may also limit possibilities to further distinguish between high-quality and low-quality recycling technologies, if required.
3.10	Banning the incineration of textiles waste Under this measure the incineration of textile wastes would be banned.	**Technical feasibility –** Presently, a part of textile waste cannot be reused or recycled (approximately 45% of the textiles currently found in residual waste would fall under this category). An outright ban for incineration of all textiles would, in the absence of measure 3.10 lead to increased textile waste being sent to landfill. No suitable alternatives exist at present for such materials. **Coherence with other EU policy objectives –** a ban on the incineration and landfill of separately collected waste was already enacted as part of the 2018 waste amendments. Hence, this measure could lead to

		incoherence with this already existing policy.
3.11	Banning the landfill of textiles waste	**Technical feasibility –** Presently, a part of textile waste cannot be reused or recycled (approximately 45% of the textiles currently found in residual waste would fall under this category). An outright ban for landfill of all textiles would, in the absence of measure 3.10 lead to increased textile waste being sent to incineration. No suitable alternatives exist at present for such materials. **Coherence with other EU policy objectives –** a ban on the incineration and landfill of separately collected waste was already enacted as part of the 2018 waste amendments. Hence, this measure would possibly lead to incoherence with this already existing policy.
3.12	Ban the destruction of unsold textile products Under this measure operators would be banned from the destruction of unsold textile products with such products either having to be reused or recycled.	**Coherence with other EU policy initiatives –** The Commission's Strategy for sustainable and circular textiles already proposes measures in relation to such a ban through the revision to the Ecodesign Directive.

The following table provides an overview of the viability screening of the measures discarded according to the criteria defined by the Better Regulation Toolbox:

Table 10 – Overview of screening of the options

Measure number and title	Legal	Technical	Policy	Coherence	E&E	Proportionality	Political	Relevance	Identifiability
1.4 Supporting the upscale of circular business models				✗					✗
1.5 Providing instruments and setting indicators to decrease the overconsumption of textiles				✗					
1.6 Sharing of best practices on planning for promoting repair services, reuse and second-hand shopping centres	✗								
1.7 Discouraging discount vouchers in product take-back schemes and encourage repair vouchers						✗	✗		
1.8 Advertising and marketing practices for waste prevention				✗					
1.9 Establishing an EU-wide consortium of PROs to ensure that all stakeholders abide by the same rules and to exchange experiences							✗		
1.10 Supporting dialogue and collaboration across the sector				✗					
2.1 Establishing minimum requirements on separate collection for textile recycling					✗	✗	✗	✗	
2.2 Defining textile sorting instructions for citizens				✗	✗				
2.3 Defining textile sorting instructions for sorters and waste operators									✗

2.5 Setting sorting obligation for residual waste before final treatment (landfilling, incineration)		✗			✗		✗		
2.8 Supporting Member States and investing in the upscale of infrastructure for collection, sorting, preparing for reuse and recycling				✗					
2.9 Setting a lower VAT for repair and reuse of textiles				✗					
2.10 Setting a lower VAT or no VAT for recycled fibres				✗					
2.11 Setting a standardised and consistent tracing and identification system for textile reuse and recycling throughout the European Union					✗	✗			
3.2 Setting a target for second-hand market share				✗					
3.6 Setting a resource use reduction target						✗	✗		
3.7 Setting a target for textiles in residual waste						✗			
3.9 Target for maximum textile waste landfilled or incinerated		✗		✗					
3.10 Banning the incineration of textiles waste		✗		✗					
3.11 Banning the landfill of textiles waste				✗					
3.12 Banning the destruction of unsold textile products				✗					

Legend: Legal = Legal feasibility, Technical = Technical feasibility, Policy = Previous policy choices, Coherence = Coherence with other EU policy objectives, E&E = Effectiveness and efficiency, Political = Political feasibility

For those measures that have been taken forward into the detailed impact assessment their description is provided below.

Option 1: Supporting MS to implement and enforce current provisions

Detailed analysis of the measures under Option 1 - Supporting Member States to implement and enforce current WFD provisions

Measure 1.1 – Clarifying definitions in relation to textiles and textile waste

In the context of the evolving policy context concerning textiles at EU level (EU Textiles Strategy and ESPR), and where each country is developing its own framework to determine what is covered by textile measures, it is essential to guarantee harmonisation both in the definition for the term "textile" and in the differentiation between used textile and textile waste amongst Members States. This measure will clarify existing definitions in the waste legislation to provide a common understanding of the notion of "textiles" and "textiles waste" to ensure a level-playing field for the different stakeholders in the EU, involved competent authorities and a consistent and comparable and clear textile and textile waste flow mapping and monitoring of the other measures addressed in this initiative.

In doing so the measure looks to specifically address the following problem drivers:

- different scopes and definitions employed by Member States in relation to textile waste management at present;
- delays in implementation of the separate collection obligation that are, in part, caused by a lack of clarity as to the scope of textiles falling under the obligation;
- information shortages that are caused in part by a lack of understanding of the scope of textiles for which data should be collected and reported.

This measure entails the adoption of guidance documents by DG ENV and/or adaptation of existing guidance documents provided by Eurostat for the purposes of guiding Member States on their reporting obligations on textile waste which clarify the scope of waste streams covered.

This measure, in a legislative format, is proposed to be taken up in the context of all the measures under Options 2 and 3, i.e., the scope and operational elements of the measures in Option 2 take up the proposed definitions of measure 1.1.

Two alternatives are foreseen proposing two different definitions as detailed below.

1. Defining 'textiles' for the purpose of the WFD application and, in particular, of the separate collection obligation. Subsets of that definition could be applicable for other measures proposed in this initiative.
2. Defining the point at which separately collected textiles become waste for the purpose of the WFD application as well as for other measures proposed in this initiative.

1. Definition of textiles

This alternative is proposed in three alternatives in relation to defining textiles as outlined in the table below:

Table 11 – Alternative definitions of 'textiles'

Alternative	Approach	Description
1	Defining textiles in accordance with the textile labelling Regulation	This alternative would consist in using Article 2(2) of Textiles Labelling Regulation that defines the following scope of textiles to define the products covered under the term "textile": "2. For the purposes of this Regulation, the following products shall be treated in the same way as textile products: (a) products containing at least 80 % by weight of textile fibres; (b) furniture, umbrella and sunshade coverings containing at least 80 % by weight of textile components; (c) the textile components of: (i) the upper layer of multi-layer floor coverings; (ii) mattress coverings; (iii) coverings of camping goods; provided such textile components constitute at least 80 % by weight of such upper layers or coverings; (d) textiles incorporated in other products and forming an integral part thereof, where their composition is specified. 3. This Regulation shall not apply to textile products which are contracted out to persons working in their own homes or to independent firms that carry out work from materials supplied without the property therein being transferred for consideration. 4. This Regulation shall not apply to customised textile products made up by self-employed tailors." Paragraphs 3 and 4 effectively remove labelling obligations for smalls-scale bespoke clothing manufacture. This broad description of textiles would appear to be the most relevant at the EU level for determining what is a textile and what is not. It should be noted that footwear is explicitly excluded from the textile labelling Regulation and is addressed in its own law.[226] In this case, therefore, footwear would not be included in the scope of textiles using this definition. Additionally, Article 3 makes clear that a textile product is any raw, semi-worked, worked, semi-manufactured, manufactured, semi-made-up or made-up product which is exclusively composed of textile fibres, regardless of the mixing or assembly process employed.

[226] Directive 94/11/EC relating to labelling of the materials used in the main components of footwear for sale to the consumer. OJ L100, 19.4.1994, p.37

<table>
<tr><td></td><td></td><td>Whilst mattress coverings would be addressed under this definition the remaining part of the mattress would not.

Finally, leather clothing and apparel would be excluded using this definition.</td></tr>
<tr><td>2</td><td>Defining textiles using CN codes from the Combined Nomenclature Regulation targeted at customs codes</td><td>This alternative enables to address, albeit with different operational obligations, all textile wastes generated (post-industrial, pre-consumer and post-consumer textile waste), and offers the potential to aim specific non-textile waste types that are subject to the same operational schemes than textile wastes (such as footwear, leather clothing and apparel), using CN codes that define specific categories of goods.

Section XI of the CN Regulation addresses textile and textile articles. Wastes resulting from the production of these articles as well as the articles at their end of life falling under the following chapters would be considered as textile waste:
<table>
<tr><th>CN code</th><th>Description</th></tr>
<tr><td>50 – all codes listed in the chapter</td><td>Silk</td></tr>
<tr><td>51 - all codes listed in the chapter</td><td>Wool, fine or coarse animal hair, horsehair yarns and woven fabric</td></tr>
<tr><td>52 - all codes listed in the chapter</td><td>Cotton</td></tr>
<tr><td>53 - all codes listed in the chapter</td><td>Other vegetable textile fibres, paper yarn and woven fabrics of paper yarn</td></tr>
<tr><td>54 - all codes listed in the chapter</td><td>Man-made filaments, strip and the like of man-made textile materials</td></tr>
<tr><td>55 – all codes listed in the chapter</td><td>Man-made staple fibres</td></tr>
<tr><td>5601</td><td>Wadding of textile materials and articles thereof; textile fibres, not exceeding 5 mm in length (flock), textile dust and mill neps</td></tr>
<tr><td>5602</td><td>Felt, whether or not impregnated, coated, covered or laminated</td></tr>
</table></td></tr>
</table>

		58 – all codes listed in the chapter	Special woven fabrics, tufted textile fabrics, lace, tapestries, trimmings and embroidery
		60 - all codes listed in the chapter	Knitted or crocheted fabrics
		61 – all listed codes within the chapter	Articles of apparel and clothing accessories, knitted or crocheted.
		62 – all listed codes within the chapter	Articles of apparel and clothing accessories, not knitted or crocheted
		6301	Blankets and travelling rugs
		6302	Bed linen, table linen, toilet linen and kitchen linen
		6303	Curtains (including drapes) and interior blinds; curtain or bed valances
		6304	Other furnishing articles, excluding those of heading 9404[227]
		630710	Floor-cloths, dish-cloths, dusters and similar cleaning cloths
		6308	Sets consisting of woven fabric and yarn, whether or not with accessories, for making up into rugs, tapestries, embroidered tablecloths or serviettes, or similar textile articles, put up in packings for retail sale
		6309	Worn clothing and other worn articles
		6504	Hats and other headgear, plaited or made by assembling strips of any material, whether or not lined or trimmed

[227] 9404 refers to mattress supports, articles of bedding and similar furnishing (for example mattresses, quilts, eiderdowns, cushions, pouffes and pillows) fitted with springs or stuffed or internally fitted with any material or of cellular rubber or plastics, whether or not covered.

6505	Hats and other headgear, knitted or crocheted, or made up from lace, felt or other textile fabric, in the piece (but not in strips), whether or not lined or trimmed; hairnets of any material, whether or not lined or trimmed

Additionally, in relation to leather clothing and apparel as well as footwear the following CN codes could be applied:

CN Code	**Description**
4203	Articles of apparel and clothing accessories, of leather or composition leather (excl. footware and headgear and parts thereof, and goods of chapter 95, e.g. shin guards, fencing masks)
6401	Waterproof footwear with outer soles and uppers of rubber or of plastics, the uppers of which are neither fixed to the sole nor assembled by stitching, riveting, nailing, screwing, plugging or similar processes
6402	Other footwear with outer soles and uppers of rubber or plastics
6403 (with the exception of 6403 12 00 – Ski-boots, cross-country ski footwear and snowboard boots)	Footwear with outer soles of rubber, plastics, leather or composition leather and uppers of leather:
6404	Footwear with outer soles of rubber, plastics, leather or composition leather and uppers of textile materials:
6405	Other footwear

Having defined textile wastes and other wastes that follow the same operational schemes using the CN code system, it would be possible to address specific measures to specific codes.

In this way, for example, measures that specifically focus on municipal clothing and textiles could address a more limited set as below:

CN code	**Description**
61 – all listed codes within the chapter	Articles of apparel and clothing accessories, knitted or crocheted.
62 – all listed codes within the chapter	Articles of apparel and clothing accessories, not knitted or crocheted
6301	Blankets and travelling rugs
6302	Bed linen, table linen, toilet linen and kitchen linen
6303	Curtains (including drapes) and interior blinds; curtain or bed valances
6304	Other furnishing articles, excluding those of heading 9404[228]
6309	Worn clothing and other worn articles
6504	Hats and other headgear, plaited or made by assembling strips of any material, whether or not lined or trimmed
6505	Hats and other headgear, knitted or crocheted, or made up from lace, felt or other textile fabric, in the piece (but not in strips), whether or not lined or trimmed;

[228] 9404 refers to mattress supports, articles of bedding and similar furnishing (for example mattresses, quilts, eiderdowns, cushions, pouffes and pillows) fitted with springs or stuffed or internally fitted with any material or of cellular rubber or plastics, whether or not covered.

			hairnets of any material, whether or not lined or trimmed
		This scope is broader than the scope of textiles considered by the JRC[229] as codes 6309, 6504 and 6505 were not addressed in the waste generation numbers in that study. To the above-mentioned set an additional set of CN-codes corresponding to certain non-textile wastes could be added to include them into the scope of the same operational measures as textiles.	
3	Using a combination of alternative 1 and 2 to clearly define operational measures in relation to textiles waste management under the WFD as well as the scope of those measures	The WFD applies to waste in general save for the exclusions listed in Article 2 of the Directive. Establishing a universal definition of textile from the Textile Labelling Regulation would solve the problems of harmonisation among the MS. However, using this definition to universally set the scope of all operational measures, including in relation to the existing provisions on textiles may render certain provisions impractical. This alternative takes a combined approach of options 1 and 2. The definition of alternative 1, from the Textile Labelling Regulation, would apply to textile materials in the strict sense, according to their composition. The CN-code listing under alternative 2 would then be used to define the scope of specific measures (for example by defining the textiles and other closely linked wastes subject to an EPR and a separate collection obligation in a specific annex to the WFD).	

The alternatives described above would entail the following regarding the existing separate collection obligation:

According to Eurostat guidance for municipal waste statistics[230], in addition to household waste, municipal waste also encompasses waste originating from other sources, whether collected by municipal or by private collectors, such us: commerce and trade, small businesses, office buildings and institutions (e.g. schools, hospitals), enterprises if it similar in kind and composition to household waste and does not come from production, etc.

With regard to the fraction of municipal textiles and disposed of as municipal waste, information collected from eleven Member States reveals that the scope of textiles covered by existing collection systems and planned ones converge around municipal textile and clothing and footwear, i.e., circa 85% of the textile waste generated. For the remaining Member States for which

[229] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144

[230] Guidance for the compilation and reporting of data on municipal waste according to Commission Implementing Decisions 2019/1004/EC and 2019/1885/EC, and the Joint Questionnaire of Eurostat and OECD. European Commission. Eurostat (2021)

information is not available, the picture is unclear. However, in the two stakeholder workshops that considered the scope of textiles, the focus of discussions tended to be in relation to clothing and, to a lesser extent, other municipal textiles (see Table 22).

In view of their different waste collection and treatment processes, mattresses, rugs and floor coverings are excluded from the lists used to define operational measures in alternatives 2 and 3. Rugs and floor coverings also cover a very broad category of products making their inclusion in a collection system with textiles even more complex. However, the small rugs that the industry may sell as household linens would be captured. When disposed of in the separate collection system for household waste this would be treated either as a target or non-target material by the waste manager depending on the rug.

With regard to post-industrial and pre-consumer, the existing waste regime already requires that the waste producer treats the waste in line with the waste hierarchy. It is assumed that where there is a market value for the textile waste and transport to the recycling infrastructure is economically feasible it is valorised in view of its clear and consistent composition that requires far less pre-processing for recycling. For the purposes of these textile waste categories, the use of relevant CN codes may also be a useful demarcation tool for the measures addressed in this initiative (e.g., measures 2.5, 2.14).

2. Definition of waste

To address the problems identified in relation to the categorisation of textiles as waste two alternatives are considered.

1. Adopting a precautionary approach to determine the point at which a textile item becomes waste. The following definition would be applied: Textile waste is a textile that is discarded by its holder in a separate collection scheme (irrespective of the actor managing the separate collection system), when donated or returned to a store or when deposited in residual waste. As such, any textile that is separately collected in a dedicated bin would acquire waste status, including the separate collection schemes managed by the (preparation for) reuse sector and non-profit organisations. However, following sorting, reusable textiles would no longer be considered as waste but rather considered as a used textile, if they meet the relevant end-of-waste criteria.
2. Adopting an approach where separately collected textiles and those donated or returned to a store are given waste status after those materials have been sorted into reusable textiles (that would therefore not be defined as waste at any point), recyclable textiles and textiles for disposal (both of which would obtain waste status following sorting).

An additional consideration that was discarded early on related to consideration of requiring, as part of the separate collection of textiles, two separate bins – one for recycling and one for reuse. However, this was discarded because of:

a. The practicalities of changing the current approach applied across the EU whereby 85% of separately collected textiles are collected in single bins.
b. The evidence showing that citizens are not always able to distinguish textiles suitable for reuse and suitable for recycling.
c. The need for sorting to take place to determine fractions suitable for reuse, recycling or other treatment.

The point at which collected textiles are considered waste varies across the EU Member States. There is no comprehensive source of information as to which Member States define textiles collected in textile collection bins as waste. There is anecdotal evidence that this can also vary regionally. As part of the stakeholder consultation there was some disagreement between Member States as to whether separately collected textiles should always be considered waste at the point of collection or not with the likes of Germany and Austria applying such waste categorisation at the point of collection and other Member States such as Italy and Sweden not doing so. In the case of Germany, it was emphasised that the Member State considered that there was a risk in not defining such materials as waste in terms of their handling post collection as well as the possibility for the contamination of reusable materials with waste at the point of collection. For Italy and Sweden, the risks to social enterprises business models in defining such separately collected materials was the greater concern. However, during the consultations, the social enterprises' sector indicated that generally such entities already hold the relevant waste management authorisations required to collect and sort waste.

The choice of either alternative would, therefore, require changes in approaches in some Member States but it is impossible to determine how many due to a lack of information.

Measure 1.2 – Adopting EU wide waste prevention indicators for textiles

The objective of the measure is to set measurable indicators in relation to textile waste prevention that are more consistently applied by Member States. This allows the identification of progress in textile waste prevention as well as data to support sharing of best practices and development of future policy on consistent datasets in relation to textile waste prevention. Waste prevention indicators can focus on several aspects of the textile life cycle, including prevention of items entering the waste management system; and reuse after preparation-for-reuse once the item has entered the waste management system. These indicators would build on the existing reporting obligations of the Member States under Article 37 of the WFD on reuse of products and waste generated, including as proposed to be improved under measure 2.14 which concerns the improvement of data flows on textiles as well as other data available at EU level based on existing reporting obligations indicating the economic activity in the countries. They would also be based and/or embedded in the overall waste prevention monitoring indicators which apply also to textiles being developed by the EEA for the purposes of measuring decoupling of waste generation from economic growth. Overall, the most pertinent indicator on waste prevention is on the quantity of reuseable textiles made available for re-use which is already subject to Member State monitoring under Article 37 of the WFD.

The measure looks to specifically address the following problem drivers:

- Insufficient waste prevention activities and monitoring employed by Member States at present;
- Information shortages that hamper the development of effective waste prevention programmes; and
- A lack of circular business models at scale that extend the lifespan of products.

The indicators would be adopted through an implementing act (already envisaged in Article 9(7) of the WFD). This action would be made in line with the monitoring framework that is being developed by the European Environmental Agency as part of its obligations to monitor waste prevention in the EU in accordance with Article 30(2) WFD.

The application of such indicators by Member States would facilitate the monitoring of waste prevention at national and EU level and would allow the Commission to better identify those Member States that appear to be applying best practices in relation to waste prevention and those that appear to be encountering challenges. This could then be used to facilitate sharing of best practices identified as well as to target support to Member States that are struggling to reduce textile waste. The information and assessment of the Union's progress towards waste prevention are to be made available to the public by the European Environmental Agency as part of its obligations to report in Article 30(2) WFD.

This measure would apply to all textiles wastes, including post-industrial, pre-consumer and post-consumer textile wastes.

Measure 1.3 – Providing Member States with guidance and support in dialogue on the management of textile waste

Measure 1.1. looks to address the issue of defining what textiles mean in the context of specific regulatory measures on textiles under the WFD. However, this only solves part of the challenge of implementing the existing measures on textiles. Even with a clearer definition there would remain inquiries about the application of the definition to specific textile products as well as how to best finance and develop sufficient textile management infrastructure. This is not currently provided neither in the WFD nor in the available guidance. This could prolong divergences in implementation and inhibit the identification of best practices that can speed up the textiles waste management systems as required.

In doing so the measure looks to specifically address the following problem drivers:

- Different scopes and definitions employed by Member States in relation to textile waste management at present;
- Delays in implementation of the separate collection obligation that are, in part, caused by a lack of clarity as to the scope of textiles falling under the obligation;
- Information shortages that are caused in part by a lack of understanding of the scope of textiles for which data should be collected and reported;
- Insufficient funding to scale up separate collection, sorting and recycling;
- Insufficient sorting and recycling capacity; and
- Insufficient waste prevention activities and monitoring.

This measure would consist of the Commission working with stakeholders to develop guidance on a range of topics related to textile waste for which problems have been identified by the stakeholders including:

- Best practices in relation to the development of suitable collection, sorting, reuse and recycling infrastructure as well as best techniques for managing textiles that cannot be reused or recycled;
- The risks associated with unsorted separately collected textiles and their export to third countries for reuse;
- Mechanisms for monitoring the management of textiles and textile wastes, namely, improvements in textile waste related data collection through guidance of the Eurostat to clarify the definitions referred to in measure 1.1. ; and
- Financing the development and management of textiles and textile waste systems, including through the establishment of a national EPR schemes, for example, adopting a

Commission Recommendation suggesting the use of EPR to finance the improvement of the sustainable management of textile waste in line with the substantive elements of measure 2.9. and to minimize the impact on the industry in terms of compliance costs where several national schemes are established and vary in terms of their regulatory frameworks.

The Commission would further develop existing platforms such as the European Circular Economy Stakeholder Platform or setting up a complementary Platform, like the EU Platform on Food Losses and Food Waste, specifically addressing textiles and textile wastes. The platform could provide a knowledge hub on best practices, strategies, etc. for textiles management, a concrete toolbox (amongst which the guidance described above). Operational actors involved in existing textile management schemes (e.g., EPR PROs) could use this platform to share experiences and best practices with all relevant stakeholders.

Whilst these types of measures exist for other waste types, there is no platform targeted to textiles and Commission guidance has not focussed on the specific needs of textiles. The guidance and platform highlighted above would look to fill this gap. This measure would apply to all textiles wastes, including post-industrial, pre-consumer and post-consumer textile wastes.

Existing platforms and hubs are either already in existence such as the Circular Economy Stakeholder Platform[231] or planned such as the wider dissemination activity on the ESPR (e.g., following the Ecodesign website model). The existence of these models allows either the addition of materials in relation to textiles via these already existing or planned guidance and knowledge platforms or to use the approaches already in existence as a model for a specific platform and guidance in relation to textiles.

Option 2: Setting additional regulatory requirements to improve performance

Measure 2.5 – Setting sorting obligations for separately collected textiles and textiles waste

Under this measure Member States would be required to ensure that all separately collected textiles are subject to a sorting operation with the objective of identifying fractions suitable for reuse and preparation for reuse, as a priority, as well as fractions suitable for recycling. Sorting may take place in one or several subsequent stages and/or facilities but shall exclude subsequent operations like repair or pre-processing operations in view of recycling, like the removal of materials that hamper recycling (e.g., zippers and buttons). This entails placing obligations on the waste collectors and waste sorters.

The measure looks to specifically address the following problem drivers:

- Inconsistent application of the “textile waste” and “used textile" definitions application;
- Insufficient sorting and recycling capacity;
- Insufficient funding to scale up separate collection, sorting and recycling;
- Low demand for recycled materials; and
- Delays in implementation of the separate collection obligation.

[231] https://circulareconomy.europa.eu/platform/

Since waste may be sorted outside the country of collection, to ensure traceability of waste [232], the obligation to ensure that the collected waste is handed over to a licensed or registered waste management operator (which may also be the same as the waste collector) and undergoes a sorting operation for preparation for reuse and recycling purposes, should be targeted at entities collecting textile waste separately from other waste, namely, municipalities or waste management operators they have outsourced, commercial and non-profit entities, such as social enterprises.

This measure would apply to all textiles wastes, including post-industrial, pre-consumer and post-consumer textile wastes. Regarding post-consumer textiles separately collected the sorting operation must ensure the separation of textiles for reuse and recycling. Since there are no automatic sorting technologies yet available to separate the reusable and recyclable fraction from other textile waste, this sorting should be manual. In view of cost and logistical efficiency gains, sorting for reuse and recycling generally takes place simultaneously. Manual sorting stage may be followed by subsequent manual or automatic sorting stages to identify more targeted factions. Automated fibre sorting and pre-processing facilities are critical to scale the recycling of post-consumer waste. It is also common practice to remove textile items and other items and materials and waste that may contaminate the collected textile fraction at all stages of the collection stage (and treat it as waste destined for disposal), including at the opening of the waste collection bins and loading/unloading of the transportation vehicles destined to the sorting facility.

Under this measure the mandated collection, subsequent handling of waste (transportation, storage) and sorting operations would be required to comply with certain minimum principles and requirements to ensure that the collected textile waste treatment, including the collection stage, adheres to the waste hierarchy. This measure operationalises an already existing obligation in Article 11(1) WFD read in conjunction with Articles 4 and 10 WFD which requires Member States to separately collect textiles to facilitate their treatment in line with the waste hierarchy. Whilst the economics of separately collected post-consumer textiles will push for reuse in the first instance as this remains the most profitable outlet for textiles, these criteria also mandate a sorting obligation to identify fractions suitable for preparation for reuse and recycling.

The following minimum requirements would be mandatory for the collection of textiles waste and handling prior to sorting:

- Collection, loading and unloading, transportation and storage infrastructure and operations and other handling of textile waste should ensure protection from weather conditions (i.e. dry/clean conditions) and other sources of contamination to prevent damage and cross-contamination of the collected textiles;
- Collection containers should be frequently emptied by trained personnel at the place of collection;

[232] Sorting may take place in the Member State of collection or other Member State or outside the EU. In the case measure 1.1 is applied in terms of harmonising the application of definition of waste, the collected textiles are considered waste at the point of collection and may only cease to be waste following a preparation for reuse operation or another material recovery operation. Therefore, the shipment of collected textiles would need to comply with the WSR for the purposes of shipments to other Member States or outside the EU.

- A first screening of waste shall be carried out at the place of collection to remove non-target items or materials/substances that are a source of contamination;
- With regard to pre-consumer textiles, the different fractions of textiles materials and textiles items should be kept separate at the point of waste generation where this facilitates subsequent preparation for reuse or recycling and subject to recovery operations.

There is significant potential to reduce textile waste and ensure that it creates further value by boosting its preparation for reuse and recycling, notably through sorting of reusable textiles and textile waste whilst prioritising recycling when reuse is not feasible. The following minimum requirements would be mandatory for ensuring high quality sorting for reuse and for preparation for reuse, as a priority, and secondly for recycling, followed by other recovery options:

- All collected textiles shall be subject to a sorting operation. Sorting for reuse, preparation for reuse and recycling is mandatory for all loads of collected textiles.
- The purpose of the sorting operation is to produce a textile fraction that is suitable for reuse, prioritising reuse in the Union market, and that meets the criteria for ceasing to be waste as a result of the sorting operation or to produce a textile fraction that is destined for subsequent preparation for reuse operations (e.g., cleaning, repairing).
- For those fractions of textile waste, where reuse, including preparation for reuse, is not possible, the purpose of the sorting operation is to produce a textile fraction that is suitable for recycling. The remainder of the textiles is to be subject to energy recovery or disposal operation.
- The fractions for reuse, preparation for reuse and recycling shall be separated from each other as well as from textiles suitable for energy recovery, or that would have to be disposed of. Damaged, dirty or otherwise contaminated items of textiles and other non-target materials (e.g., non-textile items) shall be removed from the reusable fraction and, where necessary in view of the subsequent processing operations, from the recyclable fraction.
- Sorting for reuse operations must be carried out by sorting textiles in an appropriate level of granularity, separating fractions that are fit for direct reuse from fractions that are to be subject to further preparation for reuse operations (e.g., repair), target a specific reuse market applying up-to-date criteria reflecting the needs of the receiving market, inter alia, the national customs, clothes size, weather conditions, fashion and quality of textiles.
- Sorting for recycling operations shall meet the requirements of the subsequent preliminary treatment for recycling and final recycling processes (e.g., by material composition, colour) prioritizing items for high quality textile to textile recycling over recycling for wipes or other non-woven applications.
- Sorting for reuse and preparation for reuse needs to be carried out manually for each item by trained personnel. Similarly, sorting for recycling generally needs to be carried out manually for each piece of item by trained personnel but, where equivalent output is attainable through automated sorting processes, can be carried out through appropriate automatic sorting.
- The sorting facility shall be a dry and clean workplace and be appropriately equipped.
- Sorted textile fractions must be packaged according to their quality and value and must be properly stacked during subsequent transportation, loading and unloading to safeguard from any damage.
- Bales of sorted post-consumer textiles for reuse shall not contain mixed sorted textiles; they shall be labelled with very granular information on the type of textile products (e.g.,

targeted gender, type of clothes in sub-categories, size, colour, material) to facilitate use in multiple reuse markets, material composition they contain, year of production of the bale. Records shall be kept and fixed to the packaging of sorted bales. The records shall contain information about the contents, level of granularity of the produced textile fractions that the sorting was carried out, and the name and address of the company responsible for the sorting.

The above requirements are considered by some industry members as minimum good practices for ensuring that textiles are not damaged during the collection and sorting steps and would provide a minimum level of environmental protection rules across the Union in the quality of the processes to maximise the retention of value from textile through the identification and preparation of items for reuse and recycling.[233] More detailed sorting requirements are to be observed by the sorting operators to meet the requirements for the reuse and recycling markets. The sorting specifications for reusable items differ by specific reuse market (regionally and even locally) and may change according to the local fashion and season in the year. Since this generally concerns several hundreds of sorting grades, a greater granularity cannot be captured in the above requirements. The minimum requirements however should already facilitate a greater consistency across the Union in the quality of textiles destined for sorting and sorted textiles therefore facilitating shipment across the EU for reuse or further processing. The measure would also address the wide concerns linked to the impact of export of EU used textiles outside the EU where it concerns the export of unsorted textiles.

As indicated by recyclers, mandatory sorting for recycling would provide for the necessary consistency in the quantities of the different feedstocks available for recycling to scale up the recycling facilities in the EU. Stakeholders indicate that scaling these technologies requires sufficient funding and the certainty of having a market for recycled fibres. Demand in feedstock for recycling changes based on technology development, which will affect sorting specifications for recycling.

This measure would entail also providing a mandate to the Commission for setting more detailed technical rules setting out sorting requirements to provide a higher level of harmonisation of the textile fractions to facilitate the material flows across the Union for re-use or further treatment. Such criteria, for example, would also be useful to guide how to address the risk that re-useable textiles are destined for recycling rather than re-use as a result of sorting which could be addressed by providing further technical rules how to classify textiles for re-use and preparing for re-use and for recycling.

These minimum requirements do not constitute end-of-waste criteria following a sorting operation or any other subsequent preliminary or final treatment operation, but they are a pre-condition for being considered for end-of-waste operations since minimising contamination through collection and sorting are fundamental steps to further treatment. Development of EU harmonised end-of waste criteria addressing preparation for reuse processes and recycling processes are addressed in measure 2.6. and would define detailed sorting as well as further interventions like repair requirements.

This measure takes up in a legislative form measure 1.1.2.1 which proposes to consider all separately collected textiles as waste until they undergo a sorting process that generates reusable

[233] EuRIC Textile, 2021. Handling & Sorting specifications for reuse and recycling of used textiles.

fractions of textiles or recycled textiles. This means that collected textiles that are not sorted in the country of collection would be subject to waste shipment requirements where they are destined for subsequent sorting operations elsewhere in the EU or outside the EU. This addresses the concerns raised by the stakeholders that unsorted textiles are exported as goods and that a significant fraction of that is not reusable in the country of destination.

Member States will have to ensure that the requirements of this measure applicable to collectors and sorters are reflected in the operator and facility permitting requirements and subject to monitoring and enforcement action by the competent authorities. In this context it is to be verified that the sorting practices are adapted to the target markets for reuse to prevent that the produced reusable fraction may be regarded as waste in the destination reuse markets, in particular regarding the granularity of the fractions produced and that the sorting operator gathers information on the specificities of the target reuse markets. Reporting obligations on the entities shipping used textiles (shipment of product) are already a requirement under current regulatory framework. This information would facilitate the enforcement and monitoring of the obligation on sorters.

The waste collector should be required to keep records of the weight of waste collected, handed over to a licenced/registered sorting facility and subject to sorting operations. In line with the rationale of Article 34 of the WFD on record keeping, the records should be kept for three years and shall make that information available, on request, to the competent authorities. Other reporting obligations that apply to waste collectors are considered under Measure 2.14.

In line with the principle of subsidiarity and its implementation in the context of the Waste Framework Directive, this measure does not regulate which entities should be involved in the management of textile waste (collection and sorting, preparation for reuse). Currently it is observed that both commercial and non-commercial (social, charity enterprises) as well as municipalities directly are engaged in these activities. In view of the heterogeneous, innovative and social nature of the reuse sector and the currently dominant role for social enterprises, it should be recommended to the Member States to implement the separate collection obligation for textiles safeguarding and facilitating the access to textile waste to the non-commercial entities [234].

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[234] The role of social enterprises as described in Spanish Law is significant. Under the Spanish Law 5/2011, art. 4, social economy entities operate on the basis of the following guiding principles: (a) The primacy of individuals and of the social purpose over capital, (b) Application of the results obtained from the economic activity mainly on the basis of the work provided and the service or activity performed by the partners or their members (c) Promoting solidarity within and with society that promotes commitment to local development, equal opportunities for men and women, social cohesion, the integration of people at risk of social exclusion, the creation of stable and quality employment, the reconciliation of personal, family and work life and sustainability and (d) Independence on public authorities. According to the Spanish Waste Law among the obligations of the waste producer is to deliver waste to a public or private waste collection body, including social economy entities, for treatment. In the same Law it is stipulated that the competent authorities shall, in their respective areas, promote the activities of preparing for reuse, in particular by promoting the establishment of and support for preparing for reuse and repair networks, especially in the case of social economy entities authorised to manage waste. Further, when an extended producer responsibility scheme is established the Spanish waste law requires that the roles and responsibilities of, among others, the social economy entities would be clearly defined. Particular attention is also being paid to the promotion of social economy entities in relation to the waste prevention measures and, more

Measure 2.6 – Adopting end of waste criteria

This measure entails the adoption by the Commission of an implementing act based on the mandate it is given in Article 6(2) of the WFD setting out harmonised end-of-waste criteria for the preparation for re-use and recycling of textile waste in accordance with the requirements set out in Article 6(1) and (2) of the WFD. This measure entails the preparation of the Commission of a draft implementing act and negotiation of the act with the industry and the Member States in the framework of the Technical Adaptation Committee on waste leading to the adoption of the act.

End-of-waste criteria specify when certain waste ceases to be waste and becomes a product or a secondary raw material. According to Article 6 (1) and (2) of the WFD, certain specified waste ceases to be waste when it has undergone a recovery operation (including recycling) and complies with specific criteria, in particular, when:

- The substance or object is commonly used for specific purposes.
- There is an existing market or demand for the substance or object.
- The use is lawful (substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products).
- The use will not lead to overall adverse environmental or human health impacts.

Article 6 of the WFD also defines the methodological requirements that the development of the criteria ought to follow, namely, that they have to define input material, requirements on the recovery process, quality management system requirements and output material criteria.

The measure looks to specifically address the following problem drivers:
- Different scopes and definitions on the definitions of "textile waste" and "used textile", "secondary raw material from recycled textile waste";
- Insufficient funding to scale up separate collection, sorting and recycling;
- Insufficient waste prevention activities;
- Lack of circular business models at scale that extend the lifespan of products; and
- Low demand for recycled materials.

This measure would consist in developing criteria for textiles which entails a process that engages with the industry stakeholders as well as Member State competent authorities and taking as a reference the national or industry standards in place. End-of-waste criteria for textiles at national level are rare at present. According to the JRC[235] the following Member States have applied end of waste status to certain textiles:

- France - order on end of waste for objects and chemicals that have been prepared for reuse that includes textiles (2018) and order on end of waste for cut wiping cloths made from used textiles for use as rags (2019),

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specifically, for the management of collection and reuse centres. The Nineteenth additional provision to the law explicitly provides for the tender and award of public administration's contracts on a preferential basis through reserved contracts. More specifically, it is stated that at least 50 % of the amount awarded must be the subject of a contract reserved to Insertion Companies and Special Employment Centres of Social Initiative authorised for the treatment of waste. Otherwise, the public administration and the contracting authority must provide a duly substantiated justification in the file and may be subject to special review or review procedures in the field of public procurement.

[235] JRC 2020. Study on Member States practices on by-products and end-of-waste: Final Report

- Czechia - end of waste decision on textile cord,
- Romania - end of waste decision on processed textile fibres.

In keeping with measure 1.1.2 – which proposes to clarify that separately collected textile waste ceases to be waste only after undergoing a sorting operation – the development of end-of-waste criteria would define detailed requirements to sort out reusable textile fractions.

In relation to textile recycling, consideration needs to be given to the different waste streams likely to be encountered due to:

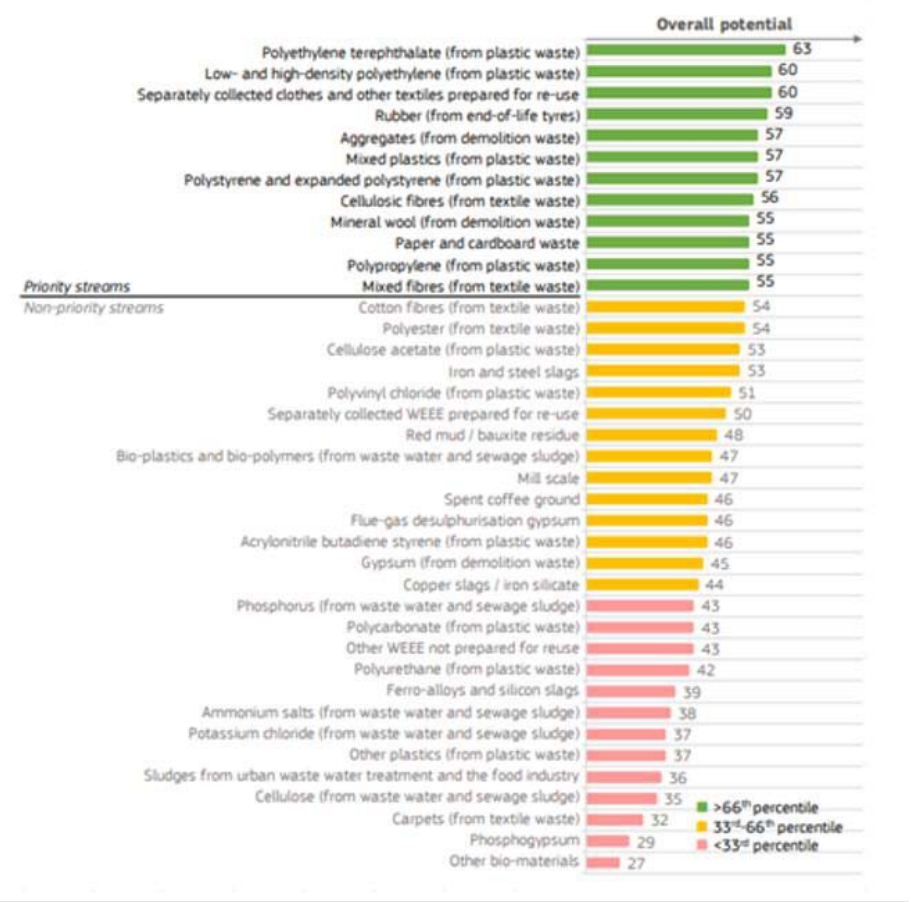
- Post-consumer textile having a large variety of textile types, product types and contaminant types (including the collection of non-textiles in textile collection facilities like shoes, the composition of textile products separately collected that includes buttons, zippers and other contaminants and the possible soiled nature of the textiles collected);
- Pre-consumer waste likely to be better defined in terms of its composition at the point of collection as a result of a better understanding of the waste feedstock, less likely to be contaminated than post-consumer waste and containing less variability in terms of the material types contained therein.

As regards the scope of determining end-of-waste criteria and based on consultation with stakeholders by the JRC an initial scope of end-of-waste criteria could be set for six textile waste streams:

1. separately collected clothes and other textiles prepared for reuse
2. cellulosic fibres (from textile waste)
3. mixed fibres (from textile waste)
4. cotton fibres (from textile waste)
5. polyester fibres (from textile waste)
6. carpets (from textile waste)

The first three streams were identified as priority streams as part of the consultations with four and five falling just below the cut-off line of priority streams. Stream six is at the bottom of the priority ranking but could be included in the scope if enough evidence is provided following the approach outlined above. Additional textile streams could also be included dependent on the acquisition of additional data by the JRC. Overall, this measure would apply to all textiles wastes, including post-industrial, pre-consumer and post-consumer textile wastes.

Figure 17 – Final ranking of the candidate streams for which to develop further EU-wide end-of-waste or by-product criteria based on their overall potential



Source: JRC

This measure builds on measure 2.5 which establishes a sorting obligation for all separately collected textiles and certain minimum requirements for those processes. This measure would entail developing more detailed sorting requirements for specific textile types and subsequent treatment and product requirements that would produce used textiles or recycled textiles for specific applications.

The act will ensure a harmonised application of the non-waste status to textiles that have been subject to specific recovery processes therefore facilitating textile re-use and recycling. This has a particular relevance to the certainty for operators engaged in the cross-border movements of used textiles and textile waste and operating waste management facilities.

The rationale for the inclusion of this measure in Option 2 rather than in the baseline, which currently only reflects the envisaged preparatory work by the JRC, is that developing end-of-waste criteria is a long process and entails uncertainties in terms of scope and adoption process. This is due to the resource intensity (additional human resources would be needed in DG ENV to proceed with this work stream and for the development of other implementing acts for other priority waste streams with regard to which preparatory work by JRC is already underway) and the adoption process. The existing EU end-of-waste decisions exist only for waste fractions where clean and homogenous fractions are ensured through separate collection - glass, metals. Textiles are more complex in composition, and the end-of-waste criteria would thus have to reflect the existing diversity which is a more complex endeavour. The preparatory work for the development of end-

of-waste criteria for textiles is planned to commence in 2023 by the JRC and would follow a detailed stakeholder consultation and data gathering process.

Measure 2.8 – Setting requirements for shipments of textiles

Under this measure, all natural or legal persons acting in their professional capacity transporting textiles for reuse shall be able to demonstrate that the used textiles for shipment are not waste and comply with any applicable criteria to distinguishing waste from non-waste textiles during transport. The holder of the textiles intending to transport or transporting textiles shall have the following obligations:

- They shall make available information to demonstrate the non-waste status of the textiles they transport: a copy of the invoice or contract relating to the sale of the textiles specifying that it is destined and fit for direct reuse; evidence that all textiles have been subject to a sorting operation for reuse or a preparation for reuse operation following the requirements set out in measure 2.5; a declaration of the textile holder or the person arranging the transport that the textiles are not waste.
- They shall ensure appropriate protection against damage during transportation, loading and unloading, in particular, through sufficient packaging and appropriate stacking of the load.
- Labelling of bales of sorted household and post-consumer textiles for reuse in accordance with the requirements set out in measure 2.5.
- Every load of used textiles shall be accompanied by a relevant transport document and a declaration by the liable person on its responsibility.

The measure looks to specifically address the following problem drivers:
- Different scopes and definitions on the definitions of "textile waste" and "used textile",
- Challenging enforcement of waste shipment rules;
- Insufficient funding to scale up separate collection, sorting and recycling;
- Insufficient waste prevention activities and lack of circular business models at scale that extend the lifespan of products;
- Inconsistent separate collection schemes; and
- Insufficient sorting and recycling capacity.

This measure is designed based on existing EU rules and best practice for facilitating enforcement of illegal shipments of waste. The requirements in this measure therefore follow the provisions of the Union legislation currently in place for several other product/waste streams which have raised concerns about the shipment of waste disguised as used non-waste items, namely, electric and electronic equipment (see Annex VI of the Directive 2012/19/EC), batteries (Annex XIV of the upcoming Regulation on batteries for which a political agreement was reached on 9 December 2022) and vehicles (Correspondent's Guidelines No 9 on shipment of waste vehicles under the framework of the WSR).

This measure builds on measure 2.5. which mandates sorting for all separately collected textiles before an end-of-waste status may be applied to used textiles. Therefore, where compliance is ensured with measure 2.5., the requirements in this measure may be readily complied with since the information on the sorting process is available and the bales for transportation are prepared fully or partially by the sorters. It is also the obligation of the sorters under measure 2.5. to ensure that the sorting for reuse is carried out to a level of granularity that allows the selection of fractions fit for reuse in the specific destination markets considering such criteria as the climate, size,

customs etc. to minimise the potential presence of fractions that may not be fit for reuse in those markets. Therefore, the knowledge of the needs of the receiving markets and the fate of the sorted textiles in those markets should be kept up to date by the sorters to comply with the obligations under measure 2.5.

Where textiles are not sorted in accordance with the requirements in measure 2.5., they should be considered as waste and their shipment should follow the requirements of the WSR. The WSR, in particular following the adoption of its recast (COM(2021)709[236]), regulates the shipments of waste and the applicable administrative and authorisation procedures, including an assessment that the countries where waste is shipped is able to manage waste in an environmentally sound way.

The informal reuse market (shipments on a consumer-to-consumer basis (C2C) via C2C platforms) is excluded from this measure.

This measure does not entail any additional obligation on the Member State competent authorities responsible for the supervision and control of shipments of waste under the Waste Shipment Regulation, but the additional requirements on the packaging and evidence base should facilitate those activities. Measures 2.6 and 2.7, and this measure would largely address the scope of the mandate given to the Commission to develop criteria facilitating the distinction of waste from non-waste items with regard to textiles under the WSR (see Article 28(4) of the legislative proposal for a recast of the WSR). In accordance with the WSR (Article 28 of the legislative proposal and the existing Regulation), where there is a disagreement between the competent authorities of shipment and transit countries about the classification of the shipment as to its waste or non-waste status, it should be regarded as waste for the purposes of the application of the WSR. In order to minimise the potential for such disagreements, the WSR proposal indicated that further guidance could be provided through secondary legislation, e.g., by determining contamination thresholds. This proposed WSR mandate is broader in scope as it would potentially also cover for example by-products. Since the WSR mandate is still subject to negotiations between the co-legislators and in view of its still further delayed entry into force, it is proposed to advance the tackling of the specific regulatory barriers related to textile waste management in this initiative clarifying the rules in the primary legislation under the WFD, like it has been done for other lex specialis acts on batteries and electric and electronic equipment which govern the specific treatment requirements for that waste stream.

Measure 2.9 – Mandating the use of extended producer responsibility for textiles

There is a funding gap that needs to be filled to provide the necessary funding to manage used textiles and similar items in strict accordance with the waste hierarchy. In this respect extended producer responsibility (EPR) is based on the polluter-pays principle: producers (who manufacture, distribute or import a product) are responsible for the entire life cycle of this product, from its design to its end of life. They must therefore finance, organise and implement the appropriate collection, reuse or recycling solutions for that product. EPR transfers all or part of the costs of waste management to producers.

[236] EUR-Lex - 52021PC0709 - EN - EUR-Lex (europa.eu)

This measure would require Member States to set up EPR schemes[237] within their territory to ensure the treatment of textiles in line with the waste hierarchy and to ensure producers of textile products–including those selling online– finance and/or organise the collection, sorting, preparation for reuse, recycling, recovery and environmentally sound disposal of textiles as well as contribute significantly to the reduction of textile waste generation. This measure would provide harmonised requirements for the EPR schemes in line with the requirements of Articles 8 and 8a WFD, as adapted to the textiles sector, and therefore address existing and minimise potential for such national schemes to diverge as well as create the conditions for economies of scale.

The measure looks to specifically address the following problem drivers:

- Insufficient funding to scale up separate collection, sorting and recycling;
- Information shortages and funding for research and development;
- Lack of incentives for textile producers to design long lasting, re-usable and recyclable textiles and lack of circular business models at scale that extend the lifespan of products;
- Delays in implementation of the separate collection obligation;
- Different scopes and definitions of definition of "textile";
- Insufficient sorting and recycling capacity;
- Low demand for recycled materials;
- Insufficient waste prevention activities; and
- Insufficient awareness by textile users.

Following the requirements of Articles 8 and 8a WFD, generally the establishment of an EPR has to follow all the requirements for EPRs laid down in those provisions. This measure therefore envisages an EPR that meets the requirements set out in those provisions. Some specific adjustments to those provisions are also proposed to shape an EPR relevant to the textile sector, e.g., the potential for reuse and its positive socio-economic and environmental impacts. The text that follows therefore will determine the substantive elements forming an EPR scheme for textiles: scope, objectives, obliged entities (producers), roles and responsibilities of producers and other stakeholders, organisational features, fee modulation, producer register, transparency, monitoring and enforcement.

(1) Scope of an EPR for textiles

The scope for an EPR should be harmonised to ensure a level playing field for the obliged industry across the EU and provide conditions for economies of scale at regional and Union level for the setting up and operation of the end-of-life management operations. The proposed scope of EPR is broadly aligned with the scope of existing (voluntary or mandatory) or planned separate collection systems for textiles which generally focus only on post-consumer municipal clothing, footwear and textiles. The reason for that is to ensure the capture of textiles that are suitable for reuse or recycling, with the aim of diverting textile waste from disposal and incineration operations. The

[237] EPR has been defined by the OECD as an environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle. EPR is typically understood to involve a shift in responsibility (administratively, financially or physically) from governments or municipalities to producers as well as an encouragement of producers to take environmental considerations into account during the design and manufacture phases of product development. EPR seeks to achieve a reduction in the environmental impact of products, throughout their lifespan, from production through end-of-life.

other textile waste generators are themselves the producers of textiles and therefore already required under EU law to ensure the treatment of this waste in line with the waste hierarchy.

It is proposed to define the **scope of EPR** covering the following **municipal post-consumer textile wastes, representing 87%[238] of textile waste generated:**

a) Clothing, articles of apparel, clothing accessories and household textiles (including clothing, apparel and accesories whose composition is not mostly textile).

Household post-consumer textile waste consists predominantly of clothing and other household textiles.

However, citizens find hard it to differentiate some garments among their main components. Hence, established collection schemes address all kind of clothing, irrespective of their composition.

For this reason, it is proposed to include all kind of clothing and apparel into the EPR scope.

It is estimated that non-textile clothing and apparel represent approximately 0,75% of post-consumer clothing and apparel.

b) clothing and waste from commerce and trade, small businesses, office buildings and institutions (e.g. HORECA, hospitals, schools, prisons, senior residences, etc.) that are similar in nature and composition to household waste, and do not come from production.

The main reason to include these wastes into the scope of EPR is that they are already being collected as municipal wastes in a certain number of Member States, and they follow the same treatment route as household textiles. In fact, according to Eurostat's guidance for compilation and reporting data on municipal waste, these wastes should be reported as municipal waste under WSR[239].

Even when MS do not collect them as municipal waste, after sorting and once the traceability on the initial producer has been lost, it is unlikely that operators of treatment facilities will be able to distinguish them, as they are similar in composition and nature to household wastes.

After use, worn textiles from households as well as post-consumer commercial waste have high reuse potential to extend the lifetime of the textile products (reuse) and can also be subject to recycling. The methods currently applied for the collection of clothing and other household textiles are similar and involve a broad network of container collection points with post-commercial wastes generally collected through waste contractors. Whilst the collection methods vary, the subsequent sorting and treatment are similar requiring a significant amount of effort to sort textiles that are fit for reuse, preparation for reuse and recycling from those to be destined for energy recovery or disposal.

c) footwear

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[238] European Commission, Joint Research Centre. *Techno-scientific assessment of the management options for used and waste textiles*. 2023 (under development)

[239] Eurostat. *Guidance for the compilation and reporting of data on municipal waste according to Commission Implementing Decisions 2019/1004/EC and 2019/1885/EC, and the Joint Questionnaire of Eurostat and OEC* (2021).

Some footwear and accessories contain a relevant share (>80% by weight) of textiles and thus fall in the scope of the Textiles Labelling Regulation.

As for footwear and accessories whose main components are not textiles, it is unlikely that citizens will differentiate the composition when discarding them. In fact, Member States that currently include footwear into the textile fraction that is separately collected, collect all kind of footwear. Changing the current approach would generate confusion upon citizens and municipalities and would hamper the separate collection of footwear.

Discarded footwear represents around 5% of post-consumer textile waste and has been reported to present a high reuse potential.

Consequently, all footwear is proposed for inclusion under the EPR scheme.

It is proposed to **exclude from the EPR scope**:

a) Bulky materials

Bulky materials (e.g., furniture containing a variable share of textiles, including sofas, carpets, mattresses, tents and sails) have a reuse or recovery potential for the different materials it consists of. However, they cannot be managed through similar collection systems and are typically collected kerbside or in civic amenity sites. [240] [241]

For this reason, they will not be covered under the proposed EPR scheme.

Nevertheless, Member States, in accordance with Article 8 WFD, may consider these products for national EPR schemes to facilitate waste prevention and recovery.

b) Textile materials that are not placed on the market as final goods

Textile materials that are not placed on the market by retailers as final goods for citizens and non-textile industries will not be covered by the EPR. This would consist of post-industrial waste (e.g., trimmings) as well as any textile products that do not reach the final consumer (i.e., all pre-consumer textile waste). Such textiles are likely to be of clearer and more consistent composition and subject to lower levels of soiling which are more suitable for recycling and certain fractions also for reuse. It seems more practical and effective to regulate their sustainable management through reporting and mandatory management requirements, such as separate collection.

c) Textile packaging

Directive 94/62/EC on Packaging and Packaging Waste and the proposal for PPW Regulation, have both an all-inclusive approach to packaging definition. Equally, the EPR obligations under this legislation apply without distinction of the packaging material and without exclusion.

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[240] An old mattress? Find a collection point near you. (valumat.be). An old mattress? Find a collection point near you. (valumat.be).

[241] Les joyeux recycleurs, *Recyclage de vos tapis et moquettes, mode d'emploi*, 2018, Recyclage de vos tapis et moquettes, mode d'emploi - Les joyeux recycleursRecyclage de vos tapis et moquettes, mode d'emploi - Les joyeux recycleurs.

Consequently, textile packaging will be excluded from the scope of EPR for textile wastes.

It is proposed to define the textiles placed on the market that will be subject to the EPR scheme by reference to specific CN codes to ensure legal certainty to the obliged industry. The CN codes that reflect the scope described above that reflects the approach in measure 1.1.1.3, are as follows:

Table 12 – CN codes subject to the textiles EPR scheme

CN code	**Description**
4203	Articles of apparel and clothing accessories, of leather or composition leather (excl. footware and headgear and parts thereof, and goods of chapter 95, e.g. shin guards, fencing masks)
61 – all listed codes within the chapter	Articles of apparel and clothing accessories, knitted or crocheted
62 – all listed codes within the chapter	Articles of apparel and clothing accessories, now knitted or crocheted
6301	Blankets and travelling rugs
6302	Bed linen, table linen, toilet linen and kitchen linen
6303	Curtains (including drapes) and interior blinds; curtain or bed valances
6304	Other furnishing articles, excluding those of heading 9404[242]
630710(selected goods)	Dishcloths, dusters and similar cleaning cloths (excluding floorcloths)
6309	Worn clothing and other worn articles
64 – all listed codes within the chapter except 6406 (parts of footwear) and 6403 12 00 – Ski-boots, cross-country ski footwear and snowboard boots	Footwear, gaiters and the like
6504	Hats and other headgear, plaited or made by assembling strips of any material, whether or not lined or trimmed
6505	Hats and other headgear, knitted or crocheted, or made up from lace, felt or other textile fabric, in the piece (but not in strips), whether or not lined or trimmed; hairnets of any material, whether or not lined or trimmed

(2) Producers subject to EPR on textiles

[242] 9404 refers to mattress supports, articles of bedding and similar furnishing (for example mattresses, quilts, eiderdowns, cushions, pouffes and pillows) fitted with springs or stuffed or internally fitted with any material or of cellular rubber or plastics, whether or not covered.

In accordance with Article 8a WFD, it is necessary to define the roles and responsibilities of all stakeholders that are involved in the EPR scheme. The entities that are to be subject to an EPR for textiles are those that **place finished textile products falling in the CN code categories listed above on the EU market**. Several EU acts that establish EPR for products and waste (batteries, electric and electronic equipment, packaging, single use plastic products) are available to be used as a reference in defining the entities that are subject to EPR rules to ensure a harmonised approach across the different EPR systems and facilitate implementation as well as positively impact the compliance costs for the concerned stakeholders.

The notion of a producer should entail any manufacturer, importer or distributor who, irrespective of the selling technique used, including by means of distance contracts as defined in Article 2(7) of Directive 2011/83/EU on consumer rights, supplies finished textile products[243] corresponding to the listed CN code categories for the first time for distribution or use within the territory of a Member State on a professional basis under its own name or trademark. Finished textile products are destined to an end user ('end user' means any natural or legal person residing or established in the Union, to whom a product has been made available as a consumer).

To define the scope of the obligated producers, it is necessary to consider that the textile sector is dominated by small enterprises at the manufacturing and placing on the market stage and social enterprises (also mainly SMEs) currently dominate the collection and reuse markets for used textiles.

Artisanal and small-scale entities

In keeping with the approach of the Textile Labelling Regulation and to avoid placing disproportionate costs on such actors, an exclusion from the producer obligations under EPR is proposed for the same entities that comprise:

- Contracted persons producing textile goods in their own homes;
- Self-employed tailors, making customised textile products.

Micro enterprises and SMEs

In the case of EPR it is considered that compliance costs are likely to be challenging for SMEs to ensure. The EU is both a manufacturer of textiles, wearing apparel and leather as well as an importer of textiles, wearing apparel and leather from other countries. Producers in the context of these two sources of textiles will vary with some being manufacturers who place goods on the market that have been manufactured within the EU and others more likely to be wholesalers or retailers that import goods from third countries that place goods on the EU market for the first time.

The composition of these two groups in terms of enterprise size is similar and is well reflected in the data found in the 2022 review of the European Apparel and Textile Confederation[244] that notes that 99.8% of total companies in the industry are micro and SMEs.

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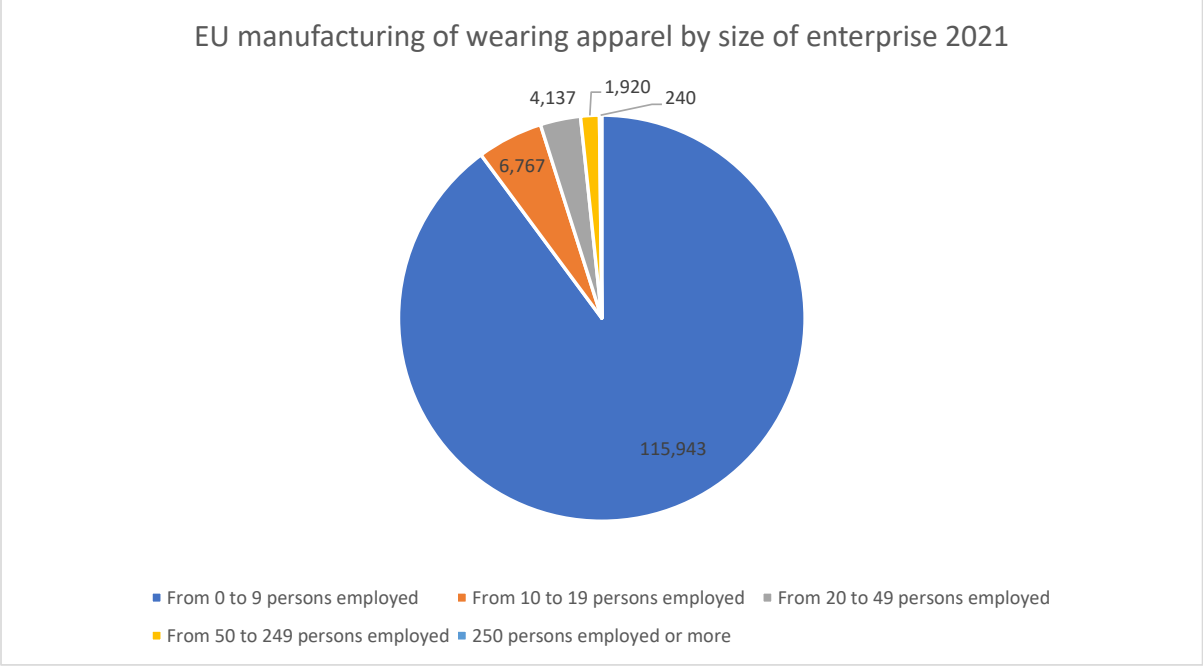
[243] ~~Textiles and other products that contain a >80% textiles, and which during production is given a special shape, surface or design, which determines its function to a greater degree that does its chemical composition, and that have completed the manufacturing process.~~

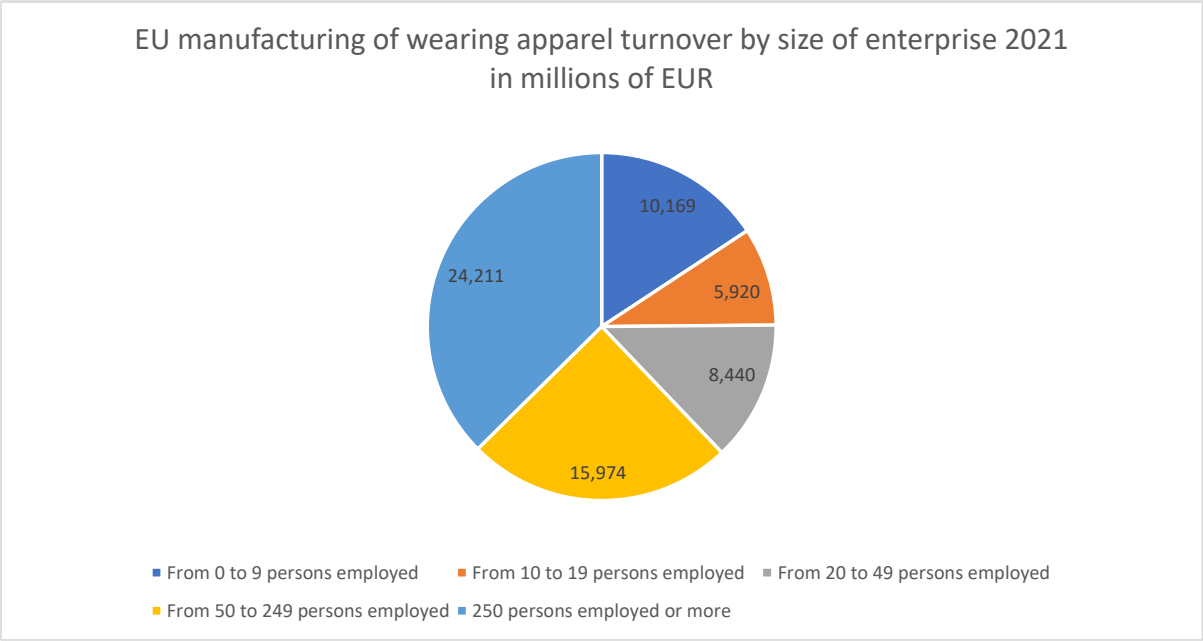
[244] EURATEX, 2022. Facts & key figures of the European textile and clothing industry 2022

In relation to EU textiles, wearing apparel and leather manufacturing, data from Eurostat[245] indicates that out of 226 624 total enterprises, 198 443 (87.6%) are micro-enterprises (0-9 employees), 27 485 (12.1%) are SMEs (10-249 employees)[246] and the remaining 696 (0.3%) employ 250 persons or more. The split of turnover by enterprise size indicates a different split with enterprises in the size 20 employees and up accounting for 80% of industry turnover. Inclusion of the 10–19-person size enterprises raises this value to 88% of industry turnover. Effectively this means that 12% of manufacturers generate 88% of industry turnover.

Figure 18 – EU textiles manufacturers and turnover by size of enterprise

[245] Annual enterprise statistics by size class for special aggregates of activities (NACE Rev. 2) [SBS_SC_SCA_R2__custom_3996079]
[246] 13 758 employee 10-19 persons, 9 106 employ 20-49 persons and 4 621 employ 50-249 persons.





Source: Eurostat, 2022

For the textile and leather wholesale and retail sector this kind of data broken down by size of enterprise is not available. However, information on the nature of the enterprises, numbers and average number of employees is available from Eurostat[247] that shows splits by agents involved in the sale of textiles, clothing, fur, footwear and leather goods, wholesalers, retail sales of textiles in

[247] SBS_NA_DT_R2

specialised stores and retail sale via stalls and markets. In terms of the number of enterprises involved in retail the values from Eurostat for 2020 are as shown below.

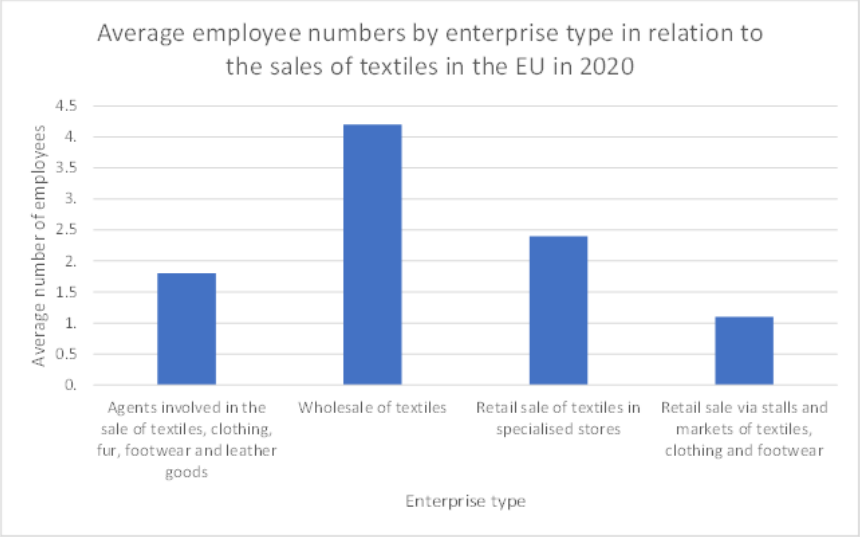
Figure 19 – Enterprises involved in the sale of textiles, clothing, fur, footwear and leather goods

Source: Eurostat 2022[248]

The number of employees per enterprise at the retail level is only provided as an average. However, the values are provided below.

Figure 20 – Average employee numbers by enterprise type in relation to the sales of textiles in the EU in 2020

[248] Enterprise statistics by size class and NACE Rev. 2 [SBS_SC_OVW]



Source: Eurostat 2022

Even without the ability to split enterprises by number of employees it is apparent from the Eurostat Annual detailed enterprise statistics for trade (NACE Rec. 2 G as found in SBS_NA_DT_R2) that the retail sector is dominated by smaller companies with a small number of employees, typically sole trades and stores with 2-3 employees at the store side, with agents similarly small in terms of number of employees and wholesalers generally larger in size.

Given this split, and in order to minimise the burdens placed on smaller producers that contribute a small proportion of textile waste generated, the following options were considered:

i. The exclusion of micro-enterprises;
ii. The inclusion of micro-enterprises and the application of a single low flat fee for the purposes of compliance with the EPR obligations.

In comparison to manufacturers, determining whether exclusions for micro-enterprises or smaller are warranted for sellers of textile goods is more challenging. It is expected that agents (these are wholesalers that operate on a fee or contract basis for textile goods sold) and wholesalers are likely to be those most impacted by EPR obligations as they will generally be selling goods on to independent retail stores and market stalls. Larger household name clothing brands will have a large number of suppliers from around the world and will be placing goods on the market for the first time and therefore would be addressed by EPR obligations. Recognising that EPR obligations would fall on those placing goods on the market a similar exclusion for micro-enterprises is considered unnecessary as they will not be generally impacted by the obligations themselves because they will be selling products that have already been placed on the market by the wholesalers and agents that will be subject to the EPR obligations directly.

Entities placing on the market used textiles

Reuse operators are commercial or non-commercial entities (non-for profit, charity organizations and social enterprises) which following a preparation for reuse operation (e.g., sorting, repair) place used textiles back on the market. This section addresses the pros and cons of including these operators in the notion of a producer in view of their significant contribution to waste prevention.

There are several reasons for including operators placing used textiles on the market within an EPR scheme. Reuse markets are growing 15% per year. Used textiles placed on the market will be discarded again and enter a separate waste collection stream. Therefore, new costs will be incurred for the purpose of managing collection, sorting and subsequent waste management operations. Subsequent reuse for this fraction of already reused textiles and therefore recovery of costs is unlikely.

This may pose a greater cost-coverage issue in countries that are important markets for textile reuse, but where the textiles were not first placed on the market. Were all second-hand sales to be excluded the additional burden on those Member States that have a larger resale sector with textiles collected in other countries and for which no EPR fee had been collected from the producer placing the good on the market for the second time could have an impact on the waste textile management sector in the Member State concerned. Excluding reuse operators from the EPR may have some economic impact on the EPR and the level playing field for the producers across the Member States. Using Comext data[249] in relation to movements of worn clothing within the EU in 2021 the following countries are top net importers of worn clothing within the EU (i.e. they import more from other Member States than they export): NL, PL, LT, RO, BG, HU, BE, SK. This data indicates the flow but not the ultimate use or management of textiles but is still indicative. This aspect has been addressed in the EPR planned in Bulgaria which considers the inclusion of the second-hand sales in the EPR to ensure that the costs of managing second-hand clothes at the end of their life is addressed in the fees payable.

However, including reuse operators within an EPR could also have negative impacts on textile reuse. While including reuse operators as producers would be beneficial in terms of financing the management of waste textiles, the impact on both commercial and social enterprises is likely to be highly negative. Also, existing EPR schemes exclude operators placing used textiles on the market from the EPR fees. For example, charities might be subject to EPR fees for the textile products they normally donate for free, severely impacting their business model. According to Cross Border Commerce [250] in 2019 traditional thrift and donation shops comprised textile sales of approximately €9.3 billion whilst commercial resale comprised sales of €3 billion. This compares to the primary textile producer market of €162 billion in the same year [251]. This means that reused textiles represent approximately 7.6% of the total textiles market. However, there is expected to be significant growth in the reuse market in the years to come with a doubling of market share in the next five years [252] driven heavily in the commercial resale sector rather than the social-enterprise resale sector. In view of the exceedingly low prices offered by reuse operators, the actors engaged in the reuse operations consider that the EPR charge may affect their business model and the reuse market growth.

In light of the above considerations, that exclusion of both commercial and social enterprises placing reused textiles on the market should be pursued. In view of the currently small scale of reuse, albeit growing, this is unlikely to place significant additional burdens on the primary

[249] EU trade since 1988 by HS2-4-6 and CN8 (DS-045409) – 6309 00 00 worn clothing and other worn articles
[250] Cross Border Commerce 2021. The rise of the resale second-hand market in fashion
[251] European Commission https://single-market-economy.ec.europa.eu/sectors/fashion/textiles-and-clothing-industries/textiles-and-clothing-eu_en
[252] https://www.cbcommerce.eu/press-releases/the-rise-of-the-resale-second-hand-market/

producers in terms of their covering the entire lifetime costs of the goods that they place on the market. In fact, part of the costs of managing end of life costs would already be covered by the fees upon the first placing on the market. And additional costs linked to separate collection and sorting should be factored in the EPR during the first placing on the market as a contribution of the producers towards reuse. This approach would be most consistent with the objective to prioritise reuse of textiles.

In relation to the situations where the reuse markets differ from the market where the textiles were first placed on the market and EPR due, specific measures may prove to be necessary if the reuse markets become disproportionate compared to the EU averages and the share of textiles placed on the market. Setting appropriate monitoring requirements in the EPR to determine the contribution of reused textiles to waste generated in the future will be an important source of data to assist in informing such an EU wide future policy decision. Given the potential time-lag in data to inform such a decision there should be an option for Member States receiving used textiles from other countries to choose to include commercial (for profit) resale operators should they consider such inclusion warranted.

(3) Objectives of the EPR scheme

The objectives of the EPR scheme should follow the waste hierarchy and prioritise waste prevention, i.e. reuse and preparation for reuse, followed by recycling. Only where textiles are not possible to recycle, other recovery options should be considered or disposal. These objectives, in view of Article 8a(1) WFD, should be defined in the form of quantitative and qualitative objectives as well as operational obligations in view of those objectives.

With regard to quantitative targets, these are considered specifically under Option 3. In the absence of EU targets, it would be important to achieve a high level of consistency in respect to targets that Member States may choose to set themselves to reduce the potential for distortion of competition and fragmentation in the obligations that increase compliance costs for the economic operators.

Qualitative objectives of the EPR should be aligned with the operational obligations defined in the section below. The primary objective of the EPR scheme should be to reduce the generation of textile waste and where textile waste is generated to reduce the amount destined to incineration or disposal. With regard to reuse, the objectives of the EPR scheme should be to prioritise reuse in the Union and for recycling to prioritise textile to textile recycling.

(4) Financial and organisational obligations of producers

The operational obligations of the EPR schemes and the producers and other relevant stakeholders are described below in the following order: prevention, separate collection, sorting, recycling, reporting and other financial and organisational obligations. This section describes the financial obligations of the producers as well as in certain cases the operational obligations.

Waste prevention

The primary objective of the EPR scheme is to ensure that all textiles within the scope of the EPR are reused where this is possible. Several operational obligations are envisaged to achieve this.

The producers are required to finance separate collection of textiles subject to EPR for the purpose of separating the reusable textiles and ensure that they are made available on the reuse markets, prioritising and maximising the share destined for local and EU market. This entails carrying out

separate collection, sorting as well as other preparation for reuse operations like repair and awareness raising.

The separate collection and awareness raising obligations are described below.

The producer responsibility organisations would have to use a variety of approaches to grow the reuse markets. Practices like increasing the number and accessibility of shops selling used textiles and carrying out washing and other repair actions to improve the saleability of items have been identified to increase the sales of used textiles in the EU from high performing reuse operators.

Separate collection

The producers are required to finance and/or organise the separate collection of textiles within the scope of EPR for the purpose of reuse and recycling. This entails providing for the infrastructure for the collection of waste (bins, containers) as well as the maintenance of that infrastructure that ensures that textiles are kept safe from external elements that undermine the quality of textiles. This also entails the services for unloading the bins, removing visible contaminants at the collection point until unloading for subsequent sorting, transportation to and storage prior to subsequent sorting operations.

Article 8a(3)(a) and (b) WFD require collection networks to have an appropriate availability of waste collection systems across the entire territory of the Member State concerned. An EPR obligation for textiles should carry the same obligations. The measure requires producers to set up separate collection systems for all of the volume of textiles placed on the market covered by the scope of EPR that are estimated to be discarded by household, commerce and institutions, regardless of their nature, brand or origin in the territory of a Member State where they make textile available on the market for the first time. Since all textiles covered by the EPR would at some point be discarded, the separate collection network should be broad enough and convenient enough for the consumers to be able to capture all textiles placed on the market and discarded and avoid them being discarded as mixed municipal waste. The collection network should enable the end-users to discard textiles at an easily accessible point in their vicinity taking into account population size, expected volume of textiles. It should not be limited to areas where the collection and subsequent management of textiles waste is profitable. The disposal of textiles in the separate collection network should not involve any costs to the end-users when discarding. Considering the different starting points among the Member States in terms of the separate collection point density (ranging from 10% to 65% across the EU with the average of 38%), this measure would entail different implications for the producers financially. It is only the textile waste generated by post-consumer households that should be covered by wide-spread and accessible separate collection systems.

As reflected in this assessment, separate collection systems vary across the EU as well as the types of actors engaged in this process. In view of the subsidiarity principle, this measure does not prescribe a single separate collection model to allow for local circumstances to be respected. Also, in view of the subsidiarity principle and the agreed principles under other EU EPR schemes, Member States should be allowed to determine the scope of the organisational responsibility of producers in terms of the waste collection. This means that the Member States may decide the scope of the organisational obligations of producers for the setting up of the separate collection, in particular, where those activities are already in the competence of local authorities or other actors. However, considering the currently prominent role of the non-for-profit sector actors in the textile collection and reuse and their contribution to the social economy, the setting up of EPR schemes

should envisage that their activities and contribution to the sustainable textiles management is preserved and encouraged. Therefore, the EPR system shall be obliged to ensure the participation in the separate collection of other interested actors without discrimination, inter alia, in terms of the geographical or material basis.

The producers therefore would be required to finance and/or operationally establish or enlarge textile separate collection points across the territory of the Member States where textile waste is generated. They should also be obliged to do that in cooperation with the following actors (already operating in the market or new actors):

- social enterprises;
- public authorities or third parties carrying out waste management on their behalf, commercial collectors;
- textile distributors, retailers;
- other voluntary collection points hosted by private or public entities (e.g. schools).

In relation to the above participating actors, except for social enterprises and commercial waste collectors, the producers are required to provide, upon request, for the bins/containers and/or service their emptying and waste collection. In keeping with existing collection systems, social enterprises should be allowed to operate their own collection points as part of the separate collection network that the Member States should ensure. To avoid their networks being undermined due to the availability of other collection points, Member States should ensure that they are given equal or preferential treatment in the location of the collection points (e.g. in the context of authorisation of by local authorities). This is to address a concern raised by the social enterprises and other stakeholders (NGOs, non-commercial waste managers) as already recognised in the EU Textiles Strategy and also addressed in some national legislation regulating textile management which specifically carve out a role for social and non-profit entities engaged in collection and sorting for re-use activities.

In relation to textile distributors and retailers, it is reported that there are retailers that offer to take used textiles from consumers and that generally the subsequent sorting of the collected waste is outsourced to professional sorting facilities. Several stakeholders have pointed out that such practices have also been accompanied with incentives to participating consumers in the form of vouchers for the purchase of new textile products at the retailer. They argue that such incentive mechanisms run counter to the objectives to minimise waste generation. While incentives to consumers to take part in separate collection are considered to be positive and are recommended by several Commission policy instruments, it is proposed in this measure to not support such practices in the scope of the EPR schemes as going against the primary objective of waste policy – prevention – as far as they facilitate the consumption of textiles.

With regard to specific requirements on the separate collection infrastructure and operations, this measure should entail the requirements set out in measure 2.5. In brief, those requirements look to preserve the reusability and recyclability of textiles in terms of avoiding contamination.

In order to verify and improve the effectiveness of the collection network and the information campaigns (addressed below), regular compositional surveys at least at NUTS 2 level[253] should be carried out on mixed municipal waste to determine the amount of waste textiles still collected as residual mixed waste. The cost of these analysis is to be covered by the producers. These surveys may be carried out in the framework of regular compositional analysis being carried out by the competent authorities or economic operators for the purposes of national statistical and waste data collection and verification policies.

Treatment of textiles

In line with the principles of the EPR, producers would be obliged to finance and/or organise the subsequent treatment of collected textiles in line with the waste hierarchy. This measure specifies obligations of producers and other actors of the sector in relation to sorting for reuse and recycling, preparation for reuse and recycling and other treatment.

Sorting is a key stage in determining whether textiles will be treated according to the waste hierarchy. Producers are required to finance the sorting of all collected textiles following the requirements set out in measure 2.5, namely, manual sorting of every collected textile item within the scope of the EPR to produce a fraction that is destined for reuse and a fraction that is destined for further preparation for reuse operations, such as cleaning and repair. A secondary objective of the sorting process, for the fraction that is not possible to reuse, is to produce a fraction that is to be destined for recycling. The sorting process shall also separate fraction that is to be recovered in other ways that recycling or disposed of.

The producers are required to finance the sorting of all textiles that are separately collected through its network or in cooperation with other entities as specified above, including the social enterprises. While social enterprises collecting textiles through their collection network would likely carry out certain sorting operations themselves, the producers should be obliged to accept outputs of sorting from social enterprises for subsequent sorting, in particular, in view of recycling or other treatment.

The producers are required to finance preparation for reuse operations other than sorting, such as repair and washing, for the fraction of collected textiles that they collect to increase the sale of used textiles in the Union and global markets. The fraction that is feasible for reuse following preparation for reuse activities other than sorting should be identified as part of the collection operations. The output of such operations is sold in the Union and global used textile markets for re-use.

The producers are required to finance recycling and all preliminary treatment operations in view of recycling (e.g. processing removing buttons, zippers) of collected textiles, including those collected through the networks of social enterprises. The output of the recycling operations are sold in the secondary raw material markets for uptake in new textiles or other applications.

The producers are required to finance all other treatment operations for the fraction that is collected and not removed for reuse and recycling, such as other recovery operations (incineration with

[253] Regulation (EC) No 1059/2003 of the European Parliament and of the Council of 26 May 2003 on the establishment of a common classification of territorial units for statistics (NUTS)(OJ L 154 21.6.2003, p. 1).

energy recovery) and disposal. The producers shall also cover the costs of treatment for textiles collected through the networks of social enterprises.

In accordance with Article 8a WFD, the funds required for these activities will need to consider the revenues generated by reuse and from sales of secondary raw materials from textile and therefore would overall reduce the costs of the operation of the EPR scheme and the fees due by producers.

Information to end-users

Article 8a(2) requires Member States to take the necessary measures to ensure that the waste holders targeted by the extended producer responsibility are informed about waste prevention measures, centres for reuse and preparing for reuse, take- back and collection systems, and the prevention of littering.

Producers shall finance and organise regular awareness campaigns to consumers on the environmental, social and economic impacts of textile consumption patterns (i.e. on the impacts of fast fashion) and promoting separate collection of textiles and their reuse. Producers shall also finance the campaigns organised by local authorities where they are responsible operationally for the separate collection. They shall also finance and/or organise the information to consumers about waste prevention measures consumers can take, collection points and centres for preparation for reuse, including those not operated by the PROs, centres selling used textiles.

Research and development

In view of the objective to prioritise recycling over energy recovery or disposal, producers shall support research and development of automated sorting, pre-processing and recycling technologies, notably to enable fibre-to-fibre recycling and recycling of all textile materials including synthetic fibres and blends of materials. As the recycling technologies develop, the feedstock specification requirements will also evolve, which will require continuous development of automated sorting technologies (e.g. detection of construction of materials (weave or knit), solutions for pre-processing (shredding, removing buttons, zippers, non-textile contaminants, etc.), advanced colour sorting options, solutions for deconstructing/processing of multilayer materials). These solutions should be explored in cooperation with umbrella organisations representing and bringing together producers, recyclers and other actors of the textile value chain. This shall be financed from the fees collected from the producers. Similar requirement is included in the French EPR.

Reporting

Article 8a(1)(c) requires Member States to have in place a system of reporting to gather data on the products placed on the market of the Member State by the producers of products subject to extended producer responsibility and data on the collection and treatment of waste resulting from those products specifying, where appropriate, the waste material flows, as well as the attainment of EPR objectives.

As described under Measure 2.12, there are a number of reporting mechanisms that are already in existence that would address such monitoring and reporting as well as several others proposed to address existing data gaps. The collection of data for most of the aspects will fall on the PROs to increase understanding of material flows and provide the necessary harmonised data to monitor the objectives of the EPR scheme, e.g. textiles quantities placed on the market, collected and

subject to final treatment, including the quantities sent to the various treatment types and their final destinations (country of destination in the case of exports) and relevant actors involved in line with the principles of other EPR schemes established under EU law. In order to minimise the impact on the industry which is largely made up of SMEs, the reporting requirements should be harmonised across the EU and with regard to the reporting by industry to the PRO should concern limited amount of categories for reporting as well as reporting frequencies.

Commencement of the EPR obligations

Given that the proposed EPR measure would take time to be agreed through the ordinary legislative procedure that would be estimated to be completed by mid-2024 there will be a significant quantity of textile products that have been placed on the market and purchased by consumers that will need to be managed. As EPR funding is based on the fees generated by products placed on the market once the EPR obligations are established no fees will have been collected for this historical group of textiles already on the market. Given the average lifespan of clothes of 5.4 years][254] and the approximately 5 million tonnes of textiles concerned being discarded per year, approximately 25 million tonnes of non-EPR fee related textiles will be required to be managed by textile waste infrastructure.

With an assumed adoption of a revised Directive in mid-2024, producers would be considered to have been informed of their obligations at that time. Member States would have a further maximum two years for transposition of the revised legislation into national law and to two additional years to put in place their national EPR schemes – mid 2028.

There is no immediate remedy to this challenge. It is apparent that Member States will develop their textiles management infrastructure in the years to come driven in part by the obligations of Article 11(1) WFD. However, there will still be a need for Member States to make transitional arrangements to contribute to the costs of collection that should take into account the gradual increase in collection rates anticipated as well as the benefits from the resale of collected historical waste. As 2024 is the date from which what is being placed on the market should be subject to EPR with an expected average lifetime of 5.4 years of those textiles, and since it will take several years to put in place the necessary textile management infrastructure the costs of collection of post 2024 textiles placed on the market should be addressed by the EPR fees collected at the latest as of 2028. It is expected that the cost of the EPR scheme in its first years will be high to establish the infrastructure for collection, sorting and treatment, even if the waste resulting from the post 2024 placed on the market textiles is not immediately generated. Therefore, EPR schemes would likely capture historical waste to recover those investments early and at scale.

(5) Organisational rules, monitoring and enforcement

Article 8a(5) WFD requires Member States to establish an adequate monitoring and enforcement framework with a view to ensuring that producers of products and organisations implementing extended producer responsibility obligations on their behalf implement their extended producer responsibility obligations, including in the case of distance sales, that the financial means are

[254] Oslo Metropolitan University and Norwegian National Institute for Consumer Research, 2015. Age and active life of clothing.

properly used and that all actors involved in the implementation of the extended producer responsibility schemes report reliable data.

This section describes the measures that facilitate monitoring, compliance and enforcement of EPR rules. In view of minimising the compliance costs for the involved public and private entities, existing practices in Member States and mandated under EU law are used as a basis.

Producer Register

In order to ensure appropriate monitoring and compliance with the obligations of producers, a producer register is proposed to be established by each Member State. The producer register would generate an EPR registration number(s) demonstrating proof of compliance with EPR requirements. This register shall also include information of the PRO membership and shall allow PROs to register producers on their behalf as a means to reduce the administrative and cost impact on the obliged producers. A register is proposed in line with the enforcement policies for other EPR schemes required under EU law (under Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators (as well as the recently agreed Batteries Regulation that replaces the Directive), Directive 2012/19/EU on waste electrical and electronic equipment (WEEE) and Directive 94/62/EC on packaging and packaging waste (as well as the recently proposed Packaging and Packaging waste Regulation that would replace the Directive). As such, integration of the textile producer register in the existing producer register systems offer opportunities for synergies and cost reduction for the administrations sand this option has been used by several Member States in the context of implementing other EPR schemes.

Registrations exist or will exist in the case of Member States that have already implemented EPR for textiles. However, as noted at the start of this measure, only two Member States have an EPR in place – France and the Netherlands. The majority of Member States will, therefore, require setting up a register of producers. In order to minimise the compliance costs for the obliged producers, it is proposed that the information to be submitted in the register is harmonised and therefore the information it should contain should be clearly defined in the WFD and clear to the industry from the outset.

In keeping with existing EPR obligations under the EU law on electric and electronic equipment, batteries and packaging and single use plastic products Member States would be able to decide whether the register of producers is publicly accessible or not. As described in a later section below on enforcement, certain actors engaged in the enforcement activities will require access to the register data.

The operation of a Register would have a number of benefits in terms of enforcement needs. An obligation to be part of a register that can be searched by consumers and other businesses means that finding whether a producer is registered would enable more informed consumer choices to be made, as well as allowing a swifter identification of potential producers that have failed to meet their obligations where they are not found on the register. For smaller independent clothes retailers and market stall operators that will generally deal with Agents and Wholesalers (who will be considered as producers under EPR) an online register would allow such retailers to be able to confirm that their supplier is EPR compliant.

Producer responsibility organisations

Extended producer responsibility carries two main approaches for producers in terms of compliance. Under WFD, it is upon Member States to decide whether the producers should be able to fulfil their EPR obligations individually or collectively, i.e., where a producer responsibility organisation fulfils the EPR obligations on behalf of its member producers. Producers may fulfil EPR requirements individually, ensuring compliance at the individual producer level. This is generally more applicable to larger producers that have the capacity to meet all EPR requirement in-house and is normally applied in the minority of cases. To date the majority of producers under EPR schemes cooperate with Producer Responsibility Organizations that provide full management of post-consumer waste collection and subsequent treatment and ensure the producer's compliance with the EPR obligations concerned.

As noted in the problem definition, one of the challenges of EPR is in relation to ensuring compliance. The larger the number of producers concerned, the greater the challenge in ensuring compliance on behalf of the competent authority and the greater the likelihood of non-compliance existing. The use of PROs reduces this risk somewhat by placing the compliance obligation on the PROs themselves requiring competent authorities to ensure compliance with a smaller number of legal entities overall and reducing regulatory compliance burden accordingly.

A PRO approach is proposed because of its inherent nature of providing cost saving opportunities to the producers in terms of administrative obligations and well as the operational obligations with gains from economies of scale.

In the context of textiles with such a broad range of possible producers and the majority being SMEs it is appropriate to make membership of a PRO mandatory. This will greatly facilitate the compliance verification for the enforcement authorities, compliance costs for the industry and generally lead to greater efficiencies in application and scale in managing textile waste feedstocks to enable investments in sorting, reuse and recycling. In fact, this would be hampered if actors are provided with the opportunity to operate outside of a PRO. The main impact of making membership of a PRO mandatory would be in relation to larger producers that may otherwise have chosen to meet their EPR obligations individually. Whilst a PRO operates on a contractual basis with producers to manage EPR fees, to engage with obliged companies and issue contracts with waste management operators and municipalities there will be an overhead cost related to the operation of the PRO itself that must be covered by fees from producers. Whilst this fee is likely to be small, addressing administrative costs such as PRO salaries, overhead costs (rent and utilities) and information technology and system costs to operate the EPR, in the case of larger producers this fee may represent an additional cost in comparison to meeting their obligations individually.

Fee modulation

In accordance with Article 8a(4) of the WFD, EPR schemes must implement a fee modulation requirement for the fees that are due by producers to cover the costs of the EPR scheme. The purpose of the fee modulation is to ensure that the fees of each producer reflect the true cost of managing their products as well as to encourage a design of products that further the compliance with the waste hierarchy. Therefore, this measure is to determine the criteria for the fee modulation for textiles.

A harmonised EU-wide approach to eco-modulation would be most effective and as such is called for strongly by all stakeholder groups. Since the proposal for the Ecodesign for Sustainable Products Regulation (ESPR) contains textiles in its scope and they are considered as a priority

group of products for the development of the delegated acts defining product sustainability criteria and the measurement methods (the EU strategy for sustainable and circular textiles provide an indicative date of 2024), it is proposed that the fee modulation under EPR is strictly aligned with those eco design requirements and related performance measurement rules. ESPR ecodesign requirements are going to be minimum requirements to secure that the least performing textiles are not allowed on the market or information requirements that may be based on classes of performance, taking into account a variety of parameters relevant for the assessment of the sustainability of textiles, including at the end-of-life stage.

Mandatory criteria under ESPR should form the minimum criteria and measurement tools, whereas EPR modulated fees can provide significant incentives for businesses to go further and deliver more ambitious results based on the same parameters. By aligning eco-modulation with the umbrella legislation under the ESPR, EPR policies can deliver the strongest possible push on ecodesign, reinforcing the existing and future framework instead of adding new eco-design principles. Where such criteria and measurement methods are not defined in the framework of the ESPR, the EPR schemes should apply a simple fee modulation based on the weight and the costs incurred in the waste management.

The number of criteria applied for the fee modulation also has an impact on the costs of administration both for producers and for the PRO. In view of the composition of producers in this sector, attention should be paid to limit those impacts while ensuring that the fee modulation targets the key criteria that can improve the management of textiles, prioritising reuse and recycling. Therefore, it is proposed that the fee modulation criteria should focus on durability, recyclability and recycled content. These are also key sustainability factors envisaged in Annex I of the ESPR for the development of the delegated acts on eco design for sustainable textiles. These are also factors part of the existing EPR in France. Since certain criteria may pursue different objectives, the eco design criteria will need to weigh their relevance, for example, durability and repair requirements compared to recyclability requirements. Therefore, the criteria may require differentiated application per different product types. As a principle the fees shall be based on the weight of the products placed on the market, modulated by a value reflecting the criteria.

This approach reflects the positions of the industry and other stakeholders calling for high level of harmonisation in the fee modulation criteria and the measurement methods underpinning their application. Therefore, this measure envisages that the fee modulation should be applied across the EU following the development of the ESPR delegated act defining the ecodesign requirements for textiles and be based on the measurement methods envisaged therein. This measure also envisages the possibility for the Commission to adopt implementing act to provide for further harmonisation rules on the fee modulation application in view of the development of the rules under EPSR, for example to address textile products that are outside the scope of ESPR but subject to an EPR. This is deemed necessary to further minimise the costs of compliance by the obliged industry, in particular, for those that operate across several Member States. The WFD already includes a mandate to the Commission for an implementing act to develop such harmonised criteria (Article 8(5) of the WFD).

In the case of footwear, that is different in nature to the other clothing and apparel that would be addressed by this measure, fee modulation would be based on the weight of the good only.

Enforcement

The nature of monitoring and enforcement is somewhat dependent on the number of registered entities involved in EPR at the national level. As noted above in relation to Producer Responsibility Organisations, it is proposed that membership of a PRO should be obligatory and this measure also proposes a reduction of scope for the obliged industry to alleviate the impact on the SMEs. Were this to be the case the monitoring and enforcement would be more limited for the relevant PRO than would be the case of numerous actors participating independently to an EPR scheme. This would also alleviate the identification of free riders since the proof of compliance would be verifiable through producer and PRO registration that can be cross-referenced with the registers on economic activities.

A key enforcement challenge is linked to the enforcement of EPR obligations in relation to products sold online, a market that has shown extremely steep growth in the textile sector. Regulation (EU) 2022/2065 of the European Parliament and of the Council lays down rules on the traceability of traders (DSR), which more specifically contain obligations for providers of online platforms allowing consumers to conclude distance contracts with producers offering products to consumers located in the Union. The DSR aims to address the online sector in relation to compliance with the product and other rules, including environmental rules such as EPR. Its Article 30 addresses conformity of online sales with relevant EU law placing obligations on the online platforms the verify that the traders that aim to sell products using that platform are registered in trade registers and have declared compliance with the applicable rules of Union law. In order to prevent free riding from the extended producer responsibility obligations, it should be specified how such providers of online platforms should fulfil those obligations with regard to textiles and the measures envisaged under the EPR in this measure.

In the case of EPR rules being set at EU level, these provisions in the DSR are to be applied in a way that include the verification of EPR rule compliance. In that context, providers of online platforms, falling within the scope of Section 4 of Chapter 3 of Regulation (EU) 2022/2065, allowing consumers to conclude distance contracts with producers, should obtain from those producers information about their compliance with the extended producer responsibility rules set out in this Regulation. This means that the online marketplace would be verifying the presence of a trader in the textile producer register that is also envisaged in this measure. And they would be required to ask for a self-declaration of the trader that they comply with the EPR requirements in the country where they sell their products to the end users. The rules on traceability of traders selling textiles online should be subject to the enforcement rules set out in Regulation (EU) 2022/2065. This measure would entail that the textile producer register to be established as part of the EPR scheme should be accessible to the online platforms to enable them to comply with their obligations under the DSR as read in conjunction with the obligations under the EPR (this requirement does not limit the Member State competences in the organisation of the registers).

This follows the approach taken in all legislative initiatives following the adoption of the DSR, namely, the new Batteries and Batteries waste Regulation that was subject to a political agreement in December 2022 and the Commission proposal for the Regulation on packaging and packaging waste. Both the DSR as well as the sectoral environmental legislation referred to above respond to the long-standing concerns expressed both by the Member State competent authorities as well as the PROs and industry representatives calling for legislative tools at EU level to allow effective enforcement and ensuing level playing field among the producers.

Measure 2.14 – Setting reporting obligations for textiles

This measure would entail, first, a clarification of the scope of the existing reporting requirements in relation to textile waste management to close the regulatory gaps that undermine attaining sound and consistent EU level data and, second, new data collection requirements to complete the knowledge base at national and EU level. This would enable proper monitoring of the textile end-of-life stage and its adherence to the waste hierarchy, including compliance with the regulatory framework as well as setting the knowledge base to enable further performance target setting to reinforce the waste hierarchy. Focus is on reusing existing datasets where they meet data needs, adjusting existing reporting requirements to ensure that they are fit for purpose and only adding reporting requirements where a data gap has been identified. Reporting obligations vary depending on the type of measure implemented, as detailed in the previous sections on reporting requirements for each of the measures.

This measure takes up the proposed changes to definitions as envisaged in measure 1.1.1.3 and 1.1.2.1 but in a regulatory form of amending the scope of the reporting obligations under the WFD and the implementing acts setting out reporting formats.

It looks to specifically address the following problem drivers:

- Information shortages;
- Delays in implementation of the separate collection obligation; and
- Different scopes and definitions of "textile waste" of separate collection activities.

This measure would entail an amendment to the WFD clarifying the scope of the reporting obligations to cover **all textiles under the scope of EPR schemes (measure 2.9)** and introduce mandatory reporting for collection and the different treatment operations. The following obligations on different actors are involved:

- The European Commission would be required to revise existing and set new reporting formats specifying the obligations for Member States and the reporting criteria/ platform to be applied; and to verify the data sets and make available to the public as Union statistics.
- Member State competent authorities will be required to collect the new data, verify and to report to the European Commission.
- The pertinent actors under measure 2.9, i.e. textile producers, waste generators other than households (institutions and commerce) and producer responsibility organisations, will be required to collect and report data on textiles placed on the market and waste generated.
- Textile waste operators will be required to collect and report data the on waste fraction that is collected, prepared for reuse, recycled, recovered with energy, otherwise recovered and disposed of.

Changes to the obligations under the WFD would entail the following:

(a) adaptation of the existing reporting requirements on textiles for municipal waste to the categories of textiles clarified under the CN codes referred to in measure 1.1.1.3

The WFD would need to be amended to clarify the scope of the reporting obligations under Article 37 of the WFD in terms of the textile waste and the types of waste management operations to be covered by the obligation. Subsequent adjustments would be required to Implementing Decision

(EU) 2019/1004/EU and the accompanying Eurostat guidance[255] both in terms of the scope of the data reported and the voluntary nature of some of the reporting requirements.

The Implementing Decision currently refers to the EWC and three main entries in relation to municipal textiles - 20 01 10 clothes, 20 01 11 textiles and 15 01 09 textile packaging. In terms of the data that would be preferred to be reported, the reference should be moved to EWC that cover textile wastes under the scope of EPR (defined by the pertinent CN-codes in measure 1.1.1.3.). Consequently, the reference should be changed to 20 01 10 and 20 01 11 only, with textile packaging removed. The provisions requiring reporting of tonnes subject to separate collection and preparation for reuse should be changed from 'voluntary' to 'mandatory'.

Adjustments would be required in relation to Implementing Decision (EU) 2021/19 to specify these changes.

(b) Collection of data from producers of textile goods placed on the market

Under measure 2.9 concerning EPR, producers would be obliged to provide information on the volume of goods placed on the market to the PRO as this would determine the scope of the operational obligations and financial needs of the PRO and the fees to be paid by the producer to the PRO. This would be an annual submission and is expected to result in little additional administrative burden as the volumes of production are already likely to be collected by producers already under normal business operating practices. The reporting frequency to the PRO is proposed to be harmonised and reduced to minimum, i.e. annual, to reduce the administrative impacts for the producers. A PRO would be required to report this data to the competent authorities for the purposes of monitoring compliance with the EPR obligations. This obligation would be specified in the WFD provisions linked to producer and PRO obligations under EPR nationally.

It is possible to extract data on the volume of textiles placed on the market from the Eurostat PRODCOM and COMEXT data source. Although these data do not meet the precision and granularity required to determine the financial contributions of producers (see *Table 13*), they could be used at EU level for the purposes of monitoring and verification of data. The JRC already has a suitable tool and set of instructions that can be populated with extracted data to determine the relevant product volumes as well as to examine trends over time. For data of products placed on the market, focus will be given to the methodology used in the JRC's "Circular Economy Perspectives in the EU Textile sector", which identified the volumes placed on the market using PRODCOM data supplemented by Comext data. Given the existence of such a tool, it is envisaged that a small number of changes would be required to assist in further automating the extraction and calculation tool itself, amount to potentially two months development time.

Feasibility of reporting data under Regulation (EC) No 2150/2022 on waste statistics

In terms of waste generation, under Regulation (EC) No 2150/2002 data are provided granulated by waste categories and the source of waste generation; i.e., for every covered economic activity, statistics on every waste category are compiled.

[255] Eurostat, 2021. Guidance for the compilation and reporting of data on municipal waste according to Commission Implementing Decisions 2019/1004/EC and 2019/1885/EC, and the Joint Questionnaire of Eurostat and OECD https://ec.europa.eu/eurostat/documents/342366/351811/Guidance+on+municipal+waste+data+collection/

Municipal waste is tagged as a specific aggregate which enables to differentiate it from other sources of waste generation.

However, regarding waste categories, Regulation (EC) No 2150/2002 defines textiles wastes under the 07.6. category encompassing three headings:

- 07.61 Worn clothing
- 07.62 Miscellaneous textile wastes.
- 07.63 Leather wastes

This waste category may include non-textile wastes that are not covered by the established scope for EPR, such as leather waste other than clothing and apparel, which prevents the use of Regulation (EC) No 2150/2002 for reporting on the required data of generation of textile wastes.

Data on recovery and disposal of textile wastes are affected by the same limitation at the identification of textile wastes. Moreover, reporting is due by final waste treatment operation and does not cover intermediate treatment operations (such as collection and sorting) and, as it lays on the treatment operation codes defined in WFD, it does not enable to distinguish between preparation for reuse and recycling (both operations under the same R3 code). Reporting under this Regulation is also restricted to the country of final treatment and not traceable to the country of waste generated.

As such, the use of the "env_wasgen" statistics does not provide the knowledge base to monitor with precision the generation of municipal textile waste in terms and the adherence to the waste hierarchy.

It does not allow for the determination of the exact textile waste generation data, because the reporting is not exclusive on textiles. It does not allow to trace and link the treatment performance for textile waste to the waste generated because the reporting is due by final waste treatment operation.

Therefore, if further waste treatment performance targets were to be set in the future (as considered under Option 3), the statistics generated as a result of Regulation (EC) No 2150/2002 would not allow to monitor compliance with those targets at Member State level or any other level of granularity in relation to the specific types of waste or sources of textiles.

In conclusion, monitoring textile wastes and their adherence to the waste hierarchy would require extending the existing reporting obligation under Article 37 of the WFD for textiles to all textile waste generated and treated. That reporting obligation would then require an amendment to Implementing Decision (EU) 2019/1004/EU. All data would be mandatory rather than voluntary and would address textile wastes:

- Waste generated in tonnes,
- Prepared for reuse in tonnes,
- Recycled in tonnes,
- Energy recovery in tonnes,
- Other recovery in tonnes,
- Disposal in tonnes.

In order to ensure consistency with the existing data collection efforts and minimise additional administrative burden, the data collection and reporting frequency could be aligned with that under the Regulation (EC) No 2150/2002.

The table below summarises the assessment in relation to data needs, the current reporting mechanisms and their suitability to meet data needs.

Table 13 – Assessment of data needs textiles wasted and closely related wastes under EPR scope, current reporting mechanisms and their suitability

Data required	**Why is it needed**	**Does a collection mechanism already exist?**	**Does the current system meet the data needs?**	**What would need to change?**
The quantity of goods placed on the market	As a verification of data on waste generated In relation to EPR (measure 2.9) this is required information to determine the financial contributions of producers.	Yes – PRODCOM and COMEXT can provide this information	No – in some cases the volume by weight is not recorded in PRODCOM. In keeping with the approach of the JRC to determining weights using COMEXT data proxies can be applied to determine weight but with less precisions than were it to be reported in PRODCOM directly. In relation to EPR (measure 2.9) this data source would not be sufficient as information is required per producer and at a more granular level on different products for the administration of the scheme.	Existing data may be used a data source and one of the verification tools to verifying at EU level the data reported by Member States on waste generated. For this purpose, the Commission would need to set up a data extract from the PRODCOM and COMEXT databases, apply certain calculations to determine weights (where this is necessary). Should an EPR scheme (measure 2.9) be applied for textiles then to determine the financial contributions of producer, this information would need to be reported by the producers to the producer responsibility organisations. This obligation would need to be placed on the producers.
The quantity of textile wastes generated	To determine the size of the textile waste generated that allows effective monitoring whether the treatment of textiles is in line with the waste hierarchy (i.e. its	Implementing Decision (EU) 2019/1004/EU addresses municipal textile wastes and clothing according to the ELoW[256].	No – reporting under Decision (EU) 2019/1004/EU is not aligned with CN codes that would be subject to separate collection Data on municipal waste fractions is	The EWC currently reflected in the reporting formats on municipal waste for Member States would need to be brought in need to be more closely aligned to the CN codes proposed under measure 1.1. This could be done by revising Decision (EU) 2019/1004/EU by adjusting the scope of textile wastes subject to specific performance

[256] 20 01 10 clothes, 20 01 11 textiles and 15 01 09 textile packaging

Data required	Why is it needed	Does a collection mechanism already exist?	Does the current system meet the data needs?	What would need to change?
	comparison to the quantities collected, sorted, reused, recycled and recovered, disposed of).	Regulation (EC) No 2150/2002 on waste statistics addresses municipal textile waste but includes in the same waste category some non-textile wastes.	available every two years under Regulation (EC) No 2150/2002 but does not allow for direct monitoring of the textile waste generated, since under the same waste category textile and non-textile waste are reported.	requirements under the WFD brought forward by this initiative and to establish a knowledge base for developing further performance requirements as indicated in Option 3 of this initiative. In this case reference to textile packaging would be removed.
The quantity of textile waste separately collected	To ensure monitoring of compliance with the waste hierarchy and the separate collection obligation under Article 11(1) WFD as well as for measure 3.6 on separate collection	Implementing Decision (EU) 2019/1004/EU addresses municipal textile wastes and clothing according to the ELoW.[257] Regulation (EC) No 2150/2002 on waste statistics does not entail this data.	No - reporting under Decision (EU) 2019/1004/EU is not aligned with the pertinent CN codes, and is voluntary	The EWC currently reported would need to be brought in line with the CN codes proposed under measure 1.1. and the data requirement would also need to be changed from 'voluntary' to mandatory in Decision (EU) 2019/1004/EU. The main change, therefore, would be to remove textile packaging from the list of reported wastes under the textiles category.
The quantity of textiles prepared for reuse	To ensure monitoring of compliance with the waste hierarchy and of waste prevention under measures 1.2, 2.10, 3.1, 3.4, 3.5 (enable future target setting)	Implementing Decision (EU) 2019/1004/EU addresses municipal textile wastes and clothing according to the ELoW[258] Regulation (EC) No 2150/2002 does not entail this operation at this level of granularity[259]	No - reporting under Decision (EU) 2019/1004/EU is not aligned with the pertinent CN codes, reporting is voluntary. Regulation (EC) No 2150/2002.[260] addresses municipal textile waste but includes in the same waste category some non-textile wastes, and does not consider individually the preparing for reuse	The EWC currently reported would need to be brought in line with the CN codes proposed under measure 1.1 and the data requirement would also need to be changed from 'voluntary' to mandatory in Decision (EU) 2019/1004/EU. The main change, therefore, would be to remove textile packaging from the list of reported wastes under the textiles category.

[257] 20 01 10 clothes, 20 01 11 textiles and 15 01 09 textile packaging
[258] 20 01 10 clothes, 20 01 11 textiles and 15 01 09 textile packaging
[259] 20 01 10 clothes, 20 01 11 textiles and 15 01 09 textile packaging
[260] Under Regulation (EC) No 2150/2002, preparing for reuse, recycling and other material recovery of textiles are reported under the same operation code (R3).

Data required	Why is it needed	Does a collection mechanism already exist?	Does the current system meet the data needs?	What would need to change?
			operation[261]. Information under this Regulation is available only on the country of final treatment not traceable to the country of waste generated	
The quantity of textiles reused	To ensure monitoring of compliance with the waste hierarchy and measures 1.2, 2.10, 3.1, 3.4, 3.5 (enable future target setting)	Partially via Commission Implementing Decision (EU) 2021/19. Regulation (EC) No 2150/2002 on waste statistics does not entail this data.	No-the scope of textile products under Decision (EU) 2021/19 is not defined or aligned with CN-codes	The broad categories currently reflected in the reporting formats for Member States would need to be brought in line with the CN codes proposed under measure 1.1 in Decision (EU) 2019/1004/EU.
The quantity of textiles recycled	To ensure monitoring of compliance with the waste hierarchy and measures 2.10 and 3.8 (enable future target setting)	Implementing Decision (EU) 2019/1004/EU addresses municipal textile wastes and clothing according to the ELoW[262] Regulation (EC) No 2150/2002 does not entail this operation at this level of granularity[263]	No - reporting under Decision (EU) 2019/1004/EU it is not aligned with the pertinent CN codes. Regulation (EC) No 2150/2002.[264] addresses municipal textile waste but includes in the same waste category some non-textile wastes, and does not consider individually the recyling operation[265]. Information under this Regulation is available only on the country of final	The EWC currently reflected in the reporting formats for Member States would need to be brought in line with the pertinent CN codes proposed under measure 1.1 in Decision (EU) 2019/1004/EU. The main change, therefore, would be to remove textile packaging from the list of reported wastes under the textiles category.

[261] 20 01 10 clothes, 20 01 11 textiles and 15 01 09 textile packaging
[262] 20 01 10 clothes, 20 01 11 textiles and 15 01 09 textile packaging
[263]
20 01 10 clothes, 20 01 11 textiles and 15 01 09 textile packaging
[264] Under Regulation (EC) No 2150/2002, preparing for reuse, recycling and other material recovery of textiles are reported under the same operation code (R3).
[265] 20 01 10 clothes, 20 01 11 textiles and 15 01 09 textile packaging

Data required	Why is it needed	Does a collection mechanism already exist?	Does the current system meet the data needs?	What would need to change?
			treatment not traceable to the country of waste generated	
The quantities of textiles subject to energy recovery, other recovery and disposal	To ensure monitoring of compliance with the waste hierarchy and measures 2.10 and measures under Option 3 (enable future target setting)	Implementing Decision (EU) 2019/1004/EU addresses municipal textile wastes and clothing according to the ELoW[266]. Regulation (EC) No 2150/2002 on waste statistics addresses municipal textile waste but includes in the same waste category some non-textile wastes. Information available only on the country of final treatment not traceable to the country of waste generated.	No - it is not aligned with the pertinent CN codes. Regulation (EC) No 2150/2002.[267] addresses municipal textile waste but includes in the same waste category some non-textile wastes. Information under this Regulation is available only on the country of final treatment not traceable to the country of waste generated	The EWC currently reflected in the reporting formats for Member States would need to be brought in line with the CN codes proposed under measure 1.1 in Decision (EU) 2019/1004/EU. The main change, therefore, would be to remove textile packaging from the list of reported wastes under the textiles category.

Option 3: Prescribing performance targets

Measure 3.1 – Setting an EU textile waste reduction target

This measure consists of setting a textile waste reduction target, which would be aimed at reducing the amount of textile waste generated. This target should be set at EU level, to ensure coherence between the different Member States and to harmonise industry effort towards reaching the target. It could be a percentage improvement rate based on the amount of textiles waste generated in a baseline year.

This measure looks to specifically address the problem driver of insufficient waste prevention activities.

[266] 20 01 10 clothes, 20 01 11 textiles and 15 01 09 textile packaging

[267] Under Regulation (EC) No 2150/2002, preparing for reuse, recycling and other material recovery of textiles are reported under the same operation code (R3).

It is estimated that the first full reporting year following an improved data collection and verification exercise in accordance with measure 2.14 would be three years after the legislation enters info force. With an estimate that the amendments to the WFD would enter into force mid-2024, implementing acts setting out new reporting formats are adopted in 2026 and the first reporting year is 2027 for which data would become available mid-2029. This would enable an element of stability to the figures to be arrived at after three years of reporting.

It is proposed that any target for waste reduction is set after a baseline verification period – potentially starting at 2030 and then requiring reductions each year beyond until 2035. It would be expected that the targets could be introduced through subsequent revision of the WFD.

Measure 3.4 – Setting a preparation for reuse target for textiles

The objective of this measure would be to drive Member States to improve their reuse of textiles by setting a realistic preparation for reuse target, in comparison to solely relying on the application of the separate collection of textiles under Article 11(1) of the WFD. Preparing for reuse in the context of textiles means checking, cleaning, or repairing recovery operations, by which textile products that have become waste are prepared so that they can be reused without any other pre-processing. Presently, the costs of preparation for reuse within the EU generally mean that such preparation is limited as the economic costs of such preparation are higher than the value added to the repaired product. However, one of the expected impacts of the EU strategy for sustainable and circular textiles is to facilitate the reuse and repair sector such that repair within the EU becomes more profitable and a preparation for reuse target would be set with this expected outcome in mind.

Setting a preparation for textile reuse target, which would be aimed at increasing the amount of textiles reused in comparison to the status quo. This target should be set within the WFD across the EU to ensure coherence between the different Member States and to harmonise industry efforts towards reaching the target i.e., the same preparation reuse target would apply to all Member States. The target could take the form of a percentage improvement by volume of textile waste or an absolute target in tonnes – both of these are considered below.

This measure looks to specifically address the following problem drivers:

- Insufficient funding to scale up separate collection, sorting and recycling;
- Insufficient waste prevention activities and lack of circular business models at scale that extend the lifespan of products
- Delays in implementation of the separate collection obligation.

It is estimated that the first full reporting year following an improved data collection and verification exercise in accordance with measure 2.14 would be three years after the legislation enters info force. With an estimate that the amendments to the WFD would enter into force mid-2024, implementing acts setting out new reporting formats are adopted in 2026 and the first reporting year is 2027 for which data would become available mid-2029. This would enable an element of stability to the figures to be arrived at after three years of reporting.

Any preparation for reuse target would need to be set beyond this baseline verification period – potentially starting at 2030 and then requiring increasing levels of reuse each year beyond until 2035. It would be expected that the targets could be revised through subsequent revision of the WFD either through the ordinary legislative procedure or via delegated act.

In discerning what could be a reasonable preparation for reuse target the reuse targets applied by Member States at present have been considered. It should be noted that preparation for reuse and actual reuse are likely to vary. This is because whilst efforts under this specific measure would look to prepare textiles for reuse in reality some of the materials prepared may not actually be fit for reuse.

France and the Netherlands have targets on the management of textile waste as part of their EPR schemes. In the Netherlands, the EPR scheme establishes a common target on reuse and recycling, with sub-targets on reuse and on domestic reuse.

Table 14 – Reuse targets for the EPR scheme in the Netherlands

	Objectives for 2025	**Objectives for 2030**
Reuse and recycling	50% of the textiles placed on the market are reused for product reuse or recycling	75% of the textiles placed on the market are reused or recycled
Target on reuse	There should be at least 20% of reuse, the remaining 30% may be achieved by recycling or reuse	There should be at least 25% of reuse, the remaining 50% may be achieved by recycling or reuse
Target on domestic reuse	Regarding the reuse part (20% of the textiles placed on the market), 10% will be reused in the Netherlands, and the remaining 10% may be reused abroad	Regarding the reuse part (25% of the textiles placed on the market), 15% will be reused in the Netherlands, the remaining 10% may be reused abroad

To note that the Dutch EPR scheme specifically sets a target for reuse, while what is considered under this measure is a preparation for reuse target.

In France, there are common targets on reuse and recycling.

Table 15 – Reuse, recycling and disposal targets for the EPR scheme in France

	Objective
Reuse and recycling	95% of what is sorted should be reused or recycled
Disposal	A maximum of 2% of what is sorted is disposed of (undergoes no form of recovery)

Under this measure, and to confirm that the 50% reuse level is reached a 50% preparation for reuse target could be set, a more ambitious target of 60% could also be applied, albeit a determinant of the ability to reuse textiles is its quality in the first place. It is assumed under the Sustainable Textiles Strategy that product quality will improve allowing greater repair and reuse. This could

mean that a 60% target is feasible. Therefore, it would be opportune to assess the potential implications of the measure at a 50% and 60% reuse target.

In alternative to setting a percentage target, an absolute target in tonnes could be set per Member State. The tonne target could be set in the same manner as requiring a percentage reduction. However, fluctuations in the volumes of textile waste generated would need to factored into any absolute target and based on existing data the setting of tonnage targets is considered to be technically challenging. In this respect a total target does not seem feasible and a percentage target is, therefore, considered in relation to the detailed assessment below.

Based on the targets set Member States would report to the Commission on achievement of the target, starting in advance of the target deadline to allow progress to be monitored by the Commission.

There is a need for improved data knowledge at Member State and EU level to define a preparation for reuse target and the baseline year against which it is measured in the first place. It is estimated that the first full reporting year following an improved data collection and verification exercise in accordance with measure 2.14 would be three years after the legislation enters info force. With an estimate that the amendments to the WFD would enter into force mid-2024, implementing acts setting out new reporting formats are adopted in 2026 and the first reporting year is 2027 for which data would become available mid-2029. This would enable an element of stability to the figures to be arrived at after three years of reporting.

Any preparation for reuse target would need to be set beyond this baseline verification period – potentially starting at 2030 and then requiring increasing levels of preparation for reuse each year beyond until 2035. It would be expected that the target setting could be revisited through subsequent revision of the WFD.

Measure 3.5 – Setting a reuse target for textiles

The objective of this measure would be to drive Member States to improve their reuse of textiles by setting an overall reuse target that they should achieve in comparison to solely relying on the application of the separate collection of textiles under Article 11(1) of the WFD. The focus on this measure is beyond preparation for reuse and is on actual reuse rates.

This sub-measure consists in setting a textile reuse target, which would be aimed at increasing the amount of textiles reused in comparison to the baseline year. This target should be set at EU level, to ensure coherence between the different Member States and to harmonise industry efforts towards reaching the target. The target could take the form of a percentage improvement by volume of textile waste or an absolute target in tonnes – both are considered.

This measure looks to specifically address the following problem drivers:

- Insufficient funding to scale up separate collection, sorting and recycling;
- Insufficient waste prevention activities and lack of circular business models at scale that extend the lifespan of products
- Delays in implementation of the separate collection obligation.

It is estimated that the first full reporting year following an improved data collection and verification exercise in accordance with measure 2.14 would be three years after the legislation

enters info force. With an estimate that the amendments to the WFD would enter into force mid-2024, implementing acts setting out new reporting formats are adopted in 2026 and the first reporting year is 2027 for which data would become available mid-2029. This would enable an element of stability to the figures to be arrived at after three years of reporting.

Any reuse target would need to be set beyond this baseline verification period – potentially starting at 2030 and then requiring increasing levels of reuse each year beyond until 2035. It would be expected that the target setting could be revisited through subsequent revision of the WFD.

In discerning what could be a reasonable reuse target the reuse targets applied by Member States at present are identified. Both France and the Netherlands have targets on the management of textile waste as part of their EPR schemes. In the Netherlands, the EPR scheme establishes a common target on reuse and recycling, with sub-targets on reuse and on domestic reuse.

Table 16 : Reuse targets for the EPR scheme in the Netherlands

	Objectives for 2025	**Objectives for 2030**
Reuse and recycling	50% of the textiles placed on the market are reused for product reuse or recycling	75% of the textiles placed on the market are reused for product reuse or recycling
Target on reuse	There should be at least 20% of reuse, the remaining 30% may be achieved by recycling or reuse	There should be at least 25% of reuse, the remaining 50% may be achieved by recycling or reuse
Target on domestic reuse	Regarding the reuse part (20% of the textiles placed on the market), 10% will be reused in the Netherlands, and the remaining 10% may be reused abroad	Regarding the reuse part (25% of the textiles placed on the market), 15% will be reused in the Netherlands, the remaining 10% may be reused abroad

In France, there are combined targets on reuse and recycling.

Table 17 : Targets for the EPR scheme in France

	Objective
Reuse and recycling	95% of what is sorted should be reused or recycled
Disposal	A maximum of 2% of what is sorted is disposed of (undergoes no form of recovery)

The baseline trends (see below) indicate that even without a fixed reuse target, reuse of separately collected textiles should be around 50%. Under this measure, and in order to confirm that the 50% reuse level expected in the baseline is reached, a 50% preparation for reuse target could be set. A more ambitious target of 60% could also be applied, albeit a determinant of the ability to reuse textiles is its quality in the first place. It is assumed under the Sustainable Textiles Strategy that

product quality will improve allowing greater repair and reuse. This could mean that a 60% target is feasible. The measure was assessed for both a 50% and 60% reuse target are proposed.

Alternatively, to setting a percentage target, an absolute target in tonnes could be set per Member State. The tonne target could be set in the same manner as requiring a percentage reduction. However, fluctuations in the volumes of textile waste generated would need to be factored into any absolute target and based on existing data the setting of tonnage targets is considered to be technically challenging. In this respect a total target does not seem feasible, and a percentage target is, therefore, considered in relation to the detailed assessment below.

Based on the targets set, Member States would report to the Commission on their achievement, starting in advance of the target deadline in order to allow progress to be monitored.

Measure 3.6 – Setting a separate collection target for textile waste

The objective of this measure is to drive Member States, particularly those for which separate collection is low, to improve their separate collection rate for textiles thereby increasing reuse rates, recycling rates and decreasing disposal rates. The target would incentivise investment in collection systems which will then enable increased sorting and recycling capacity by setting a realistic recycling target that considers likely changes in recycling capacity and technologies – see for example the ReHubs initiative that looks to achieve 2.5 million tonnes of fibre-to-fibre recycling by 2030[268]. This target would be in comparison to solely relying on the application of the separate collection of textiles obligation under Article 11(1) of the WFD.

This measure would apply to the municipal post-consumer textile waste under the scope of EPR schemes (measure 2.9).

This measure consists in setting a separate collection target, the concept being that increased separate collection will in turn lead to greater levels or reuse and recycling and lower levels of disposal. This target should be set within the WFD across the EU to ensure coherence between the different Member States and to harmonise efforts towards reaching the target, i.e., the same collection would apply to all Member States. The target could take the form of a percentage improvement by volume of textile waste or an absolute target in tonnes – both are considered below.

This measure looks to specifically address the following problem drivers:
- Insufficient sorting and recycling capacity;
- Insufficient funding to scale up separate collection, sorting and recycling;
- Insufficient waste prevention activities and lack of circular business models at scale that extend the lifespan of products;
- Delays in implementation of the separate collection obligation; and
- Low demand for recycled materials.

As is the case for measure 3.4, the setting of a target for collection is dependent on good quality data to inform the target itself to ensure that it is realistic and achievable. As indicated in measure 2.14, existing reporting mechanisms were assessed and some changes were proposed to collect additional data. Therefore, it is important to consider how this newly reported data could be used

[268] ReHubs, 2020

to set an ambitious target and, whether, in the interim a less ambitious target based on baseline projections should be applied.

The main difference between setting a target for separate collection in comparison to the other targets is that it specifically addresses an already existing obligation under the WFD – the separate collection obligation that was introduced in the 2018 revision of the WFD with a deadline for separate collection of textiles to be in place in all Member States by 1 January 2025. Member States should already be in the process of tackling this obligation and consequently the necessary actions to achieve improvements in the level of separate collection should, in theory, be in the planning or implementation phase. As noted previously, in general Member States already cover a significant share of the textiles that would be addressed under this measure in their separate collection schemes. The understanding of the levels of textile wastes generated and currently collected, should, therefore, be better than in relation to levels of subsequent sorting, reuse and recycling where no specific obligation for textiles exists in the WFD.

However, it is considered that the feasibility of this measure is directly linked to measure 2.14, that requires collection of data on waste generation and collection. Without this additional measure there would be significant challenges relying on existing datasets to measure compliance with the target set.

Setting a specific target would clarify exactly what minimum level of separate collection should be targeted under this existing provision, assisting Member States and producer responsibility organisations (PROs) in their understanding as to what needs to be achieved to be in compliance with the Directive. In the absence of such a target, Member States and PROs may currently interpret the obligation in terms of whether it requires separate collection of 100% of all textile wastes generated or only a fraction thereof that may be well below what has been proven to be technically and economically feasible by the forerunner Member States that already separately collect over 50% of textile wastes generated.

Based on the assumption that the proposal to amend the WFD will be adopted in July 2023, the ordinary legislative procedure would be completed and the amendments to the Directive enter into force by mid-2024, Member States would have two years to transpose the legislation, i.e., until mid-2026 and the first reporting year would be the year 2027 for which the data would become available mid-2029. An implementing act setting out the reporting formats would be adopted by the end of 2026. A target based on this data for 2035 or beyond could then be set through further amendment of the WFD.

Unlike Measure 3.4 that would require a specific formula to determine the correct target, here data on textile waste generation and separate collection would be used as the basis for determining the right target. In this respect, measures 3.6 and 2.14 are linked, with the data expected to be generated under 2.14 that would offer reliable information on textile waste generation and collection rates used to determine compliance with the target set.

In determining whether the separate collection target had been met the numerator would be the amount of separately collected textiles in tonnes and the denominator would be the textile waste generated in tonnes in the same year, for the textile under the scope of EPR.

The proposed scope of the EPR measure (2.10) is defined as below:

Table 18-CN codes subject to the EPR scheme according to measure 2.9

CN code	Description
4203	Articles of apparel and clothing accessories, of leather or composition leather (excl. footware and headgear and parts thereof, and goods of chapter 95, e.g. shin guards, fencing masks)
61 – all listed codes within the chapter	Articles of apparel and clothing accessories, knitted or crocheted
62 – all listed codes within the chapter	Articles of apparel and clothing accessories, now knitted or crocheted
6301	Blankets and travelling rugs
6302	Bed linen, table linen, toilet linen and kitchen linen
6303	Curtains (including drapes) and interior blinds; curtain or bed valances
6304	Other furnishing articles, excluding those of heading 9404[269]
630710(selected goods)	Dishcloths, dusters and similar cleaning cloths (excluding floorcloths)
6309	Worn clothing and other worn articles
64 – all listed codes within the chapter except 6406 (parts of footwear) and 6403 12 00 – Ski-boots, cross-country ski footwear and snowboard boots	Footwear, gaiters and the like
6504	Hats and other headgear, plaited or made by assembling strips of any material, whether or not lined or trimmed
6505	Hats and other headgear, knitted or crocheted, or made up from lace, felt or other textile fabric, in the piece (but not in strips), whether or not lined or trimmed; hairnets of any material, whether or not lined or trimmed

Textile waste generation and collection will be reported under WFD requirements. Consequently, data will be provided relying on the following categories of waste according to the ELoW:

- 20 01 10 clothes; and

- 20 01 11 textiles.

The fact that these two ELoW codes do not match precisely the list of CN codes proposed to be subject to the EPR measure may lead to challenges in determining a consistent numerator and denominator by all Member States.

The main problem may arise in relation of bulky textile waste (e.g. carpets), and sacks and bags which are out of the EPR scope. As there is not a specific ELoW code for such waste, the possibility

[269] 9404 refers to mattress supports, articles of bedding and similar furnishing (for example mattresses, quilts, eiderdowns, cushions, pouffes and pillows) fitted with springs or stuffed or internally fitted with any material or of cellular rubber or plastics, whether or not covered.

remains from Member States to report them additionally to the materials subject to the EPR scope under the two relevant ELoW categories.

Using data (see the table below), it is estimated that these wastes would represent up to 14.3% of the reported totals.

In order to eliminate this possible error in calculation, this measure would also entail:

1. Adjusting the guidance from the Commission[270] on reporting under the ELoW to make clear to Member States that bulky textiles waste (e.g. carpets), and sacks and bags should not be reported under these headings but rather under 20 03 07–bulky waste or 20 01 99 – other fractions not otherwise specified, respectively.
2. Providing for Member States to undertake analysis of the fractions generated and collected and excluding the bulky textile waste and leather accessories from the overall textile target fraction under this measure.

*Table 19-Estimated composi*tion of flows at category and subcategory level of post-consumer textile waste

Category	**Subcategory**	**Post-consumer waste**	
		Category share	Subcategory share
Clothing and footwear	Jackets and coats	48.2%	9.7%
	Sweaters and midlayers		7.6%
	Pants and shorts		6.4%
	T-shirts		4.8%
	Closed-toed shoes		4.6%
	Apparel accessories		3.4%
	Shirts and blouses		3.1%
	Leggings, stockings, tights and socks		2.8%
	Dresses, skirts and jumpsuits		2.2%
	Boots		2.0%
	Underwear		0.9%
	Swimwear		0.8%
Home textiles	Carpets	15.7%	7.2%
	Bedding		4.3%

[270] OJ C 124, 9.4.2018, p. 1Commission notice on technical guidance on the classification of waste

Category	Subcategory	Post-consumer waste	
		Category share	Subcategory share
	Toilet and kitchen linen and towels		1.8%
	Curtains		0.9%
	Blankets		0.6%
	Table linen		0.4%
	Furnishing		0.2%
	Other personal care		0.1%
	Sleeping bags		0.0%
Technical textiles households	Non-woven articles	20.8%	7.8%
	Cleaning articles		7.0%
	Sacks and bags		6.0%
Technical textiles professional use	Non-wove articles	15.1%	7.5%
	Mixed technical articles		3.5%
	Cleaning articles		2.6%
	Workwear and protective clothing		0.9%
	Carpets		0.5%
Total		**100%**	

It is apparent that relying on a new reporting mechanism to address a target for collection may result in a significant delay in driving collection forward – up to ten years for the setting of a target as explained above. Therefore, this report considers a target based on the trends identified in the baseline. This ensures that, at the very minimum, the foreseen positive trend in quantities of textiles separately collected is mandated into a legislative obligation at the EU level or at the Member State level through reporting of PROs.

In determining what could be a suitable level for a collection target, the collection rates currently achieved by the forerunner Member States have been considered alongside the collection rates of all other Member States for the last year where data exists[271]. These are shown in the table below.

It should be noted that these data are overall consistent with the Sankey diagrams of current flows shown in Annex 6. However, there are difference on what is considered to fall under the categories 'post-consumer waste' and what is 'separately collected'. The difference in the scopes refer in particular to bulky waste (e.g. carpets, pieces of furniture), clothing that has no textile component (e.g. leather, fur) and also non-leather accessories. Additionally, the Sankey diagrams refer to 2019 data, where the table below considers 2021/2022 data.

Table 20 –Textile waste generation and collection in Member States, tonnes and collection rate reported for 2021 and/or 2022

Note: only textile waste that is commonly subject to separate collection schemes have been considered into "waste generation" to calculate the share of collection

[271] As noted in Annexes 6 and 7 Member States were specifically asked to provide information on textile waste generation, collection and sorting rates. In some cases the information provided related to 2021 and in some cases 2022. The most recent data has been applied for all Member States where available.

Member State	Waste generation (tonnes)	Waste collected (tonnes)	Waste collection percentage
AT	146 000	43 120	30%
BE	213 000	116 100	55%
BG	33 000	6 000	18%
CY	3 000	600	20%
CZ	78 000	14 100	18%
DE	1 267 000	784 640	62%
DK	85 460	36 000	42%
EE	22 400	3 900	17%
EL	98 000	17 850	18%
ES	451 000	95 160	21%
FI	85 500	40 000	47%
FR	517 000	204 000	39%
HR	53 000	10 200	19%
HU	79 000	14 400	18%
IE	167 500	57 500	34%
IT	615 000	242 200	39%
LT	45 000	14 000	31%
LU	4 000	1 000	25%
LV	20 000	2 400	12%
MT	2 000	750	38%
NL	305 100	136 100	45%
PL	362 000	65 700	18%
PT	144 000	20 880	15%
RO	149 000	27 000	18%
SE	62 000	38 300	62%
SI	14 000	1 700	12%
SK	44 000	5 300	12%
Total	5 064 960	1 998 900	39%

In determining likely growth rates in collection, the impacts of the 2018 separate collection obligation and the plans and programmes of Member States to meet this obligation have been taken into account. Additionally, for those Member States with currently high levels of collection the rate of growth is considered as likely to be lower than those with currently low levels of collection that are, in effect, most likely to invest in collection going forward.

On average, it is predicted that by 2035 49% to 55% of clothing and household textile waste across the EU would be separately collected in the absence of additional measures put in place (this acknowledges that some Member States already have significant shares of separate collection as well as accounting for a larger proportion of total EU waste).

A 50% target is considered to be set given that:

1. It would seem imminently achievable given that BE, DE and SE are already well above this collection target and several others are close (DK, IT, FR and NL). Using predicted growth in collection rates from the JRC[272], AT, BE, DE, DK, FI, FR, IE, LT, LU, MT, NL and SE would be predicted to meet or exceed such a target by 2035. Even the Member States with the lowest collection rates would be expected to be above 40% of separate collection for textiles by that year and could take additional measures to reach the 50% target.
2. Given the challenges in the reliability of data from Member States on their collection rates at present, including variations in scope of what Member States consider as textiles and the years for which data is held, the risk of setting a higher target is that it would be unrealistic and unachievable.
3. Similarly, setting different targets by Member States is subject to the same data shortcomings that may result in the setting of unachievable targets for each Member State concerned. Setting different targets would also be at odds with the targets that exist for Member States under the WFD for other wastes at present.
4. However, setting a target would also have downsides. For instance, the defining, implementing and monitoring of the target results in administrative burden and costs for Member States. Additionally, as detailed further below, there is a large heterogeneity across predictions for where Member States are likely to be in 2035 with the separate collection rate, making it challenging to set a specific target at this stage. Also, the existing 2025 separate collection obligation is likely to have the same effect on increasing the separate collection rate.

Table 21 - Predicted collection rate per Member State in 2035 (under the baseline assumptions of implemented existing and announced measures) and reported collection rate per Member State in 2021 and/or 2022

[272] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144

Member State	Waste collection percentage	Predicted collection rate in 2035	Volume separately collected in 2035 in tonnes
AT	30%	51.50%	70,034
BE	55%	76%	154,357
BG	18%	45.50%	13,355
CY	20%	47%	1,214
CZ	18%	45.50%	31,565
DE	62%	83%	1,032,203
DK	42%	63%	53,385
EE	17%	44%	9,065
EL	18%	45.50%	39,659
ES	21%	47%	175,747
FI	47%	68%	34,600
FR	39%	60%	297,111
HR	19%	44%	21,448
HU	18%	45.50%	31,970
IE	34%	56%	77,834
IT	39%	60%	347,280
LT	31%	53%	19,561
LU	25%	50%	1,859
LV	12%	42.50%	8,694
MT	38%	59%	929
NL	45%	66%	190,591
PL	18%	45.50%	146,495
PT	15%	44%	56,114
RO	18%	45.50%	60,298
SE	62%	83%	26,950
SI	12%	42.50%	5,246
SK	12%	42.50%	16,486
Total	39%	52.70%	2,924,050

It should be noted that the resulting figures are more optimistic regarding the share of separate collection that can be reached by 2035 compared to the baseline scenario Sankey diagram in Annex 6. Based on a rough calculation, 58% of the category 'post-consumer waste' in the Sankey diagram from the JRC would be cover by separate collection systems (i.e. clothing, footwear and home/household textiles, accounting for 56.6% and in addition workwear and protective clothing, accounting for another 0.9%) and the scope of this measure (as set out in measure 2.9), while effectively everything that is covered by the category 'separate collection' in the JRC Sankey diagram would indeed be covered by the scope. This would result in an estimate of a separate collection rate of roughly 40-44% across the EU in 2035. The higher estimate would be the result by further including leather and other non-textile elements in the separate collection figure (resulting in up to 4 Mt yr-1 separately collected by 2035). Again, the difference stem from the scope as previously mentioned, but also on the assumptions of waste generation and separate

collection in 2035. A preliminary JRC estimate for 2030 would suggest post-industrial waste generation of 13.3 Mt yr-1 and separate collection of 3.15 Mt yr-1. Applying the same approach would result in an EU-level average estimate of roughly 41-45% separate collection in 2030.

In alternative to setting a percentage target, an absolute target in tonnes could be set per Member State. The tonne target could be set in the same manner as requiring a percentage reduction. However, fluctuations in the volumes of textile waste generated would need to be factored into any absolute target. Based on existing data, setting a tonnage target is technically challenging. Therefore, a percentage target is assessed in detail below.

With regard to the enforcement and the governance structure for the target, one way is for Member States to report to the Commission (or the EEA) on the achievement of the target, with the first reporting period being the first full calendar year following the adoption of the Implementing act revising the existing format established by the Commission Implementing Decision (EU) 2019/1004. The data collection at national level is regulated by the Member States. In accordance with Measure 2.9, data on textiles management, including collection is to be provided to the competent authorities by the producer responsibility organisations and waste management entities engaged in the collection of used and waste textiles, including municipalities and social enterprises.

The collection and validation of textile waste data would be carried out by Eurostat or the EEA, with annual reporting of data by Member States. This data would be the basis for the Commission to assess compliance of MS with the EU target. In the event of non-compliance, the Commission uses a broad toolbox of measures to facilitate compliance promotion (capacity building programmes, guidance, exchange of best practices, Waste Committee and enforcement platforms). The Commission also has enforcement powers through the launch of infringements, which the Commission has exercised in the past for failure to meet environmental performance targets. MS decide on their national governance structures by defining roles and responsibilities of individual actors, including deciding whether to pass on the responsibility for meeting the targets to national actors, including financial responsibility. This is the case, for example, in some MS which pass on the target compliance obligations to regional authorities or to producer responsibility organisations in the case of EPR, including with financial penalties.

Another way of reporting would be through PROs, which would need to report to Member States in any case the necessary data to calculate the separate collection target. This would reduce the administrative burden for Member States of not having to report the data to the Commission (or the EEA). It would also support the timeliness of data collection since there would be no delay of 18-24 months for data collection. Lastly, it would further set a performance target for the EPRs themselves given that the waste covered under the EPR would essentially be monitored through the reporting of PROs themselves.

Measure 3.8 – Setting a recycling target for textiles

The objective of this measure would be to drive Member States to improve their recycling of textiles and, thereby, increase recycling capacity by setting a realistic recycling target that considers likely changes in recycling capacity and technologies – see for example the ReHubs initiative whose stated objective is to achieve 2.5 million tonnes of fibre-to-fibre recycling by 2030. This target should be set at EU level, to ensure coherence between the different Member

States and to harmonise industry efforts towards reaching the target. The recycling target(s) could be set to promote recycling operations that induce the highest environmental benefits, including considerations to minimise the risk that re-usable textiles are sorted for recycling instead of destined for re-use.

This measure looks to specifically address the following problem drivers:

- Insufficient sorting and recycling capacity;
- Insufficient funding to scale up separate collection, sorting and recycling; and
- Low demand for recycled materials.

Practically, preparing for reuse and recycling targets could be defined as the amount of waste textiles that are "prepared for reuse" and "recycled" divided by the amount of separately collected textiles that are not reused. Calculation rules would have to account for imports/exports of sorted and unsorted textiles and textile waste[273] (see schematic overview of calculation rules indicated below).[274] In addition, the fraction of the input material that is reused after repair actions and/or recycled and associated potential differences in the environmental performance of recycling technologies, would be considered.

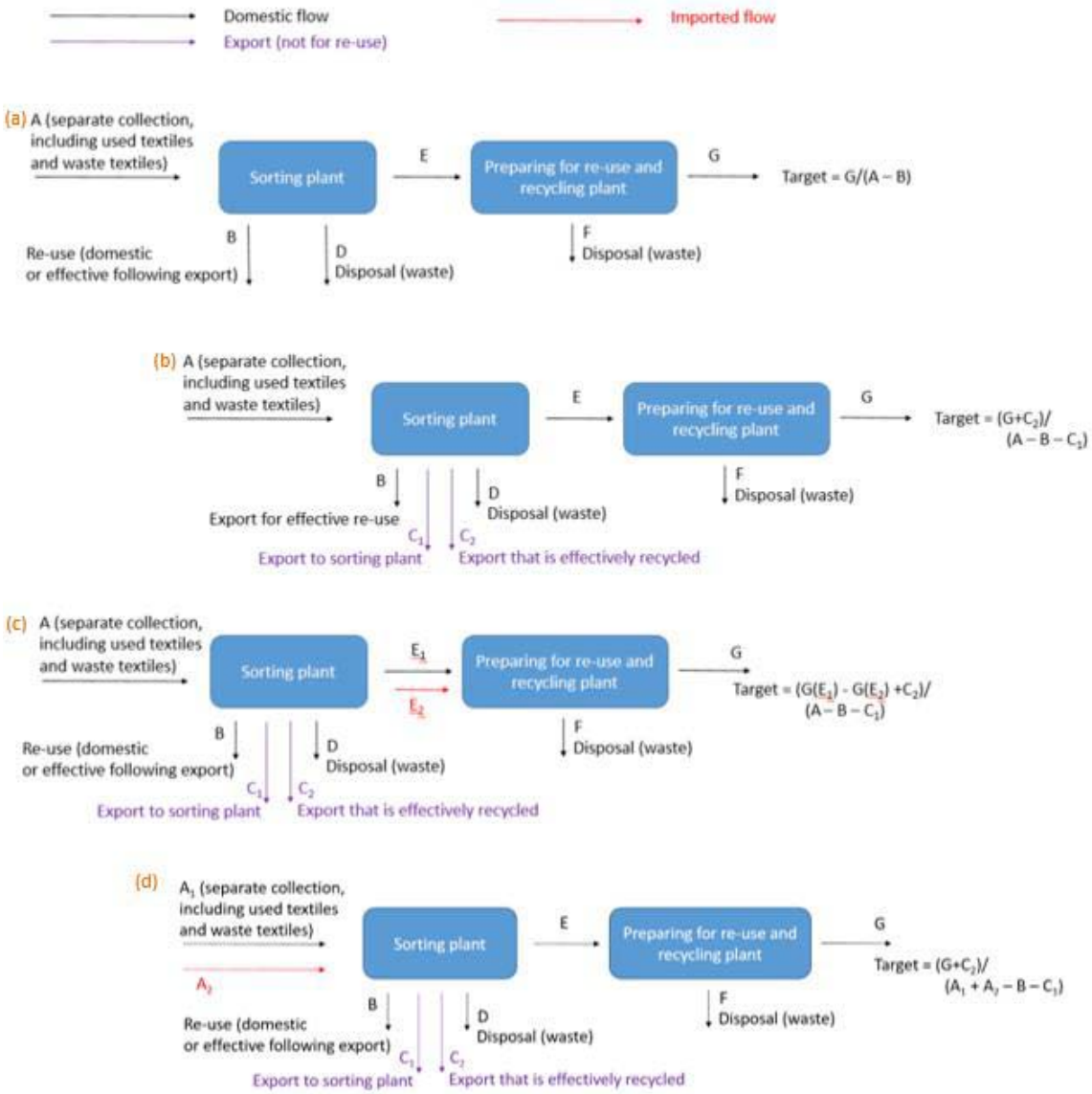
An important consideration is to ensure that setting a recycling target does not have the unintended consequence that textiles are sent to recycling to meet the recycling target when they could be reused (this is proposed to be address in measure 2.5).

An alternative may be to set a target for the sum of reuse, preparing for reuse, and recycling. Taking inspiration from the French and Dutch that have set combined targets for reuse and recycling, a combined target could drive Member States to improve both their reuse of textiles and their recycling of textiles by setting a realistic combined target, in comparison to solely relying on the application of the separate collection of textiles under Article 11(1) of the WFD. Setting a combined target has the advantage of reducing the risk that textiles that would be suitable for reuse or preparation for reuse would be recycled to achieve the target whilst they could be managed higher up the waste hierarchy.

Figure 21 – Schematic representation for calculating targets under different situations, including imports and exports

[273] In case textiles are imported for recycling, they would not count towards the targets in the receiving MS. The share of textiles that are exported to other EU Member States (or outside of the EU) can only be accounted as recycling in the MS of generation in case they are actually recycled (see Annex I, Figure 1 for a schematic representation).
In case separately collected textiles are exported without prior sorting or go to another (secondary) sorting facility in another MS, they should be excluded from the calculation in the MS that exports (in numerator and denominator) (see Annex I, Figure 1 for a schematic representation).

[274] In case textiles are imported for recycling, they would not count towards the targets in the receiving MS. The share of textiles that are exported to other EU Member States (or outside of the EU) can only be accounted as recycling in the MS of generation in case they are actually recycled (see Annex I, Figure 1 for a schematic representation).
In case separately collected textiles are exported without prior sorting or go to another (secondary) sorting facility in another MS, they should be excluded from the calculation in the MS that exports (in numerator and denominator) (see Annex I, Figure 1 for a schematic representation).


Domestic flow
Imported flow
Export (not for re-use)
(a) A (separate collection, including used textiles and waste textiles)
Sorting plant
E
Preparing for re-use and recycling plant
G
Target = G/(A – B)
B
Re-use (domestic or effective following export)
D
Disposal (waste)
F
Disposal (waste)
(b) A (separate collection, including used textiles and waste textiles)
Sorting plant
E
Preparing for re-use and recycling plant
G
Target = (G+C2)/ (A – B – C1)
B
Export for effective re-use
D
Disposal (waste)
F
Disposal (waste)
C1
Export to sorting plant
C2
Export that is effectively recycled
(c) A (separate collection, including used textiles and waste textiles)
Sorting plant
E1
E2
Preparing for re-use and recycling plant
G
Target = (G(E1) - G(E2) +C2)/ (A – B – C1)
B
Re-use (domestic or effective following export)
D
Disposal (waste)
F
Disposal (waste)
C1
Export to sorting plant
C2
Export that is effectively recycled
(d) A1 (separate collection, including used textiles and waste textiles)
A2
Sorting plant
E
Preparing for re-use and recycling plant
G
Target = (G+C2)/ (A1 + A2 – B – C1)
B
Re-use (domestic or effective following export)
D
Disposal (waste)
F
Disposal (waste)
C1
Export to sorting plant
C2
Export that is effectively recycled

2- Food Waste[275]

1.1. Baseline

1.1.1. Assumptions

The baseline or 'business as usual' (BAU) for the assessment of the food waste reduction targets assumes a continuation of current policies, regulations, and market trends on the future situation of the wider bioeconomy up to 2050. To motivate the baseline shocks, projections are taken from the European Commission's Global Energy and Climate Outlook (GECO) reference (Keramidas et al., 2021), which is updated annually by the JRC. At the outset, this publication offers a consistent set of economic-energy-climate assumptions to 2050, whilst it has the additional advantage of accounting for the recent economic shock to the global system arising from the COVID pandemic. The macroeconomic-energy-climate assumptions are supplemented by land and feed productivity assumptions consistent with shared socio-economic pathway 2 (SSP2) as well as EU trade, CAP and biofuels policy shocks, meat and dairy demand shocks, forestry biomass availability shocks and food waste projections. The baseline drivers are summarised in Table 22. While in the baseline, the effect of the Covid-19 pandemic is considered, it should be noted that the baseline does not take into account Russia's invasion of Ukraine and its potential impacts on global food prices or the refugees' migration from Ukraine to the European Union.

Table 22 – Detailed baseline drivers and assumptions

Driver	Explanation and implementation	Sources of data
Economic growth	Country specific macroeconomic (GDP) rates of growth. Fixed capital to output ratio: Capital stock changes at the same percentage rate as real GDP Fixed long-run employment rate: Labour force changes at the same percentage rate as regional population	(Keramidas et al., 2021)
Demographic development	Country specific exogenous rates of population change	(Keramidas et al., 2021)
Land use and management	Land productivities consistent with the "middle of the road" Shared Socio-economic Pathway 2 (SSP2)	(Daioglou et al., 2016)

[275] This assessment is based on: De Jong B, Boysen-Urban K, De Laurentiis V, Philippidis G, Bartelings H, Mancini L, Biganzoli F, Sanyé Mengual E, Sala S, Lasarte-López J, Rokicki B, M'barek R. *Assessing the economic, social and environmental impacts of food waste reduction targets. A model-based analysis.* Publications Office of the European Union, Luxembourg, 2023, doi:10.2760/77251, JRC133971.

Technology change	**Production technology development:** anticipated outlook for agricultural and forestry technology development, and industry **Feed efficiency**: Feed productivities consistent with the "middle of the road" Shared Socio-economic Pathway 2 (SSP2) **Forestry biomass:** Baseline EU forestry sector dry matter biomass potentials calibrated to input-output technology shifters DG RTD (2017). In the forestry sector in each EU member state, projections for forestry biomass potentials in Giga grams (=1000 tonnes) of dry matter to 2050 are implemented. The projections are taken from the EFICSCEN model and are consistent with the baseline scenario in DG RTD (2017). For the Rest of the World, an estimate of additional round wood harvesting provided by EFI (based on work in the FORMIT project) is used to calibrate ROW forestry production in the baseline (it is assumed that compared with the 1.6 billion cubic metres of roundwood harvested in 2020, by 2050 under business as usual conditions, it could increase to 2.1 billion cubic metres, whilst at the upper level, this figure could rise to 2.6 billion cubic metres. Thus, in the baseline a per year growth rate for ROW forestry production is calculated and calibrated into MAGNET.	(Keramidas et al., 2021) (Daioglou et al., 2016; European Commission, 2018a) (European Commission, 2018b; Philippidis et al., 2022)
Energy	Global trends in electricity and heat usage (million tonnes of oil equivalent) by four broad classes of (non-energy) activities – agriculture, fishing and forestry; manufacturing; services; transport. Global trends in electricity and heat generation technologies (fossil, biological and non-biological renewables) by the "blended" electricity and heat generation sector: coal, gas, oil, biomass and waste, nuclear, hydroelectric, wind and solar) World prices of fossil fuels (in dollars per barrel at 2015 prices) and carbon taxes, and global trends in: electricity and heat usage, electricity and heat generation technologies, and oil, gas, petroleum and electricity usage by private households Projected increases in the carbon taxes ($/tonne) on EU emissions trading scheme (ETS) activities and non-EU region activities. Carbon taxes ($/t) by different activities at regional level calculated from the Social Accounting Matrices (five-year intervals) of the GEM-E3 model (only available for the reference scenario). The MAGNET model determines changes in greenhouse gas (GHG) emissions endogenously as a consequence of the carbon tax, energy balance and growth assumptions	(Keramidas et al., 2021)
Policy mechanisms and reforms	**Biofuel mandates:** Biofuel mandates on first-generation and advanced-generation biofuels by region. BF2nd mandate ratcheted up to 2.2% (single counted) by 2030 and then held there to 2050. In the ROW, assume it is ratcheted up gradually to 2.5% (single counted) by 2050 (and 1.5% by 2030). For BF1st, the CAPRI trends are mimicked using productivity shocks, whilst BF1st	Keramidas *et al.* (2021), CAPRI model

	mandate for the ROW are chosen to generate plausible aggregate EU mandate values. **EU Agricultural Policy:** Common Agricultural Policy (CAP) payments shocks to 2050 employing the latest available data from DG AGRI (Clearance Audit Trail System - CATS) and assumptions. The configuration of decoupled EU agricultural market support payments is also allocated to agricultural primary factors.	(Boulanger et al., 2021; Boulanger and Philippidis, 2015)
Consumer preferences	Tops-down 'EU-wide' and 'non-EU-wide' per capita demands for red and white meats, and dairy products. To capture the consumption trends for red meat, white meat and dairy products, per capita trends from OECD FAO (2021) are implemented tops-down at the EU level and for the ROW. These per capita trends are targeted using household expenditure share budget shifters. As a first step, in the decade 2020-2030, the FAO-OECD per capita trends are correlated with the FAO-OECD real GDP growth assumptions to generate an 'elasticity'. This elasticity is applied to the GECO assumptions regarding real GDP growth to generate projections of red meat, white meat and dairy per capita consumption in each of the three decades of the baseline experiment.	(OECD-FAO, 2021)
Food waste	Food waste is projected from 2014 to 2020 following the FW MFA data. For the periods 2020 to 2050, food waste is projected following the GDP per capita development following Verma et al., 2020 and Kaza et al., 2018.	(Caldeira et al., 2021; De Laurentiis et al., 2021)

1.1.2. Projection of food waste amounts

The projection of food waste from 2020 to 2030 aims to deliver a plausible starting point for the scenarios of food waste reduction in 2030. Furthermore, coherence with ongoing projections of all municipal waste was seen as a pre-requisite for the impact assessment. At the same time, an econometric estimation of the impact of different drivers (of food waste) was planned. However, the scarcity of data, i.e., only one data point on food waste per Member State, did not allow to proceed accordingly.

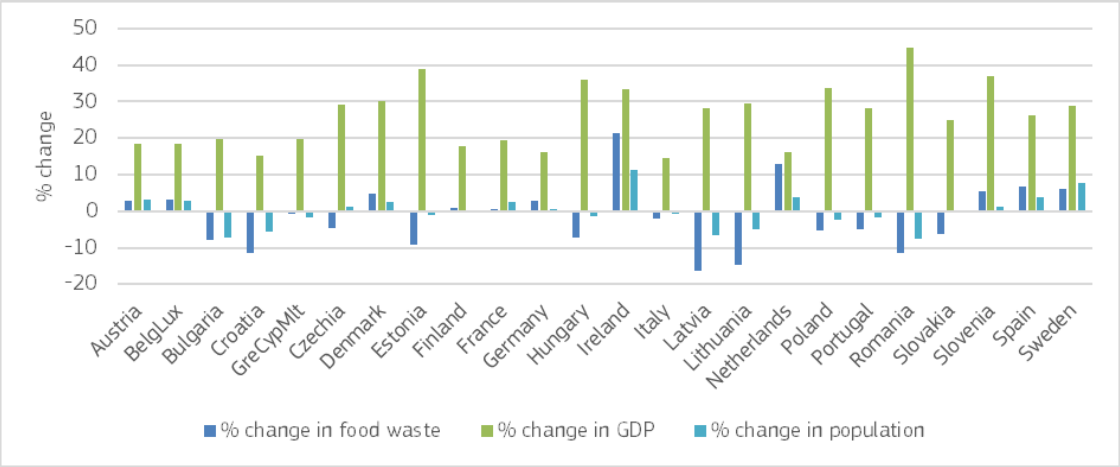
To align the various quantitative assessments related to waste, the municipal waste projections were approximated within the MAGNET simulations as a top-down approach. In the overall approach followed by the JRC, the total waste generated for the baseline is calculated using a regression on GDP and population, resulting in an increase of 8.3% over the time period 2020 (225 732 000 tonnes) to 2030 (244 471 244 tonnes). The actual value for the waste increase in the EU from 2020 to 2030 in MAGNET - after different calibration steps-is 8.5%.

This value of 8.5% waste increase for the EU27 translates in different ways in the Member State-specific food waste values per food chain step and subsector. The main drivers are population, GDP, production and demand elasticities as described in the preceding section. The importance of the population growth in the determination of the Member States' food waste growth (or even

decline), is demonstrated in Figure 225. While a group of EU14 [276] countries with positive demography and well-performing economy and agri-food sectors show an increase in food waste generation, a number of Central and Eastern European countries experience a strong demographic decline, resulting in a reduction of food waste, in spite of comparatively high economic growth rates.

For the EU-27 as a whole, a stable development from 56.98 million tonnes to 57.04 million tonnes of food waste is projected.

Figure 22 – Food waste, GDP, Population, % change 2020-2030, MSs



Source: MAGNET simulation results

Building on the JRC MFA shares, the food waste distribution across stages of the supply chain and across food groups in 2020 is calculated and projected to 2030 in Table 23.

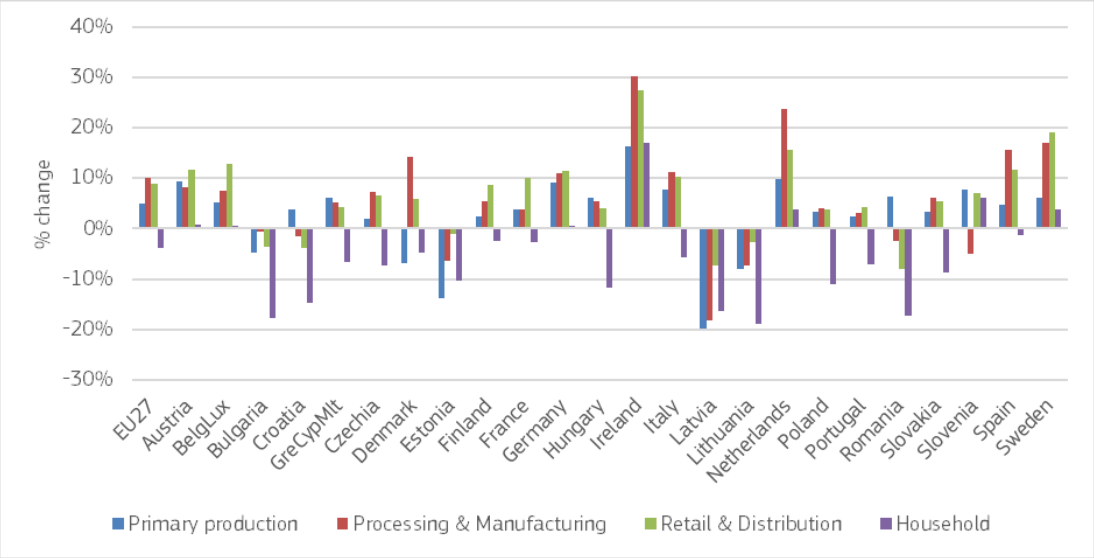
Table 23 – Food waste distribution across stages of the supply chain and across food groups for 2020 and 2030, EU-27

	2020					2030				
	Primary production	Processing & Manufacturing	Retail & Distribution	Household	Total	Primary production	Processing & Manufacturing	Retail & Distribution	Household	Total
Cereals	3.5	8.6	22.3	6.5	7.7	3.1	8.6	21.5	5.8	7.2
Dairy	4.8	11.4	7.4	7.1	7.6	5.1	12.0	7.7	7.6	8.1
Eggs	1.0	0.8	0.8	0.1	0.4	1.1	0.8	0.8	0.1	0.4
Fish	10.7	4.1	6.9	1.7	3.5	9.7	4.0	7.4	1.8	3.5
Fruits	32.6	29.7	19.4	18.3	22.0	32.7	29.3	19.1	17.0	21.4
Meat	0.0	18.0	17.0	8.0	9.5	0.0	18.2	18.0	7.5	9.6
Oils	0.7	0.8	2.0	1.3	1.2	0.6	0.8	1.9	1.1	1.0
Sugarbeets	0.0	0.0	8.0	0.3	0.8	0.0	0.0	7.8	0.3	0.8
Vegetables	46.8	26.6	16.2	21.3	24.6	47.8	26.3	15.8	19.7	23.8
Other food	0.0	0.0	0.0	18.5	11.9	0.0	0.0	0.0	18.8	11.5
Others	0.0	0.0	0.0	2.5	1.6	0.0	0.0	0.0	2.5	1.5
Food service	0.0	0.0	0.0	14.5	9.3	0.0	0.0	0.0	17.9	11.0
						0.0	0.0	0.0	0.0	0.0
Total	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*

[276] EU14 countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Republic of Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain and Sweden.

Source: MAGNET simulation results

Figure 23 – Food waste along the food chain, % change 2020-2030, MSs



Source: MAGNET simulation results

The main purpose of the baseline remains to provide a reference (scenario) for assessing the impacts of the policy scenarios and comparing the different options among themselves. The starting point for food waste reduction is nevertheless important for the costs as, in principle, the rule holds that the higher the initial food waste value, the costlier the reduction.

1.2. *Discarded food measures*

While on food waste the only measures considered were different forms of reduction targets, during consultations (inception impact assessment, public consultations, EU Platform) stakeholders requested that additional food waste prevention measures be considered..

1.2.1. Extend the scope of the WFD onto food lost in primary production and set relevant target

In particular, some stakeholders suggested extension of the scope of the WFD in order to cover food lost in primary production before, during or soon after harvest. This would allow setting up of reduction targets that would also address food lost on farm, that is which is left on the field or managed on farm, but not discarded as waste.

This measure was discarded on the basis of the criteria of political feasibility and proportionality. Extension of the scope of the WFD on this new area would require analysis of the consequences of applying existing waste management rules on biomass from primary production (which is currently excluded). In any case, it would add a completely new set of rules for primary producers.

Moreover, drivers behind food waste at farm level are linked to economic rather than environmental aspects of farm operations, in particular if such food waste savings are profitable

and who should carry related prevention costs. Therefore, the use of environmental legislation for regulating such aspects is not proportional.

1.2.2. Modify food safety legislation to reduce amount of food wasted due to safety measures

Several stakeholders suggested to use this opportunity to modify other legislation, in particular the Regulation on Animal By-Products in order to facilitate – where safe to do so - easier use as animal feed of food that is currently discarded. This measure was discarded using the criterion of coherence with other EU policy initiatives. Food safety remains a priority and any new developments in this area - even if linked to sustainability- need to be proven to be safe before they can be proposed. Therefore, such measures can only be proposed in the relevant food safety legislation.

1.3. Considered policy options

With a view to design the options, three main aspects have been taken into account: the scope of any potential targets (coverage of food supply chain), the way in which targets are expressed, and the way targets are implemented in Member States. The analysis covered the following choices:

- Scope:
  - S1 – target covering the whole food supply chain, from primary production (e.g. farm) to final consumer;
  - S2 – target covering only selected stages of the food supply chain (for example SDG Target 12.3 sets targets at retail and consumer levels).
- Expression
  - E1 – target expressed as % of food waste reduction from the amount of food waste in the baseline year (2020) to target year (2030);
  - E2 – targets expressed as absolute amounts, i.e., in kilograms per capita per year to be achieved by 2030 (per country).
- The way the targets are set for Member States
  - T1 – the same target level for all Member States;
  - T2 – target level differentiated by Member State;
  - T3 – collective target on EU level – based on MS contributions.

Following input received from stakeholders including consultations (see in particular Annex 2, section 1, Inception Impact Assessment), the Commission has further analysed modalities for setting the targets and proposes the following approach.
Scope: S1 - Policy options should explore target (or targets) along the whole food supply chain, albeit target levels may differ amongst the different stages. This is reflected in the selection of scenarios that model the results for different target levels and for different stages of the food supply chain.

Expression: E1 - target should be expressed as % of food waste reduction from the amount of food waste in the baseline year (2020 or earlier if credible data are available) to target year (2030).

The way the targets are set for Member States: T1 - the same target level for all Member States

Table 24 : Advantages and challenges of the different settings for food waste reduction targets

Possible approaches for setting the scope of the targets	Advantages	Challenges
Consumption and retail only (including households, restaurants/food services, retail)	• Better focus on identified hotspots and highest environmental gains (including embedded emissions); • Higher acceptability by Member States; • Likely acceptability from industry (depending on levels); • Lowest administrative burden and potential cost for food industry and farmers;	• Less incentives for cooperation between actors in the food supply chain; • Lowest acceptability from NGOs and probably general public (viewed as lowest level of ambition); • Risk of being accused by some stakeholders of "putting the burden on consumers and not recognising the role of other actors in the food value chain". • Better aligned to SDG Target 12.3 which only sets a quantitative target (50% reduction) at retail and consumption but also calls on reducing food losses along the whole food supply chain.
Consumption and retail + food processors/manu-facturers	• Additional coverage of large food processors/manufacturers, in line with commitments made under Code of Conduct, Champions 12.3 *etc*.; • Better cooperation to reduce food waste along the food supply chain; • Additional support for addressing date marking challenges, in line with FIC revision; • Better acceptability from general public.	• Member States' implementation may lead to additional administrative and financial burden on food processors/manufacturers (not expected to be significant); • Food processors declare commitment to SDG 12.3 target, but acceptability of targets is uncertain; • Relatively low additional environmental gains; • Implementation is susceptible to legal interpretation (waste vs by-products).
Consumption and retail + food processors/manuf acturers + primary producers (farmers)	• Full coverage of the food supply chain; • High acceptability from general public and by environmental NGOs; • Awareness raising at farm level; • Could be a precursor for addressing (pre-harvest) farm losses;	In addition to the abovementioned points: • Risk of strong opposition from farmers and their organisations which may require guarantees that during implementation they will not carry the burden caused by other actors in the food chain; • Possible reluctance from some Member States;

		• Relatively low additional gains from covering of primary production (food waste negligible amount of waste addressed); • Poor data coverage so far; • Implementation is susceptible to legal interpretation (waste vs-by-products + exclusion of certain types of farm biomass from WFD).
Options related to expression of the targets	**Advantages**	**Challenges**
E1: target expressed as % of food waste reduction	• Easiest and most understandable option; • Harmonized with potential future reduction targets of the WFD; • Less likely to be affected by the selection of reporting methods, errors/inaccuracies and modification of the measurement methodology.	
E2: target expressed as absolute amounts, i.e. in kilograms per capita per year to be achieved by 2030	• More results-orientated; • "Fair" method as the countries with low food waste generation need little or no effort.	• Not effective to set targets for the stages of primary production and processing and manufacturing of food; • More susceptible to the selected reporting methods, reporting errors/inaccuracies and modification of the measurement methodology.
Options related to the way in which targets are set for MS	**Advantages**	**Challenges**
T1: the same target level for all Member States	• Simple approach; • EU-wide level playing field; • Least hampered by potential data problems; • Consistent with other targets in WFD.	• Less consideration for national situations • Less involvement from Member States.
T2: target level differentiated by Member State	• Better takes into account national situations.	• Lack of time series data to assess evolution of food waste amounts (and potential for reduction) for each Member State; • Criteria for differentiation of the targets would require further

		development, which would further delay the process.
T3: collective target on EU level – based on MS contributions	• Greatest support during Inception IA[277]; • Potentially most involving Member States; • Incentivises action across EU while taking into account national situations.	• Most complicated; • Requires negotiations on share of each MS, which are expected to take very long and are very resource consuming; • Lack of time series data to assess evolution of food waste amounts (and potential for reduction) for each Member State.

As the Inception IA focussed on the Commission's commitment to propose legally binding targets, setting voluntary targets on food waste reduction was not part of stakeholders' consultations.

1.4. Recommended actions for Member States to reach the targets

Setting targets in EU waste legislation is a policy instrument, which requires that Member States take action in specific areas of waste management but gives Member States full flexibility in selecting the measures needed to achieve the targets. The advantage of targets is that they allow Member States to take into account the specific situation in their respective territories in order to choose the policy instruments that would be the most efficient and effective in order to reach the waste targets.

Examples of key actions taken by countries which have made significant progress in reducing food waste can be found hereunder:

[277] Based on feedback received, 21 contributions favoured T3, 14 called for T1 and 5 supported T2.

Examples of key actions by countries

- **Setting a target** to stimulate action by all players in the supply chain, in accordance to those set at international level (Courtauld commitment in the UK: https://wrap.org.uk/taking-action/food-drink/initiatives/courtauld-commitment)
- **Conducting periodic measurement to assess progress** against a baseline/benchmark (e.g., The Netherlands – United Against Food Waste, Norway)
- **Launching and coordinating actions between public authorities** (government, agencies) and private businesses in the food supply chain as well as other enabling actors including NGOs, academia, media, financial institutions. This can take the form of:
    - public-private partnership/Voluntary Agreements (e.g., The Netherlands – United Against Food Waste, Germany – Dialogue Forums)
    - and/or legislative framework to ensure engagement of all actors towards a common, agreed goal (France – anti-waste law for a Circular Economy)
- **Creating an enabling policy and legislative environment for implementation of the waste hierarchy**, i.e., to:
    - **facilitate redistribution** of surplus food for human consumption (e.g., clarification through guidance and amendments, if/as needed, of relevant food safety legislation; legal obligations for food business operators to donate surplus food – France, Czech Republic, fiscal incentives for food donation – France, Spain, Portugal…)
    - **promote circularity in the food supply chain**, in particular the use of former foodstuffs and by-products in animal feed (e.g., by national legislation in Lithuania clarifying procedures for the use of food of non-animal origin for feed and in Latvia on registration of businesses involved in animal feed valorisation and guidelines in Denmark with examples of the use of feed from food products of both animal and non-animal origin).
- **Providing clear direction and guidance** (e.g. UK Food Waste Reduction Roadmap, Ireland's National Food Waste Prevention Roadmap 2023-2025) and associated resources to support food businesses in implementing Target-Measure-Act (e.g. French Environment Agency – ADEME- supporting diagnoses by food business operators, the Netherlands – tailor-made advice to cut food waste in business operations)
- **Engaging consumers** through awareness raising campaigns and behavioural change interventions (e.g., UK – Love Food, Hate Waste, Germany, The Netherlands...).

Specific actions targeting food waste at consumption level

Food waste at consumption represents the major hotspot for food waste generation in the EU and should therefore be a key focus area for Member States' intervention. There is no single solution, and the evidence suggests that changing consumer behaviours (better food management, better understanding and use of date marking...) is not easy and requires sustainable action carried out over time and involving multiple partners. (For more information on consumer behaviour drivers, see Annex 7). Simple awareness raising is not enough. It is important to understand the drivers for food being wasted at a household level and real change requires a mix of interventions that target specific behaviours and are tailored to the needs of specific consumer groups. This will be best achieved by a **partnership of actors in the food system working together**, with strategies and tools (including use of digital solutions as appropriate) adapted to the awareness, attitudes, motivation and information needs of targeted population groups in the Member States.

A Guide on Changing Behaviour to help more people waste less food, developed by the Champions 12.3 network, provides guidance to help key actors in the food system, including government,

focus on how they can help consumers reduce food waste through behaviour change. In the EU, the **European Consumer Food Waste Forum** (ECFWF) – bringing together both academics and practitioners to work together to develop solutions and tools to address consumer food waste- is expected to deliver a best-practice compendium by July 2023.

Countries which have achieved significant reduction of consumer food waste associate both **public-private partnerships** between government and actors in the food supply chain, committed to a common roadmap for food waste reduction at national level, with a **public behaviour change campaign.**

The examples in the textbox below illustrate the type of initiatives implemented by governments and private sector organisations to help consumers reduce food waste (in the EU and beyond).

Examples of different types of consumer targeted actions

- In the United Kingdom, the Waste and Resources Action Programme's (WRAP), '**Love Food, Hate Waste' (LFHW) programme** helped reduce consumer food waste by 21% in 5 years. Its consumer-focused campaigns, developed in collaboration with government, celebrities and businesses, aim to **increase awareness about the costs of food waste and provide practical strategies** for reducing food waste. WRAP's **behaviour change programme** includes a range of interventions, for example a nudge on bread packaging designed to change the existing perception that bread (one of the top 5 wasted items) is only fresh for four days. The LFHW programme cost £26 million over five years to implement but was responsible for £6.5 billion in savings to households in avoided food costs, as well as £86 million in savings to UK government authorities in avoided waste disposal costs. Altogether, the initiative reaped a total benefit-cost ratio of 250:1 and avoided 3.4 million tons of greenhouse gas emissions and saved 1 billion cubic meters of water.
- In the **Netherlands**, the ongoing **national food waste activation campaign** contributed to a significant reduction of food waste in Dutch households: a reduction of 17% compared to 2016 and 30% compared to 2013.
- In **Portugal**, as part of the 'United against Waste Alliance', the Portuguese Retailers Association launched a national campaign in supermarkets to educate consumers about the difference between 'use by' and 'best before' dates.
- **School education materials** have been developed in many countries and regions including: Flanders (Belgium), Estonia, Hungary and Ireland.
- **Technology providers,** in particular **digital,** also have a role to play. For example, Too Good to Go, a **mobile application** that connects customers to restaurants and stores that have unsold food surplus, **initiated national pacts with food business operators** on **date marking**, sometimes in collaboration with public authorities in Member States (e.g., Belgium, Denmark, France, Poland, Spain, etc). **Smart bin technologies** have been used to track and reduce food waste in the **food services sector** and are now being developed for **use by consumers** as well as **mobile apps** to monitor food waste in households. The **online platform**, Foodiverse, run by the social entreprise, FoodCloud, and operating in four markets (Ireland, United Kingdom, Czech Republic and Slovakia) **facilitates the redistribution of surplus food** by connecting food businesses, government and non-profit organisations such as food banks and other charities. Digital technology is also **used by supermarkets to reduce the price of fresh food** based on its expiry date (e.g., Wasteless, operating in cities located in Germany, Italy, the Netherlands, Poland, Slovakia and the United States).
- **Large employee-based organisations** can work with their employees, to engage them in making small changes that can make a big difference to food waste, recycling and health (EU Small Change Big Difference campaign, funded by LIFE).

Selection of target levels to reduce food waste.

Selection of target levels is always to some extent arbitrary. To gather more information on what level of target would be feasible, the European Commission funded a study by LEI Wageningen UR on "Reducing food waste by households and in retail in the EU; A prioritisation using economic, land use and food security impacts" in 2013. (http://edepot.wur.nl/290135). The report concluded with proposing three food waste reduction target levels: 50% ("ambitious"), 40% ("realistic") and 30% ("modest"), which were to be realised over the period 2012-2020. When confronting results of that study with actual reductions achieved then by Member States, which have started to measure progress at least in some sectors (UK, NL) as well as several pilot studies from other countries, the proposed targets have been lowered respectively to 15%, 20% and 30%.

The 15% level is at the lower end of ambition, relatively easily achieved (catching the 'low hanging fruit') with awareness raising actions and sharing of best practice; a 20% reduction target would require a more concerted effort and a higher initial cost of prevention activity; while 30% was assessed as ambitious, but not impossible. These targets were planned to be achieved over 9 years (2014-2025).

In this impact assessment we propose to test again lower and upper band limit of the 2014 Impact Assessment (i.e., 15% and 30%) and add a scenario equivalent to SDG 12.3 - i.e., 50% reduction. While there is significant progress in knowledge about the drivers behind food waste and possible solutions as well as established definitions and a monitoring framework, it should be noted that there is much less time for action if the targets are to be achieved by 2030. If targets are adopted in 2024, it leaves only 6 years, which may be challenging, given the time required to build and implement a wide-ranging food waste prevention campaign specific to the individual Member State.

The 25% target for food waste from processing and manufacturing is based on the call of the UNFSS Coalition on *Food is Never Waste*, which proposed in addition to SDG Target 12.3, to also set a specific target on food losses (which in the EU is equivalent to food waste from processing and manufacturing) at 25%. 25% is an ambitious target, especially bearing in mind that operators have an inherent economic incentive to reduce food waste and state that the potential for further reduction, linked to targets, is limited and that, in any case, will vary according to the type of business operation. For that reason, we have also proposed a more moderate target for this stage at the level of 10%, which is generally in line with commitments to reduce food waste made under the Code of Conduct.

Finally, to ensure covering the whole food supply chain, a 10% reduction target is also set on primary production for policy option 3 (advanced). However, there is very limited available evidence about reduction achieved or even potential for reduction of food waste in that sector. It should be noted that primary production is not covered by the index measuring progress towards SDG 12.3 (FWI - Food Waste Index).

The 2014 Impact Assessment proposed one target for the whole food supply chain, allowing Member States to decide whether to reduce food waste along the whole food supply chain or to focus on selected stages only. However, for this impact assessment, it was decided to consider a specific target for retail and consumption stage (as suggested by SDG 12.3) as well as separate target (or targets) for the supply side (primary production and processing and manufacturing). By

following such an approach, no stage is neglected, and Member States are obliged to address both supply and consumption in the food value chain.

Finally, it has also been decided to test Option relying on setting voluntary target for Member States. The voluntary target would be based on formulation of SDG Target 12.3 i.e., 50% reduction of food waste for the retail and consumption stages (jointly), with no numerical commitment assumed for earlier stages. This option would not be subject to enforcement mechanisms other than annual reporting of food waste levels.

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PART 4/4

COMMISSION STAFF WORKING DOCUMENT

IMPACT ASSESSMENT REPORT

Accompanying the document

Directive of the European Parliament and of the Council

amending Directive 2008/98/EC on waste

{COM(2023) 420 final} - {SEC(2023) 420 final} - {SWD(2023) 420 final} - {SWD(2023) 422 final}

ANNEX 11: IMPACTS OF THE POLICY MEASURES/OPTIONS

1- Textiles

The present chapter summarises the main impacts that could be expected from the implementation of options and measures identified in Annex 10. All three options will have economic, social and environmental impacts through a variety of channels. Based on desk research and interviews with stakeholders, the most significant impacts have been identified. This section provides an assessment of the retained measures. A quantitative assessment was performed, whenever possible, and a justification provided why a quantitative approach was not feasible. Otherwise, a qualitative assessment is provided.

In all cases the costs and benefits assessed are considered to relate directly to the measures concerned i.e., causal costs and benefits are allocated to each measure. In cases where costs and benefits would be expected to accrue under the baseline only the additional costs and benefits stemming from the measure itself are included. In the case of measure 2.9, by way of example, the resulting amounts of textiles that would be collected, sorted, reused, recycled and disposed of are the same as in the baseline. The changes resulting from the measure itself relate to the way in which those changes are funded and compliance assessed. It is these causal impacts that are, therefore, presented in this Annex.

Option 1: Supporting Member States to implement and enforce current provisions

Measure 1.1 – Clarifying definitions in relation to textiles and textile waste

Sub-measure 1.1 – Definition of '*textiles*'

Assessment of impact alternative 1

Economic impacts

Defining textiles in line with the Textile Labelling Regulation would enable a full life cycle approach to be taken for textiles in relation to their initial labelling, their management under the WFD as regards their reuse and waste management at the end of their lifespan. The definition would include raw, semi-worked, worked, semi-manufactured, manufactured, semi-made-up or made-up products encompassing a broad range of textile goods including, for example, yarns, floor coverings and carpets and would make clear that action to mitigate the environmental impacts of this broad family of textiles should be taken addressing both pre-consumer and post-consumer textiles. However, this definition is far broader than what is considered in practice as textiles in Member States and what is currently separately collected. Hence additional textile goods would be subject to the obligations currently applicable with consequent changes in waste management systems given the currently low levels of separate collection of those materials.

The volumes of these additional textiles collected under this broader scope are estimated at 4 million tonnes per year. It could be expected that for at least a proportion of these textiles where options for reuse and recycling exist that increases in such activities would take place. As noted below under environmental impacts mattresses currently have a reuse and recycling rate of 20%

across the EU and carpets have a rate of 1-3%. Including such materials in the scope of textiles under this definition and acknowledging the obligations that would then apply including the separate collection obligation under Article 11, these rates or reuse and recycling would be expected to increase. However, it is not possible to credibly quantify the additional tonnes that may be able to be reused or recycled due to insufficient data available.

This definition would pose challenges in relation to waste collection infrastructure, for example for floor coverings and carpets that are typically considered as bulky waste. Were Member States to collect 50% of this additional textile quantity (in keeping with the estimated trend for 50% collection of clothing and household textiles by 2035) the additional collection costs would amount to at least 660 million euro per year. Treatment costs for this broader family of textiles would vary given the nature of the materials collected. The reuse and recycling of floor coverings and carpets also bears little resemblance to the techniques applied to clothing and other household textiles and their possible comingling under this definition may hamper these processes rather than support them and separating them from the other less bulky textile wastes, predominantly clothing and household textiles, would entail additional costs. The manner in which these costs would be applied to this broader scope of products is likely to vary. In countries where EPR applies or is planned to apply then the costs would fall on the producer. Producers would either have to absorb those costs that would lower their profitability or increase the costs to consumers of the products themselves. Where EPR is not applied then costs may be met via the likes of disposal fees applied at the point of disposal or general taxation. The extent of these additional costs is difficult to determine. As noted in Annex 4, an impact of 0.6% of the cost of a textile item for collection, sorting and treatment has been identified as the nearest proxy for the costs of discarded textiles. A similar cost may be expected to be applied in the case of a broader scope of textiles under this sub-measure.

Footwear is not subject to the Textile Labelling Regulation. The textile component of footwear is addressed under Directive 94/11/EC relating to labelling of the materials used in the main components of footwear for sale to the consumer[1]. For those Member States that consider footwear to be included in textile waste under the WFD defining textiles based on the Textile Labelling Regulation would specifically exclude footwear for the purpose of the legislative measures within the WFD specifically targeting textiles despite the fact that the European List of Wastes does not provide a separate listing for footwear or shoes, and it is assumed that footwear is captured under codes 20 01 10 (clothes) or 20 01 11 (textiles). This contradiction could be somewhat tempered by making clear that Member States may choose to allow other apparel products such as shoes, belts or jewellery to be collected in the same collection systems as textiles (it is estimated by the JRC that footwear accounts for 5-7.5% of weight collected in separate collection systems at present). For the EPR scheme (measure 2.9), this would also cover the costs of collection and sorting of shoes and possibly other apparel included in the scope of the collection. Given the relatively small proportion by weight of these goods and their reuse value, the expected impact of allowing

[1] OJ L 100, 19.4.1994, p.37

additional items to be collected is likely to be small but would in the case of lower quality footwear make schemes less profitable overall.

Leather clothing and apparel would also be excluded under this definition. Whilst by volume such goods are likely to represent a small fraction of the clothing and apparel market (less than 1% of the collected volume of materials included in textile collection systems) they have proven to have been captured in the systems employed by Member States for textile goods and their inclusion under this option would allow Member States to continue to collect some materials for the purpose of compliance with the requirements of the WFD that apply to textile goods overall.

The effectiveness and efficiency of this sub-option would be limited by the broad nature of textiles that would be addressed i.e., resources to address textile wastes would be spread over a much larger set of textiles than are currently addressed by Member State infrastructure that focusses on clothing and household wastes that make up most textiles discarded. Furthermore, in relation to efficiency this measure would potentially increase costs of textile waste management significantly in relation to the baseline, with the expected economic value of the textiles reused or recovered likely to be less than that for a more targeted definition of textiles and accompanying measures.

With regard to pre-consumer waste, including post-industrial, pre-consumer and post-consumer commercial textile waste, the existing waste regime presently requires that the waste producer treats the waste in line with the waste hierarchy. As noted earlier, it is assumed that where there is a market value for the textile waste and transport to the recycling infrastructure is economically feasible it is valorised in view of its clear and consistent composition that requires far less pre-processing for recycling. It is expected, therefore, that there would be no or only insignificant additional costs resulting from this alternative in comparison to the baseline.

Environmental impacts

The definition in line with the Textile Labelling Regulation would include raw, semi-worked, worked, semi-manufactured, manufactured, semi-made-up or made-up products encompassing a broad range of textile goods including, for example, yarns, floor coverings and carpets and would make clear that action to mitigate the environmental impacts of this broad family of textiles should be taken addressing both pre-consumer and post-consumer textiles.

The additional 4 million tonnes of textiles collected are likely to be subject to a significant change in their waste management given their currently low levels of separate collection. This would likely lead to a greater volume of textile goods that could be reused or subject to recycling, reducing the impacts of those wastes in comparison to their disposal which is the dominant destination for these other waste types at present.

There is a degree of differentiation to be made in relation to the additionally textiles types that would be collected and the likely environmental impact from their separate collection:

Pre-consumer textile wastes are raw, semi-worked, worked, semi-manufactured or semi-made up are likely to have a more significant environmental impact due to the possibility to recycle these materials more easily than for completed and post-consumer textile wastes. This is due to:

- Fewer disruptors (for example zips and buttons) in the materials collected making them easier to recycle than textile products that contain them.
- A better understanding of the textiles' composition compared to post-consumer textiles that have a much greater variety of materials.

The recycling of fibres contained in pre-consumer textiles are estimated to be worth approximately 230 euro per tonne, with each tonne of recycled fibre saving one tonne of GHG emissions compared to its disposal. The percentage of waste volume that would fall into this pre-consumer grouping is likely to be 5-10% of textile waste generated. This would mean that approximately 200-400 000 tonnes of additional recyclable textiles would be collected. There are additional water savings through closed loop recycling because it avoids production of virgin fibre. These would equate to approximately 258M to 516M m^3 of water per year[2].

However, in relation to post-consumer textile wastes the situations is likely to be more challenging. By way of example, mattresses currently have a reuse and recycling rate of 20% across the EU and carpets have a rate of 1-3%. Developing the necessary infrastructure to collected, sort, reuse and recycle these types of textile wastes requires a different approach than for clothing and household textiles. Member States would require time to develop this infrastructure and it is unlikely that this would be feasible within the deadlines set under the existing WFD for separate collection. Therefore, the efficiency and effectiveness of this option is questionable.

Social impacts

The greatest social impacts would be linked to the need for higher levels of employment in the waste management sector. These result from Member States having to manage a broader set of products under the definition of textiles than is currently the case. In addition, there would be a reduction in the social costs of textile goods that are presently disposed and that are expected to be reused or recycled more under this measure. A clearer understanding of what textiles means in relation to the WFD is also likely to lead to more realistic and consistent data being collected whilst supporting a more level playing field between Member States. This would benefit all stakeholders including public administrations, businesses and citizens. However, the ability to split reporting to address particular textile product types is far more challenging as the Textile Labelling Regulation itself provides no such list of textile products, only a list of textile fibre names and textile products for which special provisions apply (such as specific labelling requirements or derogations). Providing reports based on textile fibre quantities by Member States is likely to be technically impossible given the mix of fibre types found in many textile products at present.

Administrative burden

Member States' understanding of what constitutes textiles affect the practical implementation of measures to manage textiles and textile waste and affects the related data reported by Member

[2] Norion consult for EuRIC, LCA-based assessment of the management of European used textiles, 2023.

States. A clarification of reporting obligations by Member States by more clearly defining the textile materials that should be captured by such reporting should reduce the administrative burden on Member States in determining their own textile reporting regimes against their own definition of what textiles comprise as is the case at present. More standardised reporting resulting from this measure should, therefore, help to reduce burdens whilst producing more reliable data.

In view of maximising administrative efficiencies and synergies with existing regulatory responsibilities in the waste prevention policy, the management of the data flow on re-use of products, including on textiles is better pursued by the EEA instead of the Commission which should, according to the Article 37 of the WFD be receiving the data from Member States. It is therefore proposed to amend Article 37 of the WFD envisaging that this data flow is to be reported to and managed by the EEA. This would require allocation of additional resources to the EEA for the fulfilment of this task.

Impact on SMEs and social enterprises

Most producers in the textiles' ecosystem are micro-enterprises (88.8% of 127 000 enterprises), with only 0.2% of enterprises being large companies. Clarifying the definition of textiles according to the Textile Labelling Regulation is likely to have no significant additional administrative burden on SMEs as they already comply with the Textile Labelling Regulation (unless they are subject to the specific exclusions provided for in that Regulation).[3] On the contrary SMEs are likely to benefit from an alignment of the scope which makes the applicable rules easier to understand.

Defining textiles according to the Textile Labelling Regulation would significantly expand the types of textiles to be collected under Article 11(1), potentially adding significant burden to social enterprises as well as any commercial SMEs that operate collection systems. Those systems would have to expand to include textiles that are currently not targeted. Such a broadening would have significant negative impacts on SME collectors and social enterprises which are currently focusing on the collection of reusable textiles due to their value. This impact may be offset if the differing nature of these other textile products in terms of their methods of collection storage and recycling was considered in identifying the relevant actors for their management. By way of example, discarded mattresses are unlikely to be resold in social enterprises and are more likely to be sent for recycling where their most valuable components (metals and foams) are removed by actual waste management companies means that Member States could not simply rely on the existing clothing and household textile collectors to manage mattresses – instead a more active engagement of waste management companies would be required to be implemented.

Stakeholder evidence

[3] The Regulation does not apply to textile products which are contracted out to persons working in their own homes or to independent firms that carry out work from materials supplied without the property therein being transferred for consideration. It also does not apply to customised textile products made up by self-employed tailors.

Stakeholders indicated that this is a useful measure if it includes a clear scope on what products are included – and excluded – in the term 'textiles' for the purpose of the WFD and "would help to establish what is to be included in separate collections" [4]. Stakeholders do not think it is necessary to regulate how collections are carried out but indicate that a common scope is essential.

Stakeholders consider that items thrown away should be deemed as waste. In a few EU countries, there are bins for both reusable and non-reusable textiles, but these are often mixed-up by consumers. The sorting needs to be carried out by professional sorters, therefore better labelling and/or definitions might not resolve this. The same respondent considered that over-the-counter donations should also be considered waste because the fact that a product is donated for an economic purpose (potentially ruling it out of being considered waste) is important, but not a determining factor as there is an economic factor behind many choices, including recycling and to align it with economic element would mean nothing would ever be classed as waste.

All alternatives are considered to be suitable alongside an EPR scheme.

Assessment of impact alternative 2

Economic impacts

Setting a definition in keeping with the CN Regulation would provide a definitive list of textiles for the purpose of the WFD. The CN codes themselves provide a list by which producers of post-industrial pre-consumer and post-consumer commercial textiles waste would be addressed by the codes addressing raw, semi-worked, worked, semi-manufactured, manufactured, semi-made-up or made-up products (generally chapters 50, 51, 52, 53, 54, 55, part of 56, 57 (with the exception of turf), 58 and 60) whilst post-consumer household waste should be easily identifiable using the codes under chapters 60, 61, 62, parts of 63 and parts of 65. Descriptions like 'overcoats', 'shirts and blouses' and the like being generally understandable to consumers discarding textiles as well for those who are likely to be involved in the subsequent treatment of textiles under the WFD. This improved delineation of textile products covered by the WFD - and subsequent national provisions - would enable a level playing field as it would provide a common understanding of the scope of textiles and textile waste in comparison to the present. It would also allow more targeted action to be put in place in comparison to alternative 1 that would address a broader and less clearly delineated set of textiles. Economically, this would ensure that action is focussed on those textiles that warrant action under the WFD and ensure a level playing field across the EU in terms of what is required of Member States.

Similarly to Alternative 1, since the existing waste regime already requires waste producers to treat their waste in line with the waste hierarchy, it is expected that there would be no or only insignificant additional costs resulting from this alternative in comparison to the baseline.

The impacts in terms of volumes of textile wastes separately collected, sorted and treated would be dependent on the final scope of CN codes included under this measure. If the scope remained similar to the scope currently employed by Member States (i.e. with a focus on post-consumer

[4] Interview with Ellen MacArthur Foundation.

clothing and household textiles) flows would be unlikely to vary in comparison to the baseline. However, should additional textile types be included then the collection, sorting and treatment of those textiles would be expected to increase in keeping with obligations that currently apply to textiles including the separate collection obligation under Article 11. Whilst an increase would be expected, it has not been possible to quantify the potential increase in tonnes as not all Member States have provided details as to the scope of textiles that they currently consider in their own textile management schemes to allow such quantification to take place.

Footwear and leather clothing and apparel would be included under this definition. Given that these types of goods have proven to have been captured in the systems employed by Member States for textile goods their inclusion under this option would allow Member States to continue to collect some materials for the purpose of compliance with the requirements of the WFD that apply to textile goods overall. This would avoid a situation whereby Member States may otherwise feel the need to employ separate systems for such clothing and apparel that is unlikely to be economically viable given the relatively small quantities concerned.

Similarly, any addition in scope would entail additional collection, sorting and treatment. As for Alternative 1, in countries where EPR applies or is planned to apply then the costs would fall on the producer. Producers would either have to absorb those costs that would lower their profitability or increase the costs to consumers of the products themselves. Where EPR is not applied then costs may be met via the likes of disposal fees applied at the point of disposal or general taxation. Similarly for Alternative 1, the additional costs are likely to fall around 0.6% of total product cost with the application of those costs being absorbed by the producer, being passed on to the consumer or a mix of both.

Environmental impacts

The definition would include raw, semi-worked, worked, semi-manufactured, manufactured, semi-made-up or made-up products encompassing a broad range of textile goods including, for example, yarns, floor coverings and carpets and would make clear that action to mitigate the environmental impacts of this broad family of textiles should be taken addressing both pre-consumer and post-consumer textiles. This would mean that the separate collection provisions of Article 11(1) for which the majority of Member States have targeted clothing and household textiles could be defined as significantly broader, obliging Member States to provide for separate collection of other textiles types with the expected environmental benefit from greater levels of separate collection being higher levels of reuse and / or recycling of those materials than at present.

In comparison to alternative 1, alternative 2 offers the opportunity to include additional specific products such as entire mattresses, umbrellas and textile covered furniture by referring to the relevant applicable CN code allowing the environmental impacts of these specific product types to be addressed under the already existing obligation for separate collection under Article 11(1).

As outlined in the description of alternative 3, the WFD applies to a broad range of wastes with only certain exclusions as outlined in Article 2. Defining textiles based on a limited number of CN codes poses the risk of unnecessarily restricting the scope of measures for textiles under the WFD, thereby preventing action being taken on other problematic textile and textile like wastes. A long

list has been drawn up as included in Table 39 but there may be additional materials containing textiles – for example Chapter 94 that includes furniture – that may warrant action that would be excluded in alternative 2. A possible solution to address this would be to make the list under this option progressive i.e., the list could subsequently be complemented as other textile containing products are identified that warrant action to address the waste management challenges associated with them.

Social impacts

A clearer understanding of what textiles means in relation to the WFD is also likely to lead to better and more realistic data being collected whilst supporting a more level playing field between Member States. This would benefit all stakeholders including public administrations, businesses and citizens. The ability to identify textiles by specific codes, in theory at least, allows greater precision of textiles and textiles waste reporting according to the CN code. However, whilst this granularity would provide more helpful information, requiring reporting for all the CN codes suggested for inclusion as the definition of 'textiles' is likely to prove overly burdensome in comparison to the usefulness of the data collected.

Administrative burden

As is the case for alternative 1, a clarification of what Member States should be reporting as 'textiles' should reduce the administrative burden on Member States in determining their own textile reporting regimes. More standardised reporting should help to reduce burdens whilst producing more reliable and comparable data. Given the greater clarity of scope of alternative 2, it is likely that the administrative burden reduced by alternative 2 would be greater than that of alternative 1. It is estimated that the administrative burden reduction stemming from a clarification of reporting obligations would result in savings of approximately 250 000 euro per year.

Impact on SMEs and social enterprises

As in alternative 1, given over 99% of producers of textiles are SMEs, clarifying the definition of textiles is unlikely to have any significant impact on SMEs as they already comply with the textile labelling Regulation unless subject to the specific exclusions provided for in that Regulation[5].

As under alternative 1 and depending on which CN codes are included, defining textiles according to CN codes could significantly expand the types of textiles to be collected under Article 11(1). This could potentially add significant burden to social enterprises as well as any commercial SMEs that operate collection systems to cover the textiles not currently targeted by their collection schemes. Such a broadening would have negative impacts on SME collectors and social enterprises accordingly in view of the increasing share of non-reusable fractions. However, using a list that is

[5] The Regulation does not apply to textile products which are contracted out to persons working in their own homes or to independent firms that carry out work from materials supplied without the property therein being transferred for consideration. It also does not apply to customised textile products made up by self-employed tailors.

in keeping with current interpretations applied in most Member States would limit this potential impact. This is without prejudice to measure 2.9.

Stakeholder evidence

Stakeholders mentioned that aligning terminology and regulations will provide a common understanding and be the basis for better monitoring of a wider set of fibres and products. This should be combined with the JRC work on EoW criteria for textiles to ensure there is a clear definition of what are textiles and when they cease to be waste[6]. Stakeholders indicated that establishing clarifying definitions on waste and ownership of waste, and to what extent waste should be exported if it cannot be recycled is critical.[7].

Assessment of impact alternative 3

Economic impacts

Alternative 3, in comparison to alternatives 1 and 2, would take a broad definition of textiles for the general purpose of the WFD, whilst allowing the targeting of specific measures to specific textile types. By way of example, defining textiles more broadly in relation to reporting requirements would allow the Commission to define data collection across several different textile product types in order to better understand the volumes of textile types placed on the market, the methods of their management when they become a waste and the challenges that may require action to be taken in the future. At the same time, narrowing specific measures to specific textile types using CN codes allows measures to be targeted more effectively than referring to textiles in general. A good example of where this may be best applied is in relation to Article 11(1) whereby a focus on the largest share of textile wastes – clothing and household textiles – would avoid Member States focussing efforts on other wastes that were not originally intended to be addressed by such measures or for which another different targeted approach should be applied. Such lists of textile types subject to specific measures based on CN codes need not necessarily be addressed in the definition Article of the WFD itself (Article 3) but could be included in an Annex of textile products to which specific measures are addressed.

Additionally, a broad reading of textiles would be at odds with the definitions currently applied by Member States, requiring them to expand the systems in place to address textiles in their implementation of the WFD. This alternative would avoid the necessity of those changes. This is particularly important for more specialist textile types such as tents, awning, umbrellas and other materials designed for particular use conditions. Such materials may be challenging in relation to recycling due to their composite material and the likely use of chemicals for the purpose of waterproofing in their everyday use. The reuse potential of these additional materials may also be hindered by the issue of scale of materials concerned i.e., they represent roughly 3% by weight of what would constitute textiles but are more specialist in their application.

[6] Feedback from workshop.
[7] Interview with Teko & Svenshandel

As is the case with alternatives 1 and 2, the existing waste regime already requires waste producers to treat their waste in line with the waste hierarchy. Therefore, it is expected that there would be no or only insignificant additional costs resulting from this alternative in comparison to the baseline.

Furthermore, in keeping with alternative 2 the impacts in terms of volumes of textile wastes separately collected, sorted and treated would be dependent on the final scope of CN codes included under this measure. If the scope focussed on post-consumer clothing and household textiles flows would be unlikely to vary in comparison to the baseline.

Footwear and leather clothing and apparel would be included into the separately collection schemes under this alternative. Given that these types of goods have proven to have been captured in the systems employed by Member States for textile goods their inclusion would allow Member States to continue to collect some materials for the purpose of compliance with the requirements of the WFD that apply to textile goods overall. This would avoid a situation whereby Member States may otherwise feel the need to employ separate systems for such clothing and apparel that is unlikely to be economically viable given the relatively small quantities concerned.

However, should additional textile types be included that are not currently addressed by Member States under their obligations under the WFD then the collection, sorting and treatment of those textiles would be expected to increase in keeping with obligations that currently apply to textiles including the separate collection obligation under Article 11. Whilst an increase would be expected, it has not been possible to quantify the potential increase in tonnes given the data at the Member State level that dictates their current scope of textile waste management is not accessible across the EU but only for a proportion of Member States as presented in Annex 6.

Similarly, any addition in scope would entail additional collection, sorting and treatment. As for alternatives 2 and 3, in countries where EPR applies or is planned to apply then the costs would fall on the producer. Producers would either have to absorb those costs that would lower their profitability or increase the costs to consumers of the products themselves. Where EPR is not applied then costs may be met via the likes of disposal fees applied at the point of disposal or general taxation. Similarly for alternative 1 and 2, the additional costs are likely to fall around 0.6% of total product cost with the application of those costs being absorbed by the producer, being passed on to the consumer or a mix of both.

Environmental impacts

As is the case for alternatives 1 and 2, the definition used under this alternative would include raw, semi-worked, worked, semi-manufactured, manufactured, semi-made-up or made-up products encompassing a broad range of textile goods including, for example, yarns, floor coverings and carpets and would make clear that action to mitigate the environmental impacts of this broad family of textiles should be taken addressing both pre-consumer and post-consumer textiles.

In comparison to alternative 1 the opportunity exists to include additional specific materials such as. entire mattresses, umbrellas and textile covered furniture by referring to the relevant applicable CN code allowing the environmental impacts of these specific product types to be addressed.

As outlined in the introduction to alternative 3, the WFD applies to a broad range of wastes with only certain exclusions as outlined in Article 2. Defining textiles based on a limited number of CN codes poses the risk of unnecessarily restricting the scope of measures for textiles under the WFD, thereby preventing action being taken on other problematic textile and textile like wastes. A long list has been drawn up as included in the table above but there may be additional materials containing textiles – for example Chapter 94 that includes furniture – that may warrant action that would be excluded using the list provided. A possible approach to address this would be to make the list under this option progressive i.e., the list could be subsequently expanded to cover other textile containing products as deemed necessary based on their waste management challenges, for example furniture.

This alternative, under the broad heading of textiles as per the Textile Labelling Regulation, would continue to exclude certain products that require attention, for example mattresses that generate approximately 240 000 tonnes of textile waste per year and carpets that generate approximately 1.6 million tonnes of waste (the share of textiles is unknown). However, given the challenges in addressing the traditional use of a latex, water-based backing which cannot be removed from the pile fibres and creates a difficult-to-recycle material mix as well as the collection challenges related to textile waste this exclusion appears relevant given the lack of practicable options to address carpet waste as a textile at present. In the case of both mattresses and carpet an alternative categorisation exists under the WFD e.g., bulky waste, but for those Member States currently considering measures on mattresses under the textile heading these would generally be excluded as textiles using this definition. According to information provided by Member States, Hungary is the only Member State that currently considers carpets under their textile waste measures.

Social impacts

As is the case under alternatives 1 and 2, a clearer understanding of what textiles means in relation to the WFD is also likely to lead to better and more realistic data being collected whilst supporting a more level playing field between Member States. This would benefit all stakeholders including public administrations, businesses and citizens.

The alignment with the Textile Labelling Regulation in the definition of textile products would allow to harmonise this term across legislation applying textiles.

On the other hand, under this alternative it would be possible to define by CN-code specific measures addressing a subset of textile products and including non-textile wastes which currently are also captured in the same systems employed by Member States for textile goods.

Administrative burden

As is the case for alternatives 1 and 2, a clarification of reporting obligations should reduce the administrative burden on Member States in determining their reporting regimes against their current definition of what ‘textiles’ comprises. More standardised reporting resulting from this

measure should, therefore, help to reduce burdens whilst producing more reliable data. Given the more specifically defined scope of reporting by specific textiles types, the administrative burden reduced by alternative 3 would likely be greater than alternative 1. It is estimated that the administrative burden reduction stemming from a clarification of reporting obligations would result in savings of approximately 250 000 euro per year.

Impact on SMEs and social enterprises

As noted under alternatives 1 and 2, in relation to producers of textiles, most companies involved in the textiles and clothing industry are micro-enterprises with only 0.2% of enterprises being large. Clarifying the definition of textiles according to the Textile Labelling Regulation is likely to have no significant additional admin burden on SMEs as they already comply with the Textile Labelling Regulation (unless they are subject to the specific exclusions provided for in that Regulation).[8] On the contrary SMEs are likely to benefit from an alignment of the scope which makes the applicable rules easier to understand.

Alternative 3 offers the greatest flexibility to both make sure that textiles in their entirety are addressed by using the definition of textiles from the textile labelling Regulation whilst targeting specific measures within the WFD at specific textile types by referring to specific CN codes. Depending on the limit of the textiles determined to be addressed under this option, defining textiles according to CN codes could significantly expand the types of textiles that to be collected under Article 11(1), potentially adding significant burden to social enterprises as well as any SME commercial operators that operate collection systems to expand those systems to address textiles that are currently not targeted by their collection schemes. Such a broadening would have significant negative impacts on SME collectors and social enterprises accordingly. However, using a list that is in keeping with current interpretations applied in most Member States would limit this potential impact for the likes of Article 11(1) by focussing on clothing and household textiles whilst ensuring greater consistency of application of these measures for SMEs and social enterprises across the EU.

Stakeholder evidence

Stakeholders felt that a clear definition of reusable/recyclable is needed for textiles as currently, no specific criteria exist for an objective classification of discarded textiles into reusable or recyclable. This lack of definitions directly hampers a homogeneous classification of garments and the application of the waste hierarchy.[9]

For all alternatives there was consensus that any definitions should be EU-wide. This would ensure consistency which will drive ease of sharing, exports, and economies of scale. In addition to this, these definitions should be equally enshrined within all the different EU legislations to ensure

[8] The Regulation does not apply to textile products which are contracted out to persons working in their own homes or to independent firms that carry out work from materials supplied without the property therein being transferred for consideration. It also does not apply to customised textile products made up by self-employed tailors.
[9] Evidence from workshop.

shared indicators/reporting and objectives. This should include definitions of legally responsible economic operators as well as business related activities such as repair, remanufacture (remake) and second-hand must also be clearly stated and harmonized within all EU legislations [10] and possible beyond (i.e., Norway). [11]

Comparison of alternatives 1, 2 and 3 in terms of scope

Given that one of the most notable differences between alternatives 1 and 2 is in relation to the scope of textile products that would be addressed, the table below summarises the differences in scope that would be seen. Alternative 3 captures all elements in green for alternatives 2 and 3. However, under alternative 3 it would be possible to specify particular textile categories for different measures i.e., the overall definition of textiles would be broad as in alternative 1 but specific measures could be targeted at specific CN codes using an approach defined under alternative 3. By way of example, an Annex could be added to the WFD containing a list of textiles by CN code for which measures such as separate collection, EPR, reporting should be applied. This would be more precise than under alternative 1 but would prevent the exclusion of textile materials from the broader measures that might otherwise be the case under alternative 2. However, the data and information currently collected through official statistics applies the CN code approach, and thus would ensure consistency and complementarity, in particular in view of the proposed EPR scheme (Measure 2.9).

[10] Evidence from workshop.
[11] Interview with Teko & Svenshandel.

Table 1: *Scope of the three alternatives*

Product type	Production phase													
	Raw		Semi-worked		Worked		Semi-manufactured		Manufactured		Semi-made up		Made up	
	Sub-option 1	Sub-option 2	Sub-option 1	Sub-option 2	Sub-option 1	Sub-option 2	Sub-option 1	Sub-option 2	Sub-option 1	Sub-option 2	Sub-option 1	Sub-option 2	Sub-option 1	Sub-option 2
Textile fibres, yarns and fabrics														
Finished textile clothes														
Household textiles														
Shoes														
Leather clothing and apparel														
Jewellery and other accessories														
Mattresses[1]														
Carpets and other floor coverings														
Tents, tarpaulins, umbrellas and sails														

Within scope

Not within scope

Table 2: Summary of impacts for measure 1.1 – Alternatives 1-3 definition of 'textiles'

Stakeholder affected	Economic impacts	Environmental impacts	Social impacts
Producers, waste managers (encompassing collectors, sorters and managers)	Improves the level playing field through a common understanding of the scope of textiles and textile waste. + Reduce administrative costs to determine the scope of textiles to be managed under the WFD. Alternatives 2 and 3 would offer greater clarity and a greater scope for admin burden reduction in comparison to alternative 1.		Businesses would benefit from the information derived from the clarifying definitions
Public authorities	Reduces administrative costs to determine the scope of textiles to be managed under the WFD.		Public authorities would be able to produce and access more consistent information enabling comparison.
Citizens			Citizens would benefit from the information derived from the clarifying definitions.

All stakeholders		Clarified definitions will allow a clearer scope of measures to be applied, thereby allowing Member States to better focus their resources in addressing textile waste. This should, in turn, result in greater environmental improvements compared to the status quo as the most important environmental impacts would be addressed first.	

Sub-measure 1.2 – Definition of '*textile waste*'

Assessment of impact alternative 1

Economic impacts

Setting a definition that requires all separately collected textiles to be considered waste would enable a consistent approach across all Member States in comparison to the status quo.

However, the application of waste status to all separately collected textiles carries with it the possibility to place burdens on actors, particularly social enterprises that are required in some cases to have the necessary authorisations to collect and sort waste in one Member State when a neighbouring Member State does not require such authorisations as textiles only become waste later in the processing of the materials collected. Data from the social enterprise sector[12] indicates that the majority of those involved in the separate collection of wastes, including social enterprises, are already in ownership of the necessary waste management permissions and so whilst some impacts are likely for a minority of actors the negative impacts of this measure are likely to be limited.

Additionally, applying waste status at the point of collection risks a deterioration in the quality of textile materials collected in separate collection systems – if those depositing textile materials are told that all textile materials are welcome because they will be subsequently sorted into reusable

[12] Communication between the European Commission and RREUSE, November 2022.

and recyclable, then lower quality materials may be collected, increasing the costs of collection and sorting for sorters, including social enterprises whilst lowering the quality of feedstock for preparation for reuse and recycling. This effect can be and is already addressed by instructions that are typically found on separate collection bins and other separate collection systems. It would be important in the application of this sub-option, therefore, to ensure that such instructions are maintained to minimise this risk from materialising in practice.

In relation to data needs, determining waste status at the point of collection sets a clear demarcation line for reporting purposes. This would assist in the present reporting requirements under Commission Implementing Decision C(2020) 8976 for reporting on reuse as the total fraction of reused textiles could be set against the total amount of textile waste separately collected through all collection systems using the same starting point as to when those materials became waste. It would also allow any new reporting requirements to have the same starting point in the future.

Environmental impacts

This alternative would put in place the protections under the WFD in relation to the correct handling of those materials following their collection and the application of the waste hierarchy to the materials contained therein. It would also address the high risk of waste that forms a part of the materials separately collected being falsely considered as non-waste and its potential export to third countries. Whilst measure 2.8 that would set requirements for the shipment of textiles for reuse, would offer some protection in this respect, in the absence of that measure the risk would remain high.

This definition also acknowledges that those depositing textiles are not always able to determine whether a textile is suitable for reuse/recycling or not, which leads to reusable textiles being discarded as waste and non-reusable or recyclable textiles being deposited in separate collection systems. Determining that all such materials are waste until they are professionally sorted into their respective reuse, recycling and disposal fractions addresses this problem directly by requiring waste management approaches to be applied from the outset. Measure 2.5 specifically addresses sorting obligations with the link in mind.

MWE, representing public waste management organisations[13] highlighted that the 'use and dispose' culture mindset is largely fostered across the entire textile supply chain. It is, in turn, adopted by consumers, driving increasing volumes of textile waste generation. This is matched by a lack of consumer understanding of the true costs of textile production beyond the purchasing price as identified during the first stakeholder workshop by an NGO. A stakeholder representing the social enterprise, reuse and repair sector [14], noted that the consumer to consumer (C2C) textile market is flourishing but this does not prevent the sale of new textiles. Indeed, when people know that they can sell their products on C2C platforms they may tend to buy even more products in what is known as the rebound effect. Stakeholders also identified the lack of sufficiently robust

[13] Municipal Waste Europe
[14] RREUSE

data on used textiles and textile waste as a barrier to developing sufficient waste prevention programmes.

Social impacts

Applying waste status at the point of collection should ensure that the materials contained therein are managed as waste. In the context of existing issues with the export of used clothing and textiles to third countries under the guise of used (but not waste) textiles that are subsequently disposed of in third countries, this would be less likely to occur in the context of all materials having to be handled as waste until sorting had taken place to differentiate between waste and non-waste (reusable) fractions.

Impact on SMEs and social enterprises

As noted under economic impacts the application of waste status to all separately collected textiles carries with it the possibility to place burdens on actors, particularly social enterprises that are required in some cases to have the necessary authorisations to collect and sort waste in one Member State when a neighbouring Member State does not require such authorisations as textiles only become waste later in the processing of the materials collected. Data from the social enterprise sector[15] indicates that the majority of those involved in the separate collection of wastes, including social enterprises, are already in ownership of the necessary waste management permissions and so whilst some impacts are likely for a minority of actors the negative impacts of this measure are likely to be limited.

SMEs other than social enterprises are unlikely to be significantly impacted by this measure as they are already likely to hold the necessary authorisations to collect and sort waste.

Assessment of impact alternative 2

Economic impacts

Setting a definition that requires all separately collected textiles to be considered as waste only after sorting would lead to greater consistency of approach across all Member States. Materials that are in fact waste would be defined accordingly following sorting and so the scope of materials subject to the requirements of the WFD would be reduced in comparison to alternative 1 and the costs would also, therefore, be less. Using this approach, reusable products would remain products rather than being classified as waste upon collection.

In relation to data needs, determining waste status at the point of sorting would not assist in reporting by Member States. The current focus of Commission Implementing Decision C(2020) 8976 for reporting on reuse would likely be more difficult as these materials would never reach waste status under this sub-option and Member States may simply determine that such quantities should not be reported in the future under the WFD. This would be counterproductive to understanding how the waste hierarchy is being applied in practice for textiles.

[15] Communication between the European Commission and RREUSE, November 2022.

Environmental impacts

Changing the point at which separately collected textiles become a waste is somewhat at odds with the definition of waste under the WFD that refers to the intention of the holder to discard a material as determining its waste status.

Additionally, as noted earlier, those depositing textiles are not always able to determine whether a textile is suitable for reuse/recycling or not, which leads to reusable textiles being discarded as waste and non-reusable or recyclable textiles being deposited in separate collection systems. By removing controls that are in place in some Member States where such materials are currently considered as waste as well as the confirmation for all others that such separately collected textiles are not waste is more likely to elevate the risk of waste materials being inappropriately categorised and exported to third countries as a non-waste.

Social impacts

Categorising materials as non-waste at the point of discard would remove waste controls on the materials contained therein. In the context of the potential of waste materials to be mixed in with reusable items and ongoing challenges with the export of unsorted EU textiles to third countries this situation would continue to exist under this option to the disadvantage of the citizens of the receiving countries.

Administrative burden

Removing waste status at the point of collection would remove administrative burden in relation to the need for collectors to obtain the relevant waste management authorisations to collect and sort waste where these are currently applied. There is no standard set fee for the relevant authorisations at the EU level. However, by way of example in DK the annual fee is approximately 200 euro per year[16] and in DE it varies by Lander and by type of waste activity. In Hamburg, for example, the fee varies between 95 and 1 000 euro per year[17]. These fees are likely to be amongst the highest in the EU, with the average likely to sit below 200 euro per year. As a result of a lack of data on the numbers of enterprises concerned it is not possible to quantify the total impact across the EU of removing these licensing costs.

Impact on SMEs and social enterprises

As noted under alternative 1, data from the social enterprise sector[18] indicates that the majority of those involved in the separate collection of wastes, including social enterprises, are already in ownership of the necessary waste management permissions so these would no longer be necessary. The same will be the case for SMEs.

Stakeholder evidence

[16] https://ens.dk/en/our-responsibilities/waste/danish-national-waste-register
[17] https://www.hamburg.com/publicservice/info/11927315/
[18] Communication between the European Commission and RREUSE, November 2022.

Stakeholder evidence tended not to differentiate between the definition of textiles in general and the definition of textile waste. The stakeholder evidence should be read with this in mind.

Stakeholder feedback generally considered that clarification of definitions was a useful measure, if it includes a clear scope on what products are included – and excluded – in the term "textiles and would help to establish what is to be included in separate collections"[19]. There is not necessarily a need to regulate how collections are carried out, however, a common scope was seen as essential.

If items are thrown away, it was deemed that this should be considered as waste. In some EU states, there is the option of reusable and non-reusable bins for textiles, which often are mixed-up by consumers, so this definition and sorting needs to be carried out by a professional sorter, therefore better labelling and/or definitions might not resolve this. The same respondent considered that over-the-counter donations should also be considered waste because the fact that a product is donated for an economic purpose (potentially ruling it out of being considered waste) is important, but not a determining factor as there is an economic factor behind many choices, including recycling and to align it with economic element would mean nothing would ever be classed as waste[20].

It was stated that it would be useful to align terminology and regulations and provide a common understanding and basis for monitoring which will extend to a much wider set of fibres and products. This should be combined with the JRC work on EoW criteria for textiles to ensure there is a clear definition of what textiles are and when they are waste[21]. It was viewed as critical to establish clarifying definitions on waste and ownership of waste, and to what extend we should export away waste if it can't be recycled - and only focus on exporting to countries that can recycle (keeping in mind the potential decrease for demand in 3rd countries that are developing and the increase in demand for second-hand in Europe)[22].

A stakeholder considered that new terms such as "renewable textiles" may need to be added and these should all be aligned across the states to provide a level playing field. These definitions should extend across new types of materials (i.e., renewable materials) as well as across blends and fibres. The decision as to what this is aligned with should be developed through in-depth consultation with stakeholders[23].

It was felt that a clear definition of reusable/recyclable is needed for textiles as currently, no specific criteria exist for an objective classification of discarded textiles into reusable or recyclable. This lack of definitions directly hampers a homogeneous classification of garments and the

[19] Interview with Ellen MacArthur Foundation
[20] Interview with Euric
[21] Feedback from workshop
[22] Interview with Teko &
[23] Interview with Euric

application of the waste hierarchy. However, once waste is classified as reusable or recyclable, rules for shipment and exports are different regarding controls, notifications and assurance[24].

For all alternatives, there was consensus that any definitions should be cross-state and should drive consistency which will drive ease of sharing, exports, and economies of scale. In addition to this, these definitions should be equally enshrined within all the different EU legislations to ensure shared indicators/reporting and objectives. This should include definitions of legally responsible economic operators as well as business related activities such as repair, remanufacture (remake) and second-hand must also be clearly stated and harmonized within all EU legislations[25] and possible beyond (i.e., Norway)[26].

Bringing the textile labelling and CN classifications together would need to also include definitions for fibre-to-fibre recycling, reusable, recyclable textile waste as well as new terms like ex. renewable textile (post-consumer cellulose-based fibres that can be chemically converted into new fibre types etc). Developing these definitions would need to be done as part of an extensive stakeholder engagement process.

Table 3 : Summary of impacts for measure 1.1 – Alternatives 1-2 definition 'waste'

Stakeholder affected	Economic impacts	Environmental impacts	Social impacts
Producers, waste managers (encompassing collectors, sorters and managers)	This measure would enable a level playing field as it would provide a common understanding of the point at which the application of waste controls apply to textile waste. Alternative 1 would possibly lead to a deterioration in the quality of textiles collected in the absence of clear instructions as citizens may simply		Businesses would benefit from the information derived from the clarifying definitions

[24] Evidence from workshop
[25] Evidence from workshop
[26] Interview with Teko & Svenshandel

	discard all textiles, including waste textiles. It may also require a small number of collectors (including social enterprises) to obtain the relevant waste permits to operate given that the majority already hold such permissions. This measure would increase administrative costs related to verifying compliance with waste definitions, if they are attached to obligations		
Public authorities			Public authorities would benefit from clearer definitions to be applied in managing textile wastes from the public
Producers, waste managers (encompassing collectors, sorters and managers) and citizens			Alternative 1 would offer greater certainty of applying relevant waste management controls to materials that are presently lost in the export of EU textiles under the guise of reuse even though they are actually waste.

			This would be beneficial to third country citizens. Alternative 2 would potentially allow even more EU textile wastes to be exported under the guise of reusable materials even though they are a waste to the detriment of third country citizens.
All stakeholders		Alternative 1 would increase the level of environmental control where these measures are not currently applied. Alternative 2 would lessen controls in comparison to the status quo in terms of environmental protection where most collectors are considered to already apply waste controls under authorisation from public authorities.	

Competitiveness impacts of measure 1.1

The following competitiveness impacts have been assessed for this measure overall.

Table 4 - competitiveness impacts of measure 1.1

Price competitiveness impacts	As noted above under economic impacts an increase in scope in comparison to the scope of textiles currently applied by Member States would lead to increases in costs for management of these types of textiles at the point of discard. The price competitiveness impacts at Member State level are likely to be greatest for those Member States that currently have taken little action to address textile wastes and for which significant investments would be required to catch up. In this context price competitiveness in the textile waste management sectors in BG, CY, CZ, EE, EL, ES, HR, HU, LV, PL, PT, RO, SI and SK would feel the largest impacts given the low levels of collection, sorting and treatment that are currently undertaken in comparison to other EU Member States.
Dynamic competitiveness impacts	A broad scope of textiles under alternative 1 of sub-measure 1.1 would incentivise research and development in particular for those textile goods that have traditionally not been considered as textiles by Member States to date – this would include the likes of pre-consumer textiles and post-consumer goods like carpets and mattresses. Given the low levels of reuse and recycling that have been identified for these types of textiles it would be expected that increased collection would, in turn, increase efforts to reuse and recycled the textiles collected. However, a broader scope also potentially dilutes R&I activities, removing focus from those textiles that represent the bulk of textile wastes and for which greatest economic value may be recovered and requiring focus across all textiles. In this respect alternatives 2 and 3 of sub-measure 1.1. offer the possibility for greater focus of R&I activities in the EU. This offers the opportunity for the EU to become a market leader in textile recycling technologies.
Export competitiveness impacts	Given the high-quality, higher margin and target markets of EU textiles limited export impacts are expected as a result of this measure.
Strategic competitiveness impacts	A broad scope of textiles under alternative 1 of sub-measure 1.1. brings with it a broad scope for which collection would take place and from which increased reuse and recycling would likely take place. This would, from a circularity perspective, allow the potential replacement of virgin materials imported from other countries (in particular for natural fibres for which the EU relies on third country imports) with reusable and recyclable fibres from the collected feedstock. Recovery of the full value of these materials would rely on investments in the necessary techniques to recover the materials contained therein – see

	dynamic competitiveness impacts above for more detail. It has not been possible to quantify the total amounts that may be recoverable. The narrower scope of alternatives 1 and 2 would focus reuse and recycling efforts for the main sources of textile waste in the EU but would offer lower volumes of potential reusable and recycled textiles in the future.

Measure 1.2 – Adopting EU wide waste prevention indicators for textiles

Assessment of impact Measure 1.2

Economic impacts

The EEA is developing a monitoring framework to track waste prevention progress at the EU level. It will be utilised using data that Member States are already collecting and reporting to the Commission under waste and other policies. It will also facilitate the monitoring of waste prevention in the textile sector as part of the efforts of measuring municipal waste reduction. However, it does not cover specific indicators on textile waste specifically. The EEA is currently setting up a reporting system (online tool) for reporting of reused textiles (in line with Implementing Decision 2021/19). Data on reuse will be available from 1 July 2023. It is not expected that developing and using mandatory prevention indicators will require additional reporting from Member States or from the economic operators because specific reporting on textiles is already envisaged under the Implementing Decision 2021/19 which, together with the EEA monitoring framework indicators, would be used as a basis for the development of indicators.

A monitoring framework may be used to identify countries that perform well and good practices/policy measures implemented at national level. Their dissemination would then indirectly contribute to the success of waste prevention measures in the EU27 overall with a consequent reduction of textile waste to be managed by the waste management sector. These impacts cannot be monetised as the impacts in volume terms are unknown.

No impacts on prices of goods are foreseen under this measure as the measure itself looks to share data between Member States on waste prevention using indicators. No additional costs of reporting are foreseen and so no additional costs are required to be priced into the cost of goods.

Environmental impacts

Setting indicators in relation to textile waste prevention approaches adopted by Member States as well as overarching data in relation to the volumes of textile wastes generated, collected, sorted and reused will provide an overview of the progress made by Member States over time in relation to waste prevention using comparable data for the first time. Additionally, such information may be used to identify good performers and to perform further analysis to identify the positive practices implemented by the Member States. This would allow a more objective assessment of Member States' practices as demonstrated by the examples of existing prevention measures in

different Member States collected by the European Environment Agency[27]. A list of such examples is provided below, albeit drawing conclusions as to the most successful of these measures is challenging in the absence of an indicator of success, as would be defined under this measure.

Table 5 : Examples of textile waste prevention measures listed in national waste prevention programmes

Information and awareness-raising	Analysis of the textile industry (e.g. textile material flows) **(Austria)**
	Technically ensure the dissemination of information and awareness programmes for a progressive increase in the number of products collected for further use, e.g. textiles, clothing, footwear and other reusable products **(Czechia)**
	Establishment of a voluntary event for selling used clothing before the start of the school year **(Greece)**
Market-based incentives	Reduce value added tax on the repair of bicycles, shoes, leather goods, clothing and electrical appliances, from 25 % to 12 % as of 1 January 2017 in **Sweden** and also in **Austria** from 20 % to 10 % from 1 January 2021
	Reduce cost of repair through a 50 % deduction of labour cost for repairs of textiles through government subsidy **(Sweden)**
	Low value added tax on the repair of clothing, e.g. of 6 % **(Belgium)**
	Reduction in patent taxes for small businesses whose activities lead to the reuse of a product (e.g. repair of shoes, furniture and clothing) **(Bulgaria)**
	Work to establish environmental targets for public procurement of textiles and textile services **(Denmark)**
Voluntary agreements and cooperation platforms	Partnerships with vendors to increase the market share of eco-labelled textiles or textiles that contain a minimal amount of harmful substances **(Iceland)**
	A partnership with companies and organisations with the slogan 'Give your clothes a longer life' **(Denmark)**
Regulatory measures	Support stricter international regulations regarding the use of chemicals in textiles **(Norway)**

Source: EEA, 2021.

[27] EEA report No 15 2021. Progress towards preventing waste in Europe – the case of textile waste prevention

Developing indicators that allow waste intensity to be determined i.e., illustrating the decoupling of textile waste generation both in relation to textiles sold but also in relation to economic growth using statistics already available from Eurostat would act as a good marker to demonstrating progress in textile waste prevention. Using statistics on the environmental costs of textile production and disposal available from the likes of Payet[28] and applying data from Eurostat, calculation of the impact of preventing textile waste production on the estimated CO2e emissions from placing textiles on the EU27 market, which was estimated in 2020 as 198 million metric tonnes[29] and its reduction in impact in the future should be possible to be calculated.

Social impacts

Waste prevention is at the top of the waste hierarchy as the avoidance of generation of waste in the first place is the preferred option. Monitoring progress on textile waste generation and identifying best practices employed by Member States should subsequently allow to determine the extent to which the social impacts of textile waste can be addressed by reducing those wastes in the first place.

As noted under economic impacts, a reduction in waste through more effective monitoring of waste prevention measures would result in less waste being generated and consequently an impact on employment in the waste management sector would be likely, albeit small in comparison to the waste management sector overall.

Impact on SMEs and social enterprises

No significant impacts on SMEs were identified for this measure. SMEs, including social enterprises, are the majority of those involved in the placing on the market of textiles (including used, repaired textiles) as well as in separate collection, sorting of wastes. The purpose of the waste prevention monitoring is to identify practices and actions that have a waste reduction impact and facilitate their use further. Therefore, in the context of applying waste prevention measures as required under Article 9 of the WFD, Member States should facilitate the creation of circular business models, support those with regulatory and economic measures. In view of the composition of the sector, this would benefit the SMEs and social enterprises.

Stakeholder evidence

Stakeholder insight described EU waste prevention indicators as essential in confirming commitment to goals and setting out a direction of travel for textiles waste management[30]. Concerns were raised however, over the potential for prevention targets to create challenges for reuse, by causing confusion between “old” and “new” products, and not doing enough to drive

[28] Payet, J. 2021. Assessment of Carbon Footprint for the Textile Sector in France. Sustainability 2021,13, 2422.
[29] European Commission, Joint Research Centre, Donatello, S., Danneck, J., Löw, C., et al., Circular economy perspectives in the EU textile sector: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2760/858144.
[30] Evidence from workshop

activity further up the waste hierarchy[31]. The optional measures could also be challenging to implement uniformly and could potentially have disproportionate impacts across areas. Concerns were also raised around the complexity of using preventative indicators which could lead to incentivisation of malpractice[32].

Feedback suggested that the WFD should go beyond indicators to include quantitative targets for preparation for reuse and waste prevention, separate to recycling. This should further encourage reuse by providing economic incentivisation for reuse operators who meet waste prevention targets, particularly social enterprises[33]. Whilst the waste prevention indicators in themselves would not be enough to drive action at company level, the impact from administration should act as a catalyst to drive action. The administration required for reporting should then be aligned with the ESPR and embedded into a Digital Product Passport[34].

Insight gathered through interviews and workshops highlighted that the waste prevention angle is not the fundamental point to focus on, as what is needed is strong infrastructure which can sort and collect textiles to retain their value. It was felt that the focus should be on investing in technology which can expand the capacity to upscale and increase the volumes of products able to be accepted beyond simply high value used products[35]. Prevention of waste should be driven through a wider set of enablers, including better materials and production processes, and fostering of reusability and repair to involve consumers[36].

Where the indicators are established, stakeholder input suggested that full life-cycle data should be used to design the most environmentally friendly systems and indicators which fully reflect the most desirable outcomes. This should include impacts from transporting, processing and production for recycling and reuse[37].

Administrative burden assessment

There would be no additional administrative burden from this measure beyond those identified in relation to the application of measure 2.14.

Table 6 : Summary of impacts for measure 1.2

Stakeholder affected	Economic impacts	Environmental impacts	Social impacts
Producers, waste managers (encompassing	Greater efficiencies identified through better monitoring		This measure would increase information on waste prevention

[31] Interview with RREUSE
[32] Interview with ARTSHC
[33] Evidence from stakeholder interview with Ellen MacArthur Foundation
[34] Evidence from stakeholder interview with Policy Hub
[35] Evidence from the first stakeholder workshop
[36] Evidence from the first stakeholder workshop
[37] NGO input in first stakeholder workshop

collectors, sorters and managers)	should lead to more focussed and efficient efforts in relation to waste prevention. Minor impacts on the economics of the waste management sector are foreseen.		measures available publicly
Public authorities	The ability to judge the impacts of waste prevention measures employed through a consistent indicator will allow Member States to more accurately assess the effects of their own programmes as well as those of other Member States. Reduced cost of waste disposal as indicators would help reaching waste prevention targets more efficiently.		This measure would increase information on waste prevention measures available publicly
Public authorities and citizens		This measure would help reaching climate neutrality targets as indicators would support improved waste prevention. It would help improving air, soil, and water quality as indicators would	Greater awareness of the measures taken by Member States to prevent waste within the territory concerned.

		support improved waste prevention. It would help protecting landscapes and improvement ecosystem services as indicators would support improved waste prevention.	

Impacts on competitiveness

The following impacts on competitiveness have been assessed under this measure.

Table 7 - impacts on competitiveness of measure 1.2

Price competitiveness impacts	No specific impacts of price competitiveness have been identified under this measure.
Dynamic competitiveness impacts	This measure has the potential to incentivise the repair and reuse market in Member States as one aspect of waste prevention that may be applied by Member States.
Export competitiveness impacts	Waste prevention measures are likely to reduce the volumes of used textiles exported from the EU to third countries. This would potentially reduce the incomes of used textile exporters within the EU as whole due to the reduced volumes available to market.
Strategic competitiveness impacts	Waste prevention measures offer the possibility to reduce the need for imports of textiles in the future as greater reuse and repair within the EU replaces the need for new textile goods to be purchased.

Measure 1.3 – Providing Member States with guidance and support in dialogue on the management of textile waste between actors involved

Assessment of the impact Measure 1.3

Economic impacts

The sharing of best practice and knowledge through both guidance and a platform would be expected to have positive impacts for textile management stakeholders. Guidance documents can

help competent authorities and other stakeholders to improve practices in relation to waste management. To produce such guidance documents, the Commission will need to identify best practice and disseminate the information to the key EU stakeholders in all EU languages.

The measure would raise awareness of circular textiles models with the most potential for growth. The Commission SWD accompanying the proposal for a Regulation establishing a framework for setting ecodesign requirements [38] shows that 9% of SMEs have already adopted Circular Business Models, and on average 20% of businesses are already familiar with Circular Business Models. With the support from the public sector, there are good reasons to believe that circular economy business models will continue to increase in relation to textiles via the sharing of practices. The SWD also notes that recent trends suggest that demand for Circular Business Models will continue to grow in future years, pushed by significant policy measures at EU and Member States level, as well as generational trends and a growing appetite for sustainable products. Generation Z and Millennials are notably boosting demand for refurbished products and easy reparability options.

The measure has the potential to significantly increase textile collection, sorting and subsequent treatment based on the sharing of practices that have been proven to work by frontrunners such as DE and SE who currently collect over 60% of waste clothing and household textiles in relation to collection schemes. This would be of greatest benefit to those Member States that are far behind such collection rates including BG, CY, CZ, EE, EL, ES, HR, HU, LV, PL, PT, RO, SI and SK. However, as the sharing of best practice does not require Member States to then implement such practice the precise impacts in terms of flows of textile waste, collection, sorting and treatment is difficult to quantify. An improvement in such processes would, however, be expected to be achieved.

Any additional collection, sorting and treatment performed as a result of the application of this measure would entail costs. In countries where EPR applies or is planned to apply then the costs would fall on the producer. Producers would either have to absorb those costs that would lower their profitability or increase the costs to consumers of the products themselves. Where EPR is not applied then costs may be met via the likes of disposal fees applied at the point of disposal or general taxation. However, these costs would be a fraction of waste generated and collected, and consequently the costs that would be applied would not be for the entire volumes of textiles collected, sorted and treated but rather the additional costs for the additional wastes collected. Given that the total costs for all wastes account for an approximate increase per product of around 0.6%, this measure would likely result in smaller overall costs per product. Should the additional collection equate to a 20% increase in the waste collected, for example, then the application of costs to all goods sold would result in an increase in costs per item of around 0.12% of total price.

Environmental and Social impacts

[38] SWD(2022) 82 final

Positive environmental impacts would stem from the sharing of best practices that could improve textile waste management across the EU. Social impacts are also likely to be positive since moving textile waste management up the waste hierarchy will generate more jobs that require skilled staff, particularly in the reuse sector where a lack of technical knowledge on repair and understaffing have been identified[39].

Administrative burden

The provision of guidelines can be managed internally by the Commission or externalised to an agency or a contractor. The costs to create the additional guidance would include the travel and event costs, i.e., the cost of holding any necessary guidance development meetings and developing the guidance. Additional to this, the cost of the staff necessary to draft the reports would need to be added. Considering the ToRs used by IMPEL in the development of their own Guidance on Effective Waste Shipment Inspection Planning, the total cost of all meeting events for detailed guidance would be approximately 135 000 euro per guidance with about 50 individuals from multiple organisations making input encompassing time and travel costs for the staff involved in the development of the guidance.

The costs associated to the set-up of a platform depends very much on the final scenario selected. If the platform takes the form of an online platform only, managed as part of a wider dissemination activity following the Ecodesign website model, it is likely that the administrative cost will be limited to the cost of Commission personnel for both the extra development of the platform and its population and updates.

Impact on SMEs and social enterprises

Given SMEs, including social enterprises, are the majority of those involved in the placing on the market of textiles as well as in separate collection of wastes, the guidance and support platform would have the largest impacts on SMEs overall.

Stakeholder evidence

In the second textiles stakeholder workshop this measure was seen as a useful tool for providing organisational information which could help users design effective collection schemes and create shared learnings, which can help 'level the playing field'. This was identified as a critical element – along with clearer definitions (see Measure 1.1) and EU wide end-of-waste criteria for textiles – in developing a clear framework across member states and it was suggested during the interview that some of the measures be grouped to increase cumulative impact. This could be particularly useful if implemented early, to drive cohesion before individual systems are established.

Without a mandate, this measure will not be enough to ensure consistency in EPR systems for textiles, with Member States likely to develop their own potentially diverging guidance, and organisations historically driven by profit rather than environmental impact dominating

[39] SWD(2022) 82 final

discussions[40]. In the absence of guidance and a platform to share information, there is a risk of substantial administrative burdens, particularly for obligated producers[41]. It is important that, to operate efficiently, PROs must collaborate and share policy recommendations with one another as well as with the European Commission to ensure co-ordinated approaches and investment[42].

Where different systems operate, there is likely to be a lack of incentive for investment in R&D since fragmented policies would lead to inefficiencies[43]. Non-harmonisation is also likely to have cost, time and labour implications as different reporting and fee systems overlap across boundaries[44]. Clarifying definitions, developing guidance and the sharing of stakeholder experience and EU wide end-of-waste criteria for textiles, when combined, could drive simplification and harmonisation which would simplify shipping and exporting and potentially encourage investment[45].

To avoid competition between the reuse and preparing for reuse sectors, several stakeholders requested that an impact assessment must be carried out in the development of EPR schemes to identify measures to avoid the two competing. This was raised within the interviews, during which stakeholders outlined that different EPR systems across the EU would struggle to drive economies of scale needed for recycled content[46].

Table 8 : Summary of impacts for measure 1.3

Stakeholder affected	Economic impacts	Environmental impacts	Social impacts
Public authorities	This measure would imply resourcing and related costs to develop a guidance document on best practices for EPR, as well as wider textile waste management techniques. The operation of a stakeholder platform would also carry some administrative		

[40] Evidence from workshop
[41] Evidence from workshop
[42] Evidence from workshop
[43] Evidence from workshop
[44] Evidence from workshop
[45] Interview with Eurocommerce
[46] Interview with Policy Hub

	burden. A cost of 135 000 euro per piece of guidance developed would apply. It would reduce costs related waste disposal because it would encourage sustainable production practices. This measure would improve knowledge thanks to sharing best practices and development of guidance documents.		
All stakeholders		This measure would help reaching climate neutrality targets and help improving air, soil, and water quality. This measure would indirectly lead to more sustainable production and consumption patterns through the increased know-how.	The sharing of best practice for those parts of the textile management stream that have been identified as particularly challenged e.g., repair and reuse could assist in stimulating employment in the activities concerned through the sharing of best practice.

Impacts on competitiveness

The following impacts on competitiveness have been assessed under this measure.

Table 9 - impacts on competitiveness of measure 1.3

Price competitiveness impacts	Impacts of price competitiveness are linked to the possible increases in collection, sorting and treatment as described under economic impacts above. In this respect, those Member States that currently collect a small share of textile wastes and have little capacity for sorting and treatment would be most likely impacted with costs falling on the waste management sectors in each of those Member States accordingly. This would particularly impact BG, CY, CZ, EE, EL, ES, HR, HU, LV, PL, PT, RO, SI and SK.
Dynamic competitiveness impacts	This measure has the potential to share best practices and improve research and development in a coordinated manner by bringing information and Member States together to discuss the practices and processes applied and in development. The measure is also likely to incentivise the repair and reuse market in Member States as one aspect of waste prevention that may be applied by Member States and addressed under this measure.
Export competitiveness impacts	Waste prevention measures are likely to reduce the volumes of used textiles exported from the EU to third countries. This would potentially reduce the incomes of used textile exporters within the EU as whole due to the reduced volumes available to market.
Strategic competitiveness impacts	This measure offers the opportunity to reduce the need for imports of textiles in the future as greater reuse and repair within the EU replaces the need for new textile goods to be purchased and improvements in recycling reduce the need for imports of virgin textile materials – in particular natural fibres for which the EU relies heavily on third country imports.

Option 2: Setting additional regulatory requirements to improve performance

Measure 2.5 – Setting sorting obligations for separately collected textiles and textiles waste

Assessment of impact Measure 2.5

Economic impacts

Additional sorting would ensure that greater volumes of textiles are removed from the mixed waste stream and processed for reuse and recycling for either onward sale within the EU or export for sale to third countries in the case of reuse or as feedstock for textile recycling.

According to current baseline predictions approximately 1.879 million tonnes of additional textile sorting would be undertaken within the EU by 2035 encompassing both the envisaged growth in

separate collection of 1.4 million tonnes as well as the approximately 475 000 tonnes of textiles sorting that is currently undertaken in third countries and that is expected would take place within the EU under this measure. This would have the potential to lead to an additional 702 000 tonnes of textiles separated for reuse with an estimated value of 534 million euro per year and 590 000 tonnes available for recycling with an estimated value of 117 million euro per year. At the same time, additional sorting and subsequent treatment carries with it additional costs. An additional sorting capacity along with subsequent treatment (preparation for reuse, closed loop and open loop recycling) would carry operational costs of approximately 913 million euro per year by 2035 with 20% of this cost attributable to collection and 80% to the subsequent collection and treatment. Additional minor operational costs would be necessary to implement the required criteria in the sorting process. Given the flexibility that would be provided to Member States in the application of these criteria it is not possible to provide a definitive cost. This means that in general approximately 70% of the costs of application of the measure would be likely retrieved via the economic value of the textiles sorted.

The additional sorting and treatment performed as a result of the application of this measure would entail costs. In countries where EPR applies or is planned to apply then the costs would fall on the producer. Producers would either have to absorb those costs that would lower their profitability or increase the costs to consumers of the products themselves. Where EPR is not applied then costs may be met via the likes of disposal fees applied at the point of disposal or general taxation. However, these costs would be a fraction of waste generated and collected, and consequently the costs that would be applied would not be for the entire volumes of textiles collected, sorted and treated but rather the additional costs for the additional wastes collected. Given that the total costs for all wastes account for an approximate increase per product of around 0.6%, this measure would likely result in smaller overall costs per product as the additional amount of sorting and treatment infrastructure in comparison to the baseline would be approximately half of the total necessary infrastructure that would already be in place. Consequently, and recognising that the full costs of the necessary increases infrastructure could be applied across all produced textile goods (and not just the fraction that would be additionally sorted and treated) an increase in costs per item of around 0.3% of total price is estimated to result from this measure.

The actual replacement of virgin textile materials by their recycled equivalent is particularly challenging to calculate. This is because the ability to recycle textiles is very much dependent upon the materials within the textile products, the presence of disruptors, colour of the textiles and other variables. In its study on the technical, regulatory, economic and environmental effectiveness of textile fibres recycling[47], the European Commission identified that mechanical recycling leaves 5-20% of the input fraction as spinnable fibres for natural fibres and 25-55% in the case of polycotton or polyester. However, it is acknowledged that the quality of these fibres is lower than the quality of virgin fibres. In the case of thermal recycling for synthetic fibres, the recycled polymers are mixed with virgin material to produce new fibres. Full fibre recycling is not yet possible. Similarly,

[47] European Commission, 2021. Study on the technical, regulatory, economic and environmental effectiveness of textile fibres recycling

chemical recycling of cotton results in materials that are generally blended with virgin materials, whereas for PA6 and PET monomer, recycling can result in high-purity virgin grade PET and inputs for virgin grade PA6. Whilst it is clear that recycling of textiles will result in the replacement of virgin textile fibres with subsequent economic and environmental benefits resulting from such recycling the volumes of displacement are highly uncertain. Using a basic assumption that between 20 – 50% of the volumes available for recycling being replace virgin fibres would result in 118 000 to 295 000 tonnes of virgin fibres would be replaced by recycled fibres under this measure.

Waste management operators that are reliant on disposal revenues for textiles would face a reduction in revenues from less textile waste being sent to disposal. With the expected increase in collection under the baseline and the obligation for sorting under this measure the result would be a diversion from landfill of approximately 530 000 tonnes per year by 2035. Several Member States also impose both an incineration and a landfill tax. Therefore, the reduced tonnage of waste sent for disposal would also lead to a reduced tax revenue. Using an average landfill tax revenue of 50 euro per tonne[48] revenues for waste management operators would fall by approximately 26.5 million euro per annum by 2035. On the other hand, many Member States are increasing their per tonnage rates of these taxes to promote recycling.

The sorting operators also will incur costs to monitoring and adapting their practices to ensure that their sorting protocols (i.e. the granularity of sorted fractions for re-use) are adapted to the specific re-use markets in the countries where their produced sorted textiles may be shipped to. Therefore, information will need to be generated and kept for inspection to demonstrate how the sorters have identified the needs of the receiving re-use markets and adapted their sorting protocols to respond to those findings. There are re-occurring (depending on the amount of traders used by the sorters) costs to the sorting facility operators (to note that under measure 2.9 this cost is due to producers subject to an extended producer obligation) to gather data about the countries (including third countries) where textiles are exported for reuse and an analysis of data and subsequent adaptation of the facilities' sorting protocols and training of sorting staff to adapt to the new sorting protocols. This entails gathering information from their trading partners where their textiles are being shipped to, which can be attained through contractual means.

The adoption of an implementing act in the future by the Commission would facilitate the monitoring and enforcement activities of the competent authorities since a more detailed set of requirements would provide more clarity on the regulatory expectation. It would also facilitate the compliance costs for economic operators as it would ensure a level playing field across the EU and entities that operate in several countries.

This obligation would be enforced as part of the other permitting requirements for the sorting facilities; therefore, allowing for synergies with the existing enforcement processes. Depending on the national permitting and registration systems, the permitting or registration conditions for

[48] CEWEP collects information on the landfill taxes applied in different Member States that can be found here: Landfill-taxes-and-restrictions-overview.pdf (cewep.eu) the values range from €5 per tonne to over €100 per tonne with four Member States imposing no landfill tax. The value of €50 per tonne has been taken as an approximate average tax for the purpose of this assessment.

sorting operators may need to be revised. There may be need for additional staff to perform such inspections as well as operator time to assist in such inspections. It is assumed that, as part of the existing national inspection policies for the permitting processes, the inspections of the requirements in this measure, would take place once every three years and entail three days of effort on behalf of competent authorities entailing preparation for the inspection, undertaking the inspection and recording the results of the inspection.

- One day of assistance per operator per inspection would be required.
- The annualised costs per inspection would be approximately 208 euro per competent authority and 78 euro per operators for the additional inspection.

Importers in third country businesses that currently manage unsorted textiles - exported outside the EU as non-waste - and that perform preparing for reuse activities, are likely to receive less unsorted waste in the future. They would receive unsorted textiles classified as waste and therefore would need to abide by waste rules in carrying out sorting activities which would increase costs. However, the sorted textiles, meant for reuse that they will receive are expected to be more suitable for their market and this should contain limited amounts of waste, reducing the costs of disposing it in an environmentally sound manner.

With regard to pre-consumer textiles, the different fractions of textiles materials and textiles items would be required to be kept separate at the point of waste generation in order to facilitate subsequent preparation for reuse or recycling and subject to recovery operations. This may require changes to the way in which wastes are separated at the point of generation and collected by waste operators. Whilst the volumes of waste being generated would not change, the manner of their storage and collection would change. This may, in turn, generate some small additional costs to enact.

Environmental impacts

Requiring sorting is likely to have two main environmental impacts. Firstly, an obligation to sort textiles in order to export them for reuse, would assist in the strong reduction of textiles that are not actually reusable (i.e., they are waste) as these would either be retained within the EU and be disposed of or would be exported unsorted (i.e., as waste) and subject to the requirements of the WSR. The negative impacts of the materials that are in fact waste and are currently exported as reusable textiles would, therefore, be mitigated. Secondly, an obligation to sort textiles according to EU wide criteria is likely to result in a more consistent sorting process that maximises reuse and recycling of textiles in the first instance, ensuring that a greater volume of textiles are managed higher up the waste hierarchy and, as a result, the environmental impacts of those materials are mitigated to the extent possible.

The effect of displacement of new textiles by reused textiles is also likely to take place. However, there is little certainty as to the level of displacement that would take place. In an assessment of

the environmental benefits of reusing clothes[49] Farrant et al examined the displacement of new clothing purchases through second hand clothing sales and found that the purchase of 100 items of second-hand clothing was estimated to reduce the purchase of between 60 and 85 virgin clothes, depending on the place of reuse. At the same time, however, it is important to note that only approximately 15% of clothing suitable for reuse following separate collection in the EU is actually reused within the EU, with the rest exported to third countries for reuse. Consequently, the effect of increased sorting and reuse within the EU on sales of new textiles equivalents is likely to be limited. Using the lower estimate of Farrant et al of 60 percent replacement and the changes in sorting and reusable fractions foreseen under this measure the additional volume of displacement would be approximately 58 500 tonnes by 2035, or approximately a 1% effect on new textile sales in the EU. A displacement effect outside of the EU is also possible but given the wide variety of nations that receive EU used textiles the effects in those recipient countries cannot be quantified.

Additionally, the recycling of textiles would replace some virgin fibre production with recycled fibres. As noted under the economic impacts using a basic assumption that between 20 – 50% of the volumes available for recycling would replace virgin fibres would result in between 118 000 tonnes and 295 000 tonnes of virgin fibres being replaced by recycled fibres under this measure. Under such circumstances the environmental impacts of virgin fibre production would be avoided. McKinsey[50] uses values from the Stockholm Environmental Institute to calculate land use for the production of virgin fibres whereby ~2 hectare per tonne of fibre output as an average all fibres is applied to calculate the land-use saved through displacement of virgin fibres by recycled fibres. Additionally, McKinsey calculates water consumption of approximately 600m^3 per tonne of fibre output using data from Mistra Future Fashion which in itself summarises various data points. Applying the same values to the potential savings in virgin fibre production calculated under this measures would result in land use savings of between 236 000 hectares and 590 000 hectares and water savings of between 71 million and 177 million m^3 per year.

The volume of textiles exported from the EU to third countries each year was predicted in the Commission Impact Assessment accompanying the proposal to amend the WSR[51] that indicated that exports beyond 2030 would equate to over 2 million tonnes. As noted under the impacts for measure 2.8 that looks at waste shipment practices in the main receiving countries of EU textile waste, the recycling infrastructure in those countries is limited and high levels of landfilling and open dumping of waste is prevalent. Using a conservative estimate that 8% of the materials sent to third countries that is disposed could otherwise have been recycled would entail a reduction in CO2e emissions of approximately 160 000 tonnes per year equalling 16 million euro year of environmental damage avoided by greater recycling by 2035. Additionally, impacts from the release of pollutants due to incineration and / or landfilling in third countries would be avoided, including air pollution, water and groundwater pollution and release of microplastics.

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[49] Farrant L, Olsen S and Wangel A, 2010. Environmental benefits from reusing clothes published in the International Journal of Life Cycle Assessment

[50] McKinsey & Company, 2022.

[51] SWD(2021) 331 final

The expectation is that exports of textiles that are not actually reusable (i.e. they are waste) will be retained within the EU and managed accordingly or exported outside the EU for further treatment in accordance with the Waste Shipment Regulation which once the recast regulation enters into force will entail a verification mechanism that waste is exported only to those countries that have an appropriate waste management policy and infrastructure that ensures an equivalent treatment requirements for the waste than in the EU. The negative impacts of the materials that are waste and are exported at present would therefore be mitigated.

Social impacts

Setting sorting requirements would be expected to lead to additional employment in the sorting, the reuse and further treatment of materials sectors, in the EU or in third countries. Whilst it is difficult to determine the downstream processing employment that would result, in terms of sorting capacity alone, 8 740 jobs are expected to be created to handle the increase in textile waste generation foreseen.

Additionally, the social impacts of textiles waste in third countries is emphasised in the Commission's Staff Working Document accompanying the ecodesign proposal[52] that notes that garments exported for reuse often end up being burnt, which impacts the local environment and inhabitants as developing countries generally do not have the suitable infrastructure to discard them safely. The same SWD quotes that 40% of the clothing traded at the Kantamanto Market (Ghana) ends up in landfill almost immediately due to its poor quality. McKinsey[53] also notes that exports of used clothing and household textiles to third countries are partly legitimate and aligned with the waste hierarchy as some goes to reuse. However, McKinsey also identifies that there is simultaneously a large problem with textile-waste management, especially in some of the Global South countries to which European textiles are exported—particularly the exports of unsorted textile waste as many of these countries do not have the capacity to recycle this waste, and, as a consequence, much of it ends up in landfills or incineration. Whilst several NGOs have highlighted the challenges resulting from exports of textile from the EU to third countries Greenpeace[54], the Plastic Soup Foundation[55] and the movie 'Textile Mountain'[56], the challenges of fast fashion have also been acknowledged by UNEP[57] and the OECD[58] at the end of textile life. The export of these

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[52] See footnote **Error! Bookmark not defined.**
[53] See footnote 46, p. 47.
[54] Wohlgemuth V (on behalf of Greenpeace), 2022. How Fast Fashion is using the Global South as a dumping ground for textile waste https://www.greenpeace.org/international/story/53333/how-fast-fashion-is-using-global-south-as-dumping-ground-for-textile-waste/
[55] Plastic Soup Foundation, 2022. Come on EU! The massive dumping of discarded clothing in Ghana and Chile must stop https://www.plasticsoupfoundation.org/en/2022/03/the-massive-dumping-of-discarded-clothing-in-ghana-and-chile-must-stop/
[56] Fellipe Lopes, 2020. Textile Mountain: The Hidden Burden of our Fashion Waste https://www.textilemountainfilm.com/
[57] UNEP, 2018. Putting the brakes on fast fashion. https://www.unep.org/news-and-stories/story/putting-brakes-fast-fashion
[58] OECD, 2022. Global Plastics Outlook. https://www.oecd-ilibrary.org/environment/global-plastics-outlook_de747aef-en

quantities also leads to additional transport, further weighing down on the environmental impact of textiles. Ensuring that better sorted textiles are sent to third countries for reuse should add to the value of those exports and to those receiving them in third countries whilst negating the waste management costs that currently arise through the contamination of reusable textiles with waste.

The further targeting of textile wastes sent to such third countries would undoubtedly reduce the volumes of materials dumped and open-burned in such a manner, having a positive impact on the social wellbeing on people in proximity to such waste sites as well as in relation to the health and safety of those currently involved in such waste management activities. Conversely, however, the employment of those currently involved in sorting textiles in third countries may be negatively impacted from an economic standpoint as sorting may instead be taking place within the EU (otherwise the requirements of the WSR would apply to protect workers in the country of receipt). It has not been possible to quantify the number of jobs that would be impacted but the number would almost certainly be higher than the number of additional jobs expected to be generated within the EU through additional sorting as a result of the more automated sorting practices that take place within the EU in comparison to third countries.

Finally, as noted in the Commission Staff Working Document accompanying the proposal for a Regulation establishing a framework for setting ecodesign requirements for sustainable products[59] workers in third countries are most often not protected against the health risks related to the pesticides and chemicals involved in the production of cotton and cotton products, as they generally work without a contract and / or without social security benefits[60]. With a salary below the minimum wage, workers can barely afford housing, food, education, and medical treatment. Child labour is also common across the production line, because of the strong demand for cotton and garments, poverty, and weak legislation[61].

Impact on SMEs and social enterprises

Given the majority of those involved in collecting textiles and their subsequent sorting are SMEs and social enterprises as well as some commercial SMEs the obligation to make sure that textiles are sorted would generally fall on these enterprises, without prejudice to Member State right to engage other actors in implementing the separate collection obligation, including public waste management entities, and measure 2.9 in this initiative. As noted above, with increasing sorting, the revenue from reuse and recycling is also likely to increase to partially offset the additional costs that will be required to implement the sorting requirements. This additional cost incurred by the sorting operators would bring economic benefits to operators placing used textiles on the market or producing textiles using recycled textiles due to the economies of scale that would reduce the cost and improve the consistency and availability of these materials of high quality. The additional costs of meeting the sorting criteria are expected to be minor where measure 2.9 (EPR

[59] SWD(2022) 82 final
[60] Cité des Sciences et de l'Industrie & ADEME, Jean, Exhibition from 8 December 2020-22 January 2022. Visited on 22 June 2021
[61] International Labour Organisation, 2016. Child labour in cotton: a briefing

schemes for textiles) is in place and would facilitate their operations since the cost of managing residual waste is assigned to the EPR.

An additional 0.5 FTE would be required within the European Commission to adopt the necessary implementing act setting out harmonised sorting requirements for re-use and recycling.

Stakeholder evidence

Stakeholders focused on two key challenges in relation to sorting. Textile value chain representatives[62] considered that a lack of harmonization for sorting criteria and fragmentation of the sorting market at the EU level hinder large scale circulation of used textiles and textile wastes. Industry representatives indicated a particular challenge is the cost of manual sorting and the lack of automated sorting technologies. All stakeholder groups have recognized the available information by NGOs that place unsorted or badly sorted textiles in the EU as one of the culprits of unsustainable textile waste management in the third countries.

Table 10 : Summary of impacts for measure 2.5

Stakeholder affected	Economic impacts	Environmental impacts	Social impacts
Producers, waste managers (encompassing collectors, sorters and managers)	More textiles available for reuse with an additional value of 534 million euro by 2035. More textiles available for recycling with a value of 117 million euro per year. Less waste sent for disposal affecting waste disposal operator income and Member State tax revenue and costs for re-use operators, in		

[62] Policy Hub, Circularity for Apparel and Footwear

	particular, in third countries.		
Public authorities	Additional costs for sorting waste, predicted to total an additional 913 million euro by 2035. This measure would create administrative burden on public authorities to revise, where necessary, monitor and enforce specific permitting requirements for sorters. Reporting by waste managers is considered already as part of current practices in Member States.		Additional data on volume sorted and volume of separately collected waste.
Citizens			More sustainable consumption of textile goods, as consumers would be exposed to broader availability of used textiles and more sustainable textiles.
All stakeholders		Less unsorted textiles and better sorted textiles exported to third countries, reducing pressures on the local infrastructure and avoiding disposal of textile waste that ends up being treated	Better public health and safety, as sorting obligations would decrease the amount of textile that is landfilled, and/or poorly managed outside the EU, leading to a

		in poor waste management systems. Lower emissions and contribution to GHG reduction targets as sorting requirements would decrease the amount of textile that is landfilled. This measure would improve air, soil, and water quality thanks to reduced waste disposal practices. Similarly, it would protect landscapes thanks to reduced landfilling.	reduction in pollution.

Impacts on competitiveness

The following impacts on competitiveness have been assessed under this measure.

Table 11 - impacts on competitiveness of measure 2.5

Price competitiveness impacts	The largest price competitiveness impacts are likely to be felt in those Member States that have significant levels of collection but low levels of national sorting capacity as the need for additional sorting capacity under this measure potentially drives up competition for the sorting capacity available. In this respect AT, DE, DK, IT, and SE would be likely to note the largest impacts on price competitiveness as these countries currently have a heavy reliance on sorting taking place in other countries where lower costs are likely to be a factor in their shortages in their own domestic sorting capacity. At the same time, the possibility exists for other Member States to expand their sorting capacity, a significant part of which is already related to imported discarded textiles from other Member States and third countries, and increase their price competitiveness. This would include BG, CZ, EE, HU, LT, LV, PL, RO and SK.

Dynamic competitiveness impacts	A greater amount of sorting taking place within the EU under this measure would drive greater levels of reuse and recycling within the EU of the textiles sorted. In turn, this should drive greater R&I activities in the EU to deal with the reusable and recyclable textiles derived from sorting. This offers the opportunity for the EU to become a market leader in textile recycling technologies.
Export competitiveness impacts	Waste sorting measures are likely to reduce the volumes of used textiles exported from the EU to third countries, particularly as more material are collected for recycling within the EU. This would potentially reduce the incomes of used textile exporters within the EU as whole due to the reduced volumes available to market whilst increasing the volumes available for EU textile recyclers.
Strategic competitiveness impacts	Waste prevention measures offer the possibility to reduce the need for imports of textiles in the future as greater reuse, repair and recycling within the EU replaces the need for new textile goods to be purchased and for the import of natural textile fibres for use in the production of EU textile goods. As noted under economic impacts above in between 118 000 tonnes and 295 000 tonnes of virgin fibres could be replaced by recycled fibres under this measure.

Measure 2.6 – Adopting end of waste criteria

Assessment of impact Measure 2.6

Economic impacts

Minimising divergence of approaches to end-of-waste criteria ensures a level playing field and provides the opportunity to ensure that sorted textiles for re-use are fit for re-use and there is consistency in the sorting outputs for the variety of re-use markets. The criteria would have a notable benefit for the textile recycling sector by ensuring sufficiently consistent feedstock from the sorting processes as input to the recycling processes and the certainty of a product status for the outputs of recycling. This certainty would foster recycling techniques that are dependent on a sufficiently defined supply of materials to reach commercial viability in the future. This would encourage investment in infrastructure projects and promote a market for high quality secondary textile materials. This would also ensure a level playing field for the operators based in different countries to avoid distortion of competition which could otherwise create more favourable circumstances for companies, for example, that are operating in countries with national end of waste criteria. However, given the precise scope of the textiles that may be impacted by the final end-of-waste criteria is unknown it is not possible to state with certainty the changes in flows by volume that would actually take place. However, as a result of materials reaching end of waste status the costs of managing those materials is likely to reduce, albeit by a relatively small amount.

The extent to which these savings may be passed on to consumers is unknown, and in reality it is likely that any savings will be felt by businesses rather than directly by consumers of textile goods. This would, in turn, not result in a change in prices to consumers but may result in an increase in profitability for the reuse and recycling sector within the EU

The JRC[63] notes that for certain wastes, end-of-waste criteria can promote the production of higher quality secondary products by defining technical and environmental minimum requirements to be fulfilled by the materials. Information on the product characteristics facilitates their comparison, enhance the final quality of the final product and may alleviate user prejudice. These would all lead to an increase in their demand and their recycling rates.

This echoes messages identified in relation to end-of-waste criteria for other wastes including metal scrap[64]. Harmonised EU criteria would ensure free movement of textile materials within the EU as intra-shipment will no longer be in relation to a waste but will be in relation to a textile material that is no longer waste.

Textiles come in a variety of types of material and scope of application. It is expected that end-of-waste criteria will need to be developed for this broad family of materials over time and developing end-of-waste criteria may be delayed for certain textile materials whilst priority textiles are initially addressed. This would allow investment to be focussed on the most environmentally important textile wastes in the first instance and to be addressed more efficiently than is presently the case.

Certainty on the end-of-waste status for sorted re-usable textiles exported outside the EU would positively impact the re-use operators as it would reduce their waste management costs since the potential waste fraction within the textile bales would be minimised through more rigorous sorting in the EU (this is the combined impact of measures 2.5, 2.6, 2.8).

Environmental impacts

Article 6 of the WFD makes clear that end-of-waste can only apply if the use of the substance or object will not lead to overall adverse environmental or human health impacts. In keeping with this provision it is considered that there are unlikely to be any significant negative environmental impacts resulting from this measure. The application of the criteria will facilitate the shipments of waste for the treatment as well as end of waste material across the Union and outside. For end of waste material, the rules of the Waste Shipment Regulation would not apply and therefore would facilitate the shipments outside the EU. The end-of-waste criteria, that build also on measure 2.5. and 2.8, will minimise the risk that the loads exported as sorted textiles may contain waste fractions.

In relation to the potential replacement of primary products with end-of-waste products it would be expected that this replacement would have environmental benefits by driving down the need for virgin materials in the future and the environmental impacts of the production of virgin

[63] JRC 2009. End-of-waste criteria.
[64] UBA and Arcadis, 2020. Study to assess Member States practices on by-product and end-of-waste

materials. It is not possible to quantify these impacts as the precise scope of textiles that would impacted by the end-of-waste criteria is unknown.

In view of the production of textiles consumed in the EU largely taking place outside the EU and the majority of textiles collected and sorted for re-use being destined to global re-use markets, the environmental benefits are largely allocated in third countries.

Social impacts

No significant social impacts have been identified.

Administrative burden

Under the current EU regime, waste textiles even if they may be suitable for reuse or as a feedstock for recycling, are subject to a waste control mechanism for the movements between Member States. The development of end-of-waste criteria would mean that the shipment of waste for recovery that meet those criteria would be facilitated. The materials that meet the criteria for the output of the recovery operation would no longer be subject to waste legislation and controls. This would remove the administration in relation to the waste status and simplify shipments of textiles accordingly both within and outside the EU. Inspections of shipments for compliance with the waste legislation would be facilitated as compliance would be checked against a set of harmonised rules in the EU; furthermore, the criteria would also provide for the evidence (traceability and quality check requirements) to demonstrate compliance.

An additional 0.5 FTE would be required within the European Commission to adopt the necessary implementing act setting out harmonised end of waste criteria.

Impact on SMEs and social enterprises

Given SMEs, including social enterprises, are the majority of those involved in the placing on the market of textiles as well as in their waste management (sorting, transportation, recycling and re-use), the application of end-of-waste criteria is most likely to provide benefits to SMEs and social enterprises above other stakeholders.

Stakeholder evidence

Both the industry and a major NGO recognise that there is a need to define end-of-waste criteria and that this measure plays a crucial role in establishing shared systems and understanding[65] [66]. Due to their capacity to support coordination of systems across states, addressing definitions, guidance development and sharing of best practice and the adoption of EU end-of-waste criteria for textiles were regarded as key enablers, and suggestions were that they should potentially be applied together. Combined these would reduce the administrative burdens, cost and exporting

[65] Interview with Ellen MacArthur Foundation
[66] Interview with Policy Hub

challenges in relation to certain textile materials, whilst driving economies of scale. In turn, this would decrease costs for recyclers as well as brands, retailers and consumers by reducing the price for recycled materials[52]. These measures could also be further paired with EPR to accelerate their impact[67] [68].

The role of harmonisation across states was also identified as vital to avoid distortion of competition which could create more favourable circumstances for some companies[69].

The Commission – through the JRC – is already exploring end-of-waste criteria for textiles and there is need for further understanding on textile waste vs used textiles. The Commission should develop guidance on end-of-waste status (both when a product becomes a waste and when a waste becomes a product). Harmonising those rules at European level is key to facilitate preparation for reuse targets[70]. Participants particularly desired a better understanding of how to treat and process textile waste as a resource which will create the volumes needed to make recovery worthwhile and scalable.

As is the case with other measures, feedback indicated the need for end-of-waste criteria to align with the focus of other key regulatory initiatives such as the ESPR, alongside investment in recycling. It was also suggested that EoW criteria be focused on high volume materials such as pure cotton streams which could allow for key learnings to be captured which would inform application to other textile waste streams. EoW criteria should then be considered for the wider range of fibre and blends used across the industry, to ensure investment in technologies which can also recycle these[71]. In addition, the textile-related definitions currently being developed by the European Committee for Standardization should be fully considered in the revised directive[72].

Table 12 : Summary of impacts for measure 2.6

Stakeholder affected	Economic impacts	Environmental impacts	Social impacts
Producers, waste managers (encompassing collectors, sorters and managers)	This measure would create new market and investment opportunities for both companies and SMEs. End-of-waste criteria would increase the quantity		

[67] Interview with Euric
[68] Interview with Eurocommerce
[69] Interview with ARTSHC
[70] Interview with RREUSE
[71] Stakeholder workshop
[72] Stakeholder workshop

	of recycled products, thus creating new opportunities. This would boost the circular economy and reduce the export of textile waste.		
Public authorities	This measure would reduce the administrative burden for waste shipping and exports as lower amount of textile would be considered waste		
All stakeholders		This measure would reduce the amount of disposed textile, replacing virgin materials with textiles that were waste.	Minor impact

Impacts on competitiveness

The following impacts on competitiveness have been assessed under this measure.

Table 13 - impacts on competitiveness of measure 2.6

Price competitiveness impacts	No impacts on price competitiveness have been identified under this measure given that the end-of-waste criteria would apply uniformly across the EU. Those firms and Member States with already existing end-of-waste criteria may increase or decrease their competitive positions depending on the changes required to adapt to the EU wide criteria.

Dynamic competitiveness impacts	This measure has the potential to incentivise the repair and reuse market as well as the recycling markets in Member States by potentially allowing easier movements of reusable and recyclable materials that would no longer be categorised as waste in the future.
Export competitiveness impacts	No significant export competitiveness impacts have been identified for this measure.
Strategic competitiveness impacts	The potential to improve feedstock movements for the reuse and recycling markets under this measure would assist in developing textile reuse, repair and recycling at the EU level.

Measure 2.8 – Setting requirements for shipments of textiles for reuse

Assessment of impact Measure 2.

Economic impacts

Implementation of this measure would entail costs in relation to:

Member States setting up the templates for the presentation of the information required upon inspection. However, the requirements in the measure are focused on factual information. Therefore, there should not be much room for national adaptations. Furthermore, this information is already readily available to the operators. This information is to be held by the entities transporting used textiles. Since this information is likely to be already available, no significant additional costs would be attributed to the compliance with these requirements.

Operators would need to provide a declaration that the textiles exported are not waste. This is expected to be less than an hour per declaration, with the main cost related to the reporting of materials to the relevant competent authority once per year under the existing reporting obligations. This would amount to approximately 208 euro per operator per year affected[73]. It is unknown how many enterprises would be affected by such an obligation as the total number of relevant exporters is not recorded at the EU level.

The requirements in relation to the preparation of the bales of sorted textiles for transportation reflect the best practice of the industry to ensure that the value of the products is maintained; therefore, no significant additional costs would be attributed to the compliance with these requirements for the sorters or transporters of goods.

With regard to the enforcement activities of the competent authorities, the requirements for the availability of documentation proving the product status of textiles should facilitate the existing

[73] Based on an estimated 8 hours of effort per year per organisation

enforcement and inspection processes carried out by the authorities in the enforcement of Waste Shipment Regulation. Therefore, a reduced administrative burden is expected for inspectors that could not be quantified precisely.

Inspections in the third countries receiving textiles are not foreseen under this measure so there is no additional administrative burden.

New business opportunities for entities (based in the EU or outside the EU) to assist the sorting operators in data collection in third countries where textiles are exported for reuse and data analysis may be expected and reduced textile waste management costs to the reuse operators within or outside the EU on account of reduced share of potential waste fractions in the bales of sorted textiles for reuse imported from the EU should be realised.

Potential impacts on flows of textile waste are presented under environmental impacts below.

No significant impact on the price of textile goods would result from this measure.

Environmental impacts

The majority of exports from the EU to third countries of used clothing and clothing accessories, blankets and travelling rugs, household linen and articles for interior furnishing and textile materials including all types of footwear and headgear are to non-OECD countries. An examination of data from Comext[74] for the period 2017-2021 shows that in 2021, 61 countries received 98.8% of volumes exported from the EU, amounting to at least 1 000 tonnes of used textiles from the EU. The controls in place for the management of these materials are likely to vary dramatically.

The top ten destination countries for EU exports the period 2017-2021 are shown below.

Table 14 : Destination countries for EU exports of used textiles

[74] DS-045409

	Year				
	2017	2018	2019	2020	2021
Total EU exports	1,143,487	1,188,647	1,298,263	1,209,608	1,325,079
Country of destination					
Pakistan	119,989	158,959	181,650	174,302	213,549
United Arab Emirates	67,166	87,776	110,733	139,423	137,608
Tunisia	107,539	97,483	109,026	102,692	102,754
Cameroon	66,048	67,235	67,097	71,293	63,005
Türkiye	59,417	62,412	71,312	54,844	54,193
Togo	50,439	51,177	53,212	52,930	50,972
Ukraine	72,967	65,114	67,354	57,213	49,541
India	35,498	31,347	44,611	38,756	43,161
Ghana			37,196	42,785	42,104
Russian Federation (Russia)	36,311	37,014	37,986	35,874	39,472
Belarus	32,205	33,337			

Stakeholders in the context of the impact assessment accompanying the proposal for a revision of the Waste Shipments Regulation[75] raised the issue that third countries often welcome EU wastes as they are generally well sorted and have a higher economic value compared to domestic waste or waste from other countries. However, the import of EU wastes can displace domestically generated wastes in other countries with even less effective management of waste or cause them to be simply disposed or even dumped rather than being managed appropriately as shown in Table below.

An examination of waste management practices in the top destination countries of used EU textiles listed using data from the World Bank[76] notes a high level of landfilling and open burning in those countries.

Table 15 : Waste management practices in importing third countries

[75] SWD(2020) 26 final

[76] World Bank (2020) What a Waste Global Database - Country level dataset – note that gaps in the data exist with no data reported for Ghana and in some cases only some percentages reported by treatment type

Country	Waste treatment method applied					
	Percentage of waste disposed of in controlled landfill	Percentage of waste disposed of in other landfill	Percentage of waste open dumped	Percentage of waste incinerated	Percentage of waste recycled	Percentage of waste composted
Pakistan		40	50		8	2
United Arab Emirates		9	62		20	9
Tunisia		70	21		4	5
Cameroon			80.3		0.4	
Türkiye			44			1
Togo			96.2		2	1.8
Ukraine		94.07		2.73	3.2	
India			77		5	18
Ghana						
Russian Federation (Russia)			95		4.5	
Belarus	76.9		7.1		16	

Source: World Bank, 2020

In general (except Turkey) within OECD and EU countries only 35% of waste is landfilled[77] meaning that these countries have more effective waste management in place in comparison to those countries receiving used EU textiles. This would support the hypotheses therefore that EU textile wastes are likely to be contributing to the blocking more effective management of domestic wastes in those third countries. Placing a financial cost on such displacement is not possible. However, ensuring that textiles exported are fit for reuse and are not a waste would clearly have a positive impact on the management of waste in those countries and the related environmental benefit.

To determine the environmental impacts resulting from textile waste management in third countries in comparison to the EU the support study used the dedicated waste LCA-model EASETECH[78] also used by the JRC applied the datasets describing open dump and open burning activities for individual waste materials. In the absence of a specific dataset for textile the impact of textile waste has been approximated as a mix of plastic (15%) and paper/cardboard (85%) based on the assumption that ca. 15% of the textile is composed of biological fibres while the rest is synthetic (Riber et al. 2009[79]). To calculate the net environmental benefits of managing textile wastes in the EU in comparison to third countries the following results from EASETECH have been applied: a GHG saving by treatment in the EU in comparison to third countries of 1.7 tonnes CO2e per tonne of textiles disposed of and saving in terms of externalities when 285 euro per tonne has been applied[80].

[77] World Bank (2020) What a Waste Global Database - Country level dataset – note that gaps in the data exist with no data reported for Ghana and in some cases only some percentages reported by treatment type
[78] Clavreul et al. (2014) https://www.sciencedirect.com/science/article/pii/S1364815214001728
[79] Riber et al. (2009) https://www.sciencedirect.com/science/article/abs/pii/S0956053X08003322
[80] These are the same values used in SWD(2020) 26 final in relation to disposal of textiles in third countries in comparison to the EU.

It is difficult to determine the volumes of waste textiles currently included in total exports of EU clothing to third countries. Using the rejection rate of collection bins (approximately 10%) on the 475 000 tonnes of textiles sorting that is currently undertaken in third countries, would result in 47 500 tonnes of textiles being waste. Alternatively, using Comext values for all EU exports of used textiles in 2021 of 1.325 million tonnes and applying the same 10% waste content of all such shipments would mean that for 2021, 132 500 tonnes of textile wastes may be found in materials currently exported. If the values reported in relation to Staff Working Document accompanying the ecodesign proposal[81] of 40% of the materials exported being waste were used these values would climb to between 190 000 and 530 000 tonnes. Managing these wastes within the EU in comparison to third countries would result in CO2 eq savings of approximately 81 000 – 225 000 tonnes per year and externality savings of between 13.5 million and 37.7 million euro per year using the 10% waste value and 54 million euro and 150.8 million euro per year.

Social impacts

The social impacts of textiles waste are emphasised in the Commission's Staff Working Document accompanying the ecodesign proposal[82] that notes that garments exported for reuse often end up being burnt, which impacts the local environment and inhabitants as developing countries generally do not have the suitable infrastructure to discard them safely. The same SWD quotes that 40% of the clothing traded at the Kantamanto Market (Ghana) ends up in landfill almost immediately due to its poor quality. McKinsey[83] also notes that exports of used clothing and household textiles to third countries are partly legitimate and aligned with the waste hierarchy as some goes to reuse. However, McKinsey also identifies that there is simultaneously a large problem with textile-waste management especially in some of the Global South countries to which European textiles are exported—particularly the exports of unsorted textile waste as many of these countries do not have the capacity to recycle this waste and as a consequence much of it ends up in landfills or incineration. Whilst several NGOs have highlighted the challenges resulting from exports of textile from the EU to third countries (Greenpeace[84], the Plastic Soup Foundation[85], and the movie 'Textile Mountain'[86]), the challenges of fast fashion have also been acknowledged by

[81] See footnote **Error! Bookmark not defined.**
[82] See footnote **Error! Bookmark not defined.**
[83] See footnote 46, p. 47.
[84] Wohlgemuth V (on behalf of Greenpeace), 2022. How Fast Fashion is using the Global South as a dumping ground for textile waste https://www.greenpeace.org/international/story/53333/how-fast-fashion-is-using-global-south-as-dumping-ground-for-textile-waste/
[85] Plastic Soup Foundation, 2022. Come on EU! The massive dumping of discarded clothing in Ghana and Chile must stop https://www.plasticsoupfoundation.org/en/2022/03/the-massive-dumping-of-discarded-clothing-in-ghana-and-chile-must-stop/
[86] Fellipe Lopes, 2020. Textile Mountain: The Hidden Burden of our Fashion Waste https://www.textilemountainfilm.com/

UNEP[87] and the OECD[88] at the end of textile life. The export of these quantities also leads to additional transport further weighing down on the environmental impact of textiles.

This measure with regard to textile wastes sent to third countries would undoubtedly reduce the volumes of materials dumped and open-burned in such a manner having a positive impact on the social wellbeing on people in proximity to such waste sites as well as in relation to the health and safety of those currently involved in such waste management activities. Conversely, however, and in keeping with the social impacts of measure 2.5, the employment of those currently involved in sorting textiles in third countries would be negatively impacted from an economic standpoint as textiles would be better managed within the EU requiring less sorting to take place in third countries.

Impact on SMEs and social enterprises

Given the majority of those involved in collecting and sorting textiles are SMEs including social enterprises which currently largely take care of textile collection the obligations under this measure (proper preparation of bales for shipment transportation, documentation preparation, as well as support for related inspections by competent authorities) would fall on such enterprises. The requirements in relation to the preparation of the bales of sorted textiles for transportation reflect the best practice of the industry to ensure that the value of the products is maintained; therefore no remarkable additional costs would be attributed to the compliance with these requirements for the sorters or transporters of used textiles.

Stakeholder evidence

The NGO stakeholders as well as sorters have raised concerns about the impacts on third countries as a result of import from the EU of used textiles due to illegal shipments or legal shipments of used textiles which may nevertheless contain large fractions of non-reusable textiles placing burden on the waste management systems in those countries. These views have been raised in the stakeholder textile workshops, targeted consultation as well as in materials submitted as evidence during this assessment[89].

Table 16 : Summary of impacts for measure 2.8

Stakeholder affected	Economic impacts	Environmental impacts	Social impacts

[87] UNEP, 2018. Putting the brakes on fast fashion. https://www.unep.org/news-and-stories/story/putting-brakes-fast-fashion

[88] OECD, 2022. Global Plastics Outlook. https://www.oecd-ilibrary.org/environment/global-plastics-outlook_de747aef-en

[89] See for example European Environmental Bureau, 2022. Wellbeing wardrobe: A wellbeing economy for the fashion and textile sector – submitted as evidence by the EEB.

Waste managers (encompassing collectors, sorters and managers) or traders transporting textiles	No significant additional impacts identified in view of existing practices. It would also improve the level playing field among the operators as it would reduce the occurrence of illegal shipments.		
Public authorities	Positive impact as the measure would facilitate the enforcement of illegal shipments in the framework of continuous enforcement activities.		
Citizens (in particular, in third countries)			The social impacts of textile wastes exported and handled by reuse (non-waste) operators or citizens in the vicinity of the illegal waste disposal operations in third countries would be minimised by the reduction of illegal shipments of waste.
All stakeholders (in particular, in third countries)		This measure would improve environmental quality as it would help avoid illegal	

		shipments of waste disguised as used products due to export of unsorted or inappropriately sorted textiles. This measure would bolster the reuse of textiles in non-EU countries that are textile export destinations. This would have environmental but also social and economic benefits for the residents of these countries.	

Impacts on competitiveness

The following impacts on competitiveness have been assessed under this measure.

Table 17 - impacts on competitiveness of measure 2.8

Price competitiveness impacts	The largest price impacts are likely to be felt by those Member States that most heavily rely on exports of discarded textiles to third countries. This would particularly impact on BE (16% of all EU exports), DE (17% of all EU exports), ES (8% of all EU exports), FR (8% of all EU exports), IT (12% of all EU exports), NL (8% of all EU exports) and PL (14% of all EU exports). However, as the costs impacts are administrative and reflect a small cost in total the impacts are likely to be low overall.
Dynamic competitiveness impacts	No significant dynamic competitiveness impacts have been identified under this measure.
Export competitiveness impacts	No significant export competitiveness impacts have been identified under this measure.

Strategic competitiveness impacts	No significant strategic competitiveness impacts have been identified under this measure.

Measure 2.9 – Mandating the use of EPR

Assessment of impact Measure 2.9

Due to a lack of data on pre-consumer textiles, post-commercial textiles and post-industrials textiles the assessment of impacts below focusses on the post-consumer fractions of textile waste.

Economic impact

The intention behind an EPR is to ensure that the producers of textiles take into account the costs of end-of-life management of the textiles that they produce. According to the evidence collected the management of discarded textiles both across the EU and within EU Member States is fragmented with a mix of different actors from the public, private and social enterprise sector involved in different aspects of collection, sorting, reuse, recycling and disposal. This inevitably leads to inefficiencies in waste management and the transfer of overall responsibility from this mix of actors to EPR would look to address these inefficiencies whilst making sure that the actors already involved in such waste management as well as new actors in the future are given a role in the operation of EPR as required under Article 8a(6) of the WFD. In this respect and reflecting on the economic impacts addressed in the individual elements in Annex 10, the costs that would be moved from the variety of actors that currently and in the future would be managing waste to PROs acting on behalf of producers under EPR would equate to approximately 2.28 billion euro by 2035 or approximately 3.5% of the turnover of the clothing sector in 2022[90] and 1.5% of the turnover of the textiles sector overall. Approximately 457 million euro of the total relates to collection costs with the remaining 1.8 billion euro related to sorting and treatment costs. At the same time approximately 1.1 billion euro of reusable textiles would be available to the market as well as 188 million euro of textiles for feeding into closed loop recycling and 49 million of textiles for open loop recycling – these impacts may be expected to take place under the baseline but the funding necessary to ensure that this is the case would be far more unsure across the EU than under an obligatory EPR scheme.

It is also important to note that much of these costs are not additional but are instead otherwise covered through general waste management funding at the Member State level including through general taxation. Therefore, this entails a transfer of costs from public authorities and waste management actors to the producers. In effect 58% of the costs would be recovered through the onward reuse and recycling of the textile wastes collected, sorted and subsequently resold or recycled.

[90] Euratex, 2022. Facts & key figures 2022 – places industry turnover at €147 billion in 2021 with clothing accounting for turnover of €65 billion of this total.

The impacts on the price of textile goods would equate to an average cost increase of 0.6%. For an average T-shirt this would be a maximum of 12c per T-shirt with the actual cost likely to be lower. For more complex textiles items containing disruptors such as zips and buttons the cost per item in cents would be higher but as a proportion of the total cost of the product is likely to remain the same

It is important to note that the introduction of EPR has the potential to change the nature of the organisations involved in the collection, sorting and subsequent reuse, recycling and disposal of textiles. As noted in Annexes 5 and 6 in all countries where data is available the major share of used textile collection is currently carried out by charitable and commercial collectors. In Denmark, Finland, Latvia and Sweden, the collection is dominated by charitable organisations. In Lithuania, commercial collectors are responsible for 54 % of collection.[91] In France, Germany and the Netherlands, commercial collectors also have a reportedly high share of the market, though there are no concrete figures on how big this share is.[92] Municipal waste companies play an increasing role in used textile collection in many countries. In Estonia, due to legal obligations, municipalities carry out 37 % of all collection, and in Lithuania they have a 30 % share.[93] Collection by municipal waste companies in Denmark, Netherlands and Sweden are thought to be lower. In Denmark for example municipalities had a share of 5 % in all collection in 2017, but this is increasing over time.[94] Implementation of EPR has the potential to change this approach as Member States may increasingly look to municipalities and commercial operators to ensure the collection of textiles wastes and their subsequent sorting and treatment.

The measure foresees the need for Member States to ensure that social enterprises are involved in the operation of EPR schemes as well as in an active dialogue in implementation in accordance with Article 8 of the WFD in order to mitigate the potential negative impacts of EPR on their operations. However, it is expected that the costs of collection and sorting would increasingly fall upon commercial operators and municipalities, particularly given the likely fall in the quality of textiles for reuse that would result from increased collection in the future. The funding generated by EPR is likely, therefore, to focus on the additional collection and sorting that will take place in the future with municipalities and commercial waste collectors and sorters receiving the majority of funds generated through EPR to address these costs. This will be particularly important for the recycling sector that requires funding to support research and development and is not the primary focus of textile collections operated by social enterprises that focus on reuse. This is ably demonstrated by the estimated costs of the likes of the ReHubs initiative that has identified costs of implementation of 6-7 billion euro up to 2030 but for which funding is sought[95]. Additionally,

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[91] Watson, D., Kant Hvass, K., Moora, H., Martin, K.; Nausėdė, V., Gurauskiene, I., & Akule, D., *Textile circularity in the Baltic countries: current status and recommendations for the future,* Nordic Council of Ministers TemaNord Report, 2020b.

[92] Watson, D., Trzepacz, S., Kiørboe, N., Elander, M., Ljungkvist Nordin, H., Lander Svendsen, N., & Wittus Skottfelt, S, *Towards 2025: Separate Collection and Treatment of Used Textiles in 6 EU countries*, 2020a.

[93] Watson, D., Kant Hvass, K., Moora, H., Martin, K.; Nausėdė, V., Gurauskiene, I., & Akule, D, 2020b.

[94] Watson, D., Aare, A. K., Trzepacz, S. and Dahl Petersen, C., *Used Textile Collection in European Cities,* Study commissioned by Rijkswaterstaat under the European Clothing Action Plan (ECAP), 2018a.

[95] https://www.innovationintextiles.com/rehubs-seeks-67-billion-for-bold-plan/

the geographical scope of Rehubs envisages five Member States acting as recycling centres - Belgium, Finland, Germany, Italy and Spain. These Member States would also serve other EU Member States. However, this leaves a gap geographically in central Europe, particularly for the likes of Romania, Bulgaria, Greece, Hungary and Slovakia that are some distance from the nearest Rehub, each requiring textile wastes to transit over at least one other country to reach the necessary recycling centre. The need to ensure sufficient and cost-effective recycling is provided for these Member States would also likely require PRO funding.

The development of a producer register would require a new register to be developed. Setting up a register will generate additional costs both in terms of establishment and in terms of maintenance of the system. In ascertaining the costs of such a system an examination of the costs identified in the application of registration under the WEEE Directive has been performed. In the impact assessment accompanying the proposal to recast the WEEE Directive in 2008, the costs of drawing up registers of producers across the EU was determined as 14M euro in total. Adjusted for inflation the present-day cost would be 18.7M euro for the EU in total. However, these registers for WEEE address almost 90 000 producers in the EU overall. Depending on the inclusion of exclusion of micro-enterprises (see Table 59 below) the number of producers likely to be impacted in the EU for textiles would more likely sit between 16 500 and 68 000 producers. The costs for textiles would, therefore, be lower and more likely sit between 2 and 12.3 million euro. It is likely that the upper bound is still overestimated since it should be feasible to reduce the costs by integrating the register into other existing systems for producer registers under other EPR schemes; it is a practice in several Member States to operate producer registers that serve simultaneously several EPR systems.

With the two systems already in operation in France and the Netherlands, the average cost per Member State would, therefore, be between 80 000 and 492 000 million euro per Member State dependent on the inclusion or exclusion of micro-enterprises. Maintenance costs, in keeping with the estimated maintenance costs of registers at the EU level as presented in the Commission Impact Assessment accompanying the proposal to revise the Waste Shipments Regulation are estimated at between 11 200 and 69 000 euro per Member State per year.

Additional costs would apply in relation to producers registering with the system. The main costs would be in completing producer details to enable the generation of the relevant Producer number. Such costs would expect to equate to 0.5 day per producer to complete the relevant details with a total cost of 104 euro per registration. Whilst the total number of Producers that would be impacted is unknown for those not manufacturing products within the EU, for manufacturers of textiles within the EU this would be a one-off cost and is assessed below.

Table 18 : Indicative one-off costs for registering in a national producer register

Size of company	**Number of producers**	**Cost of annual PoM data**
From 0 to 9 persons employed	115,943	12,058,072

From 10 to 19 persons employed	6,767	703,768
From 20 to 49 persons employed	4,137	430,248
From 50 to 249 persons employed	1,920	199,680
250 persons employed or more	240	24,960
Total	129,007	13,416,728

As can be seen, should micro-enterprises be included in the scope of EPR, the majority of costs would fall upon this fraction of EU textile manufacturers. Should micro-enterprises be excluded the total administrative burden would decrease from 13.35 million to 1.35 million euro for the EU overall.

The calculations of the one-off registration costs reflect on a situation whereby each producer registers in one producer register. However, there are likely to be situations whereby producers place goods on the market of more than one Member State. The one-off costs identified above would, therefore, multiply in the case where producers place goods on the market of more than one Member States. If, for example, producers placed goods on the market of five different Member States which even for smaller producers is possible with the rise of online sales, the total costs would be approximately five times higher as whilst the basic requirements should be the same across the EU the variations in actual systems of registration and language requirement will likely result in little saving in terms of time taken to register in additional countries once registration has taken place in another. The measure therefore provides that the information requirements that producers need to submit to the register are harmonised and specified in the WFD so that it is clear from the outset of the WFD revision across the EU and reduce compliance costs for producers operating across several countries.

In the case of producers selling goods in Member States where they have no legal registration they will need to register with an authorised representative in the country of sale. An authorized representative is a natural or legal person who assumes EPR obligations in a country on behalf of such a producer. Authorised representatives will charge fees to represent producers in third countries. By way of example, a service provider[96] offering authorised representative services to both producers located within the EU and producers based in third countries charges an annual fee of approximately 1 800 euro per year plus an hourly rate of 225 euro per hour for additional support. In the case of medical devices that also require an authorised representative a figure of approximately 2 000 euro per year is quoted[97]. In both of these examples the services include the costs in relation to product standards that are likely to be higher in terms of resources required to be expended by an Authorised Representative in relation to EPR. With this in mind, the lower cost

[96] https://www.productip.com/#home
[97] https://cmsmedtech.com/how-to-choose-an-ec-rep/

quoted of approximately 1 800 euro per year for the appointment of an authorised in any given Member State is considered representative in this case. These fees would apply per country of sale and, thereby, should a producer sell in several countries using an authorised representative in each the costs would be multiplied by the additional number of countries concerned. There is also the possibility for PROs to operate as an Authorised Representative for producers in other Member States placing goods on the market for the Member State within which they are the PRO. In this case the costs of registration with a PRO in the previous paragraph would apply.

Additionally, producers will be required to provide information on the volume of products placed on the market and in relation to the eco-modulation of fees to determine the fees payable on the basis of the eco-modulation criteria applicable to their products. The production of data addressing the overall volume of goods placed on the market would be similar to the costs of initial registration i.e., 0.5 day per producer. The costs highlighted above for one-off registration would, therefore, be duplicated for this reporting measure i.e., the total costs would be approximately 13.4 million euro per year should micro-enterprises be included and 1.35 million euro per year were they not. The production of data in relation to the eco-modulation of fees, however, will require more time and effort. In the case of the French EPR, the sustainability, integration of recycled materials from household waste and integration of recycled materials from production scrap alongside the base EPR fees effectively results in almost 50 categories to be considered in reporting of eco-modulation fees applicable. The costs are, therefore, dependent on the record keeping of producers against these criteria in any production year to simplify overall reporting alongside any efficiencies that may be achievable by providing standardised reporting tools to producers to assist them in their reporting and calculations. The time taken to report against a similar set of criteria applicable in France is estimated as 2 working days per enterprise or 416 euro per producer. The costs applicable in relation to both of these annual obligations is addressed below. Cost mitigation aspects of this measure entail: mandating the reporting under the PRO to take place annually and envisaging a mandate to the Commission to develop harmonised rules for the fee modulation purposes, including on the product category granularity for fee application.

Table 19 : Indicative annual costs of reporting total quantities of goods placed on the market as well as data on eco-modulation for EU manufacturers of textiles

Size of company	**Number of producers**	**Cost of annual PoM data**	**Cost of eco-modulation reporting**
From 0 to 9 persons employed	115,943	12,058,072	48,232,288
From 10 to 19 persons employed	6,767	703,768	2,815,072
From 20 to 49 persons employed	4,137	430,248	1,720,992
From 50 to 249 persons employed	1,920	199,680	798,720

250 persons employed or more	240	24,960	99,840
Total	129,007	13,416,728	53,666,912

In keeping with existing EPR obligations under the acquis addressing electric and electronic equipment, batteries and packaging, Member States would be able to decide whether the register of producers is publicly accessible or not. In order for the online platforms to fulfil their obligations under this measure as a verifier of traders using their services, it would be necessary for online platforms to have access to national registers. This should not entail significant costs to the producer registers; also noting that similar obligations are also relevant for other EPR schemes and their producer registers.

With regard to the manufacturing of wearing apparel sector, the complete exclusion of micro-enterprises would effectively require the remaining 10.1% of enterprises to address the costs stemming from the exempted entities that represent 89.9%. However, by weight of goods, this represents an additional cost to SMEs and larger operators of approximately 16% of their EPR costs and this is likely to be a small additional cost. This approach would also minimise the administrative cost of applying EPR to 116 000 enterprises across the EU, and the enforcement costs for the competent authorities in ensuring that all such micro-enterprises are compliant with the EPR scheme.

A potential impact of the exclusion of micro-enterprises from EPR obligations is the possibility of the costs for products resulting from micro-enterprises falling upon other SMEs (i.e., those enterprises that have between 10 and 250 employees). As noted in the Eurostat statistics for manufacturers of textiles within the EU[98] the percentage of total turnover by enterprise size as well as the average turnover by enterprise is shown in the table below.

Table 20 : Total percentage of EU turnover and average turnover per enterprise resulting from the manufacture of wearing apparel in the EU

Enterprise size	Percentage of total turnover by enterprise size	Average turnover per enterprise	Administrative costs of EPR	Administrative costs of EPR as a % of average turnover
0 to 9 persons employed	16%	87,709	527	0.60085%

[98] Annual enterprise statistics by size class for special aggregates of activities (NACE Rev. 2) [SBS_SC_SCA_R2__custom_3996079]

10 to 19 persons employed	9%	874,834	527	0.06024%
20 to 49 persons employed	13%	2,040,126	527	0.02583%
50 to 249 persons employed	25%	8,320,000	527	0.00633%
250 persons employed or more	37%	100,878,750	527	0.00052%

Comparing the administrative costs of EPR per enterprise, it is clear that in the case of micro-enterprises the impact as a percentage of turnover is far higher than for other sizes of enterprise – almost 0.6% of turnover compared to around 0.06% for the next largest category of 10-19 persons, 0.02% for 20-49 persons category, and a negligible impact for the larger sizes of enterprises.

The cost of exempting micro-enterprises can be shifted to the fees applicable to products put on the market by enterprises of other sizes. This would result in the following changes.

Table 21 : Cost shifting to the exemption of micro-enterprises to larger enterprises

Enterprise size	Total contribution to fees with micro-enterprises included	Total contribution to fees with micro-enterprises excluded
From 0 to 9 persons employed	16%	0%
From 10 to 19 persons employed	9%	11%
From 20 to 49 persons employed	13%	15%
From 50 to 249 persons employed	25%	30%
250 persons employed or more	37%	44%

The largest additional costs would fall on enterprises with 250 persons or more employed, followed by enterprises with 50-249 persons employed. Enterprises from 10-49 persons employed would see the smallest increase in costs.

Alternatively, the application of a single low flat fee for micro-enterprises would mean that at least a partial contribution to the relevant EPR scheme is made by enterprises that contribute to the textile waste generation. For example, in France, a flat fee of 75 euro per year is applied to producers with less than 750 000 euro turnover per year or if they sell less than 5 000 products in France. Should the same fee be applied to micro-enterprises, the revenue raised would be around 8.695 million euro per year. This option would also raise the costs of EPR scheme administration as well as enforcement for the competent authorities. This cost is estimated at around 525 euro per year. Therefore, the contribution of a flat fee for micro-enterprises seems disproportionate as it adds a significant amount of effort on micro-enterprises while raising less than 9 million per year.

Based on these considerations, it is proposed that micro-enterprises manufacturing textiles should not be subject to the EPR requirements in view of the effectiveness and proportionality principle.

The nature of the textiles industry is such that it is heavily dominated by micro-enterprises for which it is considered that the costs of application of the EPR obligations would be high as a fraction of their turnover whilst the additional administration for PROs and Member States in dealing with the large number of micro-enterprises would also be high. For this reason, the measure has been targeted to exclude micro-enterprises to mitigate this economic impact. Similarly social enterprises involved in the resale of textiles would be excluded given the possible impacts on their operational models and the citizens that benefit from their operation.

Addressing the full costs of waste management would apply the polluter pays principle and with greater investment in the management of textile waste would assist in driving forward to reuse repair and recycling sectors for textile by ensuring that adequate funding is in place.

The actual costs per textile item are expected to be low. By way of example Eco-Logic[99] notes that Eco-TLC the French PRO for textiles calculates the EPR fees based on the number of items placed on the market. The categories of fees are divided into 4 levels of scale depending on the size of the items: very small, small, medium and large items (Eco TLC 2019). Eco-modulation is applied on top of the standard fee, which in turn is based on the durability of textiles as well as the recycled content of textiles. Ecologic notes that the French EPR fees along with eco-modulation make a very small part of the price of the product in France.

Table 22 - EPR and modulated fees for textiles in France

Size of item	Very small	Small	Medium	Large

[99] Eco-logic, 2021. Extended Producer Responsibility and Ecomodulation of Fees

Standard fee scale (EUR excl. VAT/items)	0.002	0.009	0.020	0.063
EM1 Durability	0.001	0.0045	0.010	0.0315
EM2 Recycled content	0.001	0.0045	0.010	0.0315
EM3 Recycled content	0.0015	0.00675	0.015	0.04725

A significant economic advantage that cannot be quantified relates to the standardisation of EPR schemes for textiles across the EU under this measure. As noted in Annexes 6 and 11 FR is currently the only Member State with an EPR for textiles in place. The NL, which was due to implement EPR for textiles on 1 January 2023 (and has been delayed until summer 2023 according to the latest information available) will be the second Member State to implement EPR for textiles and SE is likely to be the third. However, the scope and operation of the EPR schemes varies and the potential for other competing yet different EPR schemes for textiles across the EU risk the development of rapidly diverging schemes that would significantly hamper producers from accessing Member State markets other than their main Member State of business given the likely levels of confusion that would result from this divergence. A good example of this possible divergence is provided in the table below that considers the scope of the EPR schemes for FR, NL and SE.

Criteria	Member State		
	FR	**NL**	**SE**
Scope	New clothing textile products, shoes or household linen intended for private individuals and, from 1 January 2020, new textile products for the home, excluding those which are furnishing elements or intended to protect or decorate items of furniture. Note that CN codes are not specifically addressed in the Ministerial Decree;	Using the relevant CN codes: Household textiles : table, bed and household linen as referred to in Chapter 63, Part I, heading 6302 Clothing : consumer and industrial clothing as referred to in Chapters 61 and 62; Specifically excluded goods are: Shoes, bags, belts (no textile products); Unsold inventories at producers (not placed on the market); Returns to producers upon cancellation of purchase (not placed on the market); Blankets (6301); Net curtains , curtains and roller blinds (6303); Bedspreads (6304); Pockets (6305); Tarpaulins , sails , tents (6306); Mop , Dishcloths , Cleaning Cloths , Dusters (6307)	Using the relevant CN codes: 4202 1291 Bags with textile exterior 4202 1299 Bags with textile exterior 4202 2290 Bags with a textile exterior 4202 3290 Articles normally carried in the pocket or purse 4202 9291 Bags with textile exterior 4202 9298 Bags with textile exterior 57 Carpets and other textile floor coverings 61 Clothes and accessories for clothes knitted or crocheted 62 Clothing and accessories for clothing not knitted or crocheted 6302 Bed linen, table linen, toilet towels, kitchen towels and similar articles 6303 Curtains, blinds and draperies; curtain valances and bed valances 6304 Other furnishing articles
Reporting frequency	Annual	Annual	Annual
Reporting date	By March 31 on previous years data	By 1 August on previous years data	By March 31 on previous years data
SMEs addressed	Yes, albeit a flat fee of 75 euro per year is applied to producers with less than 750 000 euro turnover per year or if they sell less than 5 000 products in France	A further explanation is also requested of the possibility of exempting small producers from the reporting obligation in the ministerial regulation. The latter is indeed possible: an exemption can be included for producers who produce up to a certain size. In the case of plastic packaging, for example, it has been decided in the ministerial regulation on packaging reporting that producers who use less than 50,000 kilograms of packaging annually are exempt from the reporting obligation under the Decree. No decision has yet been taken on whether an exemption will be applied to textile producers and where the limit would be. This is laid down by ministerial regulation. A basis for this is included in Article 7(3) of this Decree. No decision on this has yet been taken	The investigation has assumed that all manufacturers, sellers and renters of textiles are producers. This would include SMEs.
Obligation to use a PRO	Producers can either set up an individual scheme for the recycling and treatment of this waste or can contribute financially to an organisation created for this purpose and to which they belong (a producer responsibility organisation - PRO).	Producers can jointly implement the obligations arising from the EPR textiles (Article 6 of the EPR Decree). The obligations resting on the individual producers will then be transferred to the producer organization, which will notify the Minister of Infrastructure and Water Management on behalf of these producers. It is estimated that the implementation of the Decree will cost 16.8 FTE at the level of individual producers, compared to an expected 5.8 FTE if a producer organization is present.	Producers can use a PRO but it is not obligatory.
Eco-modulaton	Eco-modulation is applied based on durability and recycled content of products	This is regulated in Article 6, third paragraph, of the UPV Decree. The fourth paragraph of this article obliges the producer organization to differentiate the contribution of producers if possible, in particular by taking into account the entire life cycle of products and the durability, reusability, recyclability and the presence of hazardous substances. In view of Article 6(4) of the EPR Decree, however, tariff differentiation falls under the responsibility of the producer organisation(s).	In order to obtain permission to operate a collection system, the applicant must thus demonstrate that the fee for an individual producer, whenever possible, adapted based on the properties of the textile that the collection system has undertaken to take care of when it becomes waste. When the fee is calculated, a life cycle perspective must be applied and special consideration must be given to properties that affect the textile's active lifespan and material recyclability. If the Commission publishes guidelines and adopts harmonized criteria, the operator of the collection system and the Swedish Environmental Protection Agency can use these as a starting point when applying this requirement.

It is apparent that different choices in relation to the scope of the EPR schemes have or are likely to be made, meaning in turn that producers of different types of textile goods are likely to encounter different requirements in different Member States. The reporting dates also vary, and the application of the requirements to SMEs may also diverge depending on the decisions still to be taken in SE and NL. Finally, the eco-modulation of fees is likely to vary given the different criteria listed in FR, NL and SE. In each of these cases variation of the requirements is likely to result in a lack of level playing field across the EU for producers and a lack of consistency in application of requirements when selling goods in more than one Member State.

In relation to the adoption of Implementing Acts in relation to the content of the Producer Registers as well as the eco-modulation of fees approximately 1.2 FTEs would be required in the European Commission. Member States would also be asked to make input to the necessary implementing act with the total cost of inputs of Member States of approximately 135 000 euro per implementing act with about 50 individuals making input.

Textiles have been confirmed as a priority product under ESPR following the stakeholder consultation[100], and the technical work supporting the Delegated Act on textiles under the ESPR is underway. It is estimated that the Delegated Act would be adopted in 2024/25 which coincides broadly with the possible adoption and entry into force of the Waste Framework Directive rules on Extended Producer Responsibility considered in this assessment. Therefore, full alignment is possible both at the policy development and implementation stage. Full alignment between the two legislations in terms of scope and standards (e.g. on the design factors and measurement tools) is a top priority for the Commission. In practice, it is important to ensure that fee modulation under EPR is fully consistent with the ESPR sustainability criteria and their measurement standards. This will provide the clearest policy signal and prevent unnecessary administrative burdens. This approach is also strongly supported by the textiles industry.

Environmental impacts

The application of EPR should both ensure that adequate infrastructure for management of textile waste is funded as well as addressing communication to waste holders enabling to better understand the need for and opportunities for separate collection of textiles in the Member State concerned as well as on the overall impacts of textiles on the environment and the contribution of consumers, including in the purchase of used textiles. The environmental impacts may be expected to take place under the baseline, the main advantage of EPR being that the necessary funding to pay for the textiles management necessary to achieve these impacts would both be more likely and more consistent across the EU. Consequently, the indirect environmental impacts of textiles that would otherwise be discarded in residual waste should therefore be more likely to be reduced under this measure including in relation to GHG emissions through both greater reuse of textiles as well as recycling of textiles in comparison to their disposal as well as emissions to air, water and land through the avoidance of disposal in the future. As a proportion of total textile waste generation in

[100] Have your say, Published initiatives, New product priorities for Ecodesign for Sustainable Products, New product priorities for Ecodesign for Sustainable Products (europa.eu).

the EU disposal would drop from 74% at present to 56% by 2035 with a drop of nearly 670 000 tonnes in total. Notably in relation to recycling, the plans of the European Apparel and Textile Confederation (EURATEX) to significantly boost recycling of textiles is dependent on certainty in relation to the volumes and nature of the feedstock produced. EPR would target both aspects feeding into a textiles recycling market that the industry calls for to ensure investment certainty.

As noted under measure 2.5 in relation to the displacement of new textile products and virgin fibres through increased reuse and recycling, the environmental benefits in all cases outweigh the costs of production of new products and virgin fibres. Using values provided by EuRIC[101] the following savings would be anticipated to be supported through the introduction of EPR in terms of water use.

Quality level	**Reused water saving compared to new equivalent per tonne of textiles collected**	**Recycling closed-loop water saving compared to new equivalent per tonne of textiles collected**	**Recycling open-loop water saving compared to new equivalent per tonne of textiles collected**
Crème	198 000 m^3	4 500 m^3	16 800 m^3
B-grade	138 000 m^3	1 290 m^3	No value used
C-grade	5 800 m^3	1 290 m^3	No value used

Furthermore, in the case of recycling approximately ~2 hectare per tonne of fibre output as an average all fibres is applied to calculate the land-use saved through displacement of virgin fibres by recycled fibres. It is expected, therefore, that the support of EPR to recycling activities would support actions that would result in significant saving in terms of land use of up to 1.6 million tonnes by 2035.

Social impacts

The application of EPR would assist in both driving employment by improving investment in textile waste management as well as mitigating the impacts of poor textile waste management for both citizens of the EU as well as in those third countries receiving used textiles from the EU in comparison to the disparate and inconsistent approach that might otherwise develop in the absence of EPR. It has not been possible to quantify these impacts. Sorting and recycling at scale will create jobs and ensure competitiveness in light of increasing raw material and energy costs and ensure that recyclers have the necessary dependable feedstock to significantly increase closed loop recycling within the EU. By driving forward the necessary changes in textile management it is estimated that an additional 5 500 jobs would be created by 2035, supported directly by the introduction of EPR.

[101] EuRIC, 2023. LCA-based assessment of the management of European used textiles

With regard to the impact of the EPR obligations on the cost of product, it is not possible to assess with certainty whether the producers will internalise the cost or pass it onto the consumers. Considering that the textile market is fiercely competitive, it may be possible that the producers will internalise the costs. On the other hand, the costs per item are low as shown in the table above so the overall effects are expected to be limited even if the fees applied are passed on to consumers.

Impact on SMEs and social enterprises

Given the majority of those involved as producers are SMEs, the report assessed the implications of excluding certain categories of SMEs (micro enterprises) from the EPR obligations as producers. The same was done in relation to the reuse sector that has a significant proportion of social enterprises involved in the resale of reused textiles. The impacts of their inclusion or exclusion were assessed and conclude with their exclusion. In addition, the implementing acts envisaged harmonising the formats for the producer register registration and fee modulation, including the application of the harmonised criteria on sustainable textiles developed under the ESPR, as well as the obligations for the PRO membership and reduction of reporting to the PRO to annual exercise are all specific measures aimed at minimising the compliance costs for SMEs. Several features of the proposed EPR scheme aim to ensure that the role of the social enterprises in the management of textile waste for re-use purposes is maintained or strengthens with the establishment of the EPR schemes, namely, through setting an obligation for the EPR schemes to allow their participation in the collection networks and to finance the treatment of recyclable and residual waste generated by the textile sorting operations operated by social enterprises. These measures should avoid disrupting the business model of social enterprises and in fact facilitate it.

An additional 1.2 FTE would be required within the European Commission to adopt the necessary implementing acts setting out harmonised fee modulation and producer register registration format.

Stakeholder evidence

Stakeholders from across the textile value chain including NGOs and social enterprises active in the sector recognise the importance and relevance of introducing EPR to facilitate a harmonised approach to managing textile waste in the EU and consider its introduction as a high priority. In respect to support to the recycling sector, in particular, the industry considers EPR as an important funding mechanism to address the R&D and funding gap for such activities. NGOs have also emphasised the importance of EPR for textiles to implement the polluter pays principle.[102] Diverging EPR systems were raised as a concern within the workshops, mainly due to the potential for complex administration and potential high costs for exporting organisations[103].

Due to the complexity and ambition of the measure, it was highlighted that the scheme would benefit from the parallel application of other models such as the Ecodesign for Sustainable

[102] See for example: https://eeb.org/library/driving-a-circular-economy-for-textiles-through-epr/
[103] Evidence from industry stakeholder in second workshop

Products Regulation (ESPR) to enhance the effect of the targets set[104]. Industries should also be further encouraged to reuse and repair their products as part of circular economy and materials that are no longer reused should be separately collected. This can potentially increase the currently low textile-to-textile recycling rate as well[104].

There is an overwhelming support for mandating EPR for textiles among the industry and NGO stakeholders. There are however some differing opinions in terms of the level of harmonisation that the scheme should pursue acknowledging that both the industry and Member States may require some regulatory flexibility to take inventive measures[105] [106]. Others have argued the opposite that providing guidelines or encouraging an implementation of the scheme on a voluntary basis would not be expected to work as effectively as a mandated EPR.[107] Additionally, the latter group suggested that the mandated EPR should be accompanied by a set of harmonised rules for the separate collection and sorting of textiles as well as for the used textiles and textile waste market[102]. The EPR organisations should be managed by representatives of the key stakeholders such as producers waste collectors sorters and recyclers as well as NGOs[102]. It is additionally recommended that license fees should not apply to second-hand clothing as it is expected to hamper reuse activities[102].

A stakeholder group supported the mandated EPR measure as it was stated that it will ensure compliance with the requirements set across MS, increase the effectiveness of the eco-modulation fee and enhance the research and development of new preparation for recycling and recycling technologies in Europe. Industry stakeholders outlined that different EPR systems across the EU would struggle to drive economies of scale needed for developing recycling capacities to support increased uptake in textiles[108].

Regarding the expected economic impacts of an EPR mandate stakeholders underlined the substantial recurring fees[105] which one interviewee considered to be a potential obstacle for Eastern European Member States some of which may be unable to meet the set objectives on affordability reasons[109]. Additional costs may occur from data collection and validation as well as from adaptation to new labels[110].

Furthermore, it was highlighted that measure 2.9 in combination with ESPR and other high-priority measures can enable price reductions for recycled textiles and other secondary raw materials which would create a competitive market for them. By extension and due to ESPR performance targets such materials will be rendered more accessible to recyclers brands retailers and consumers as with cost savings both the demand and supply of recycled fibres will increase. Specifically, on an EPR mandate across the EU a stakeholder group stated that the framework would reduce the operational costs of producers associated with different reporting systems on products placed on the market

[104] Interview with the Ellen MacArthur Foundation
[105] Interview with Euric
[106] Interview with Eurocommerce
[107] Interview with the Ellen MacArthur Foundation
[108] Interview with Policy Hub
[109] Interview with ARTSHC
[110] Interview with the Policy Hub

and the fee structure[110]. Because of that the EPR should focus on establishing a harmonised reporting format and on strengthening EU-wide collaboration between PROs to secure the alignment of such systems throughout Member States.[110]

The design of the EPR measure should also consider how to avoid competition between the reuse and preparing for reuse sectors. Lastly a key impact area of the mandated EPR measure is the climate. Stakeholders realise the significance of the role of EPR to keep in line with climate objectives however they note that more circular business models (such as repair reuse remanufacturing and rental) should accompany the scheme to improve its effectiveness and efficiency[104]. The EPR mandate in combination with circular business models will additionally support sorting and recycling initiatives and further minimise waste generation and unsuitable waste management practices[110] [106].

Table 23 : Summary of impacts for measure 2.9

Stakeholder affected	Economic impacts	Environmental impacts	Social impacts
Producers, waste managers (encompassing collectors, sorters and managers)	Additional costs of 2.28 billion euro per year for effective textile waste management. This measure would increase the costs of placing textile products on the market. It would add costs on data recording and reporting on products placed on the market and in relation to waste management (as per measure 2.14). Such costs might result in barriers to entry for SMEs although micro-enterprises are excluded with		5500 jobs in textile waste management

	minimal knock-on consequences for larger enterprises. This measure would provide savings in compliance costs by anticipating a harmonised EPR system for the EU and prevent the obligations on the industry to comply with potentially 27 different systems. This also provides a level playing field for the operators operating across the different countries. Level playing field is also ensured between brick and mortar and online sales producers by regulating the enforcement tools and therefore tackling free riding. This measure would result in additional support to the reuse and repair sector and the recovery of value of reused textiles for 1.1 billion euro per year and of recycled textiles of 237 million euro per year. This measure would result in additional		

	support to the textile recycling sector, increasing in particular closed-loop recycling and recovering value from non-reusable textiles, by providing feedstock for the creation of new circular businesses.		
Public authorities	Reduction in costs of waste management - this measure would transfer the costs of waste management from the municipalities to the producers to the extent that the costs incurred are necessary costs. This measure would add administrative costs related to the establishment of the EPR schemes (i.e. the establishment of a producer register, authorisation systems for the permitting of PROs, stakeholder platform) and for monitoring compliance and enforcement of the compliance of PROs and producers with		

	their EPR obligations.		
Citizens	No certainty to what extent the cost of EPR compliance would or would not impact the cost of the textile goods for consumers. Reduced costs of residual waste management where pay-as-you-throw systems are applied for that stream. Increased availability of sustainable low-cost textiles options from re-use shops and other circular businesses.		Increased awareness of the impact of sustainable textile management and the role of citizens in contributing to this objective through behavioural changes.
Producers, waste managers (encompassing collectors, sorters and managers) and public authorities			This measure would negate the impacts of textile waste on both EU citizens and third country citizens by providing sufficient resourcing to manage textile wastes more effectively.
All stakeholders		This measure would ensure the funding for the collection, sorting, reuse, recycling and other	

		treatment of textile wastes compared to the baseline. This is particularly beneficial for those Member States that currently have low levels of textile collection, and which have textile production industries that may benefit from new flows of secondary raw materials. This measure would support greater reuse and recycling. In the case of recycling the support to closed-loop recycling expected to come from EPR will directly replace primary raw textile manufacture and the resource use including land use that is presently dedicated to such primary fibre production.	

Impacts on competitiveness

The following impacts on competitiveness have been assessed under this measure.

Table 24 - impacts on competitiveness of measure 2.9

Price competitiveness impacts	Impacts of price competitiveness are linked to the shift of the costs of managing textiles at the point of discard in comparison to the status quo. As noted under the assessment of economic impacts above, this has the potential for the costs of textile products within the EU to increase by up to 0.6% if the full costs are applied to the price paid by the consumer and not absorbed by the producer (whereby should some or all of the costs be absorbed by the producer the impact on price would be lower). At the same time, the nature of textile goods produced within the EU that focusses on high-quality goods supplied to mainly well-developed economies means that this price increase is unlikely to prove detrimental to volumes of exports of EU textile products. As the measure would apply universally across the EU the costs should generally be the same per tonne of product managed. However, the price impacts are likely to be most keenly felt in those Member States that currently lag behind others in their current and predicted rates of separate collection as other Member States have or will already have invested significant capital amounts in textile waste management infrastructure, thereby diminishing the costs that the EPR scheme would have to address. These shortcomings would mainly impact BG, CY, CZ, EE, EL, ES, HR, HU, LV, PL, PT, RO, SI and SK where collection rates are low at present and will remain behind the majority of Member States according to the baseline. The need to place higher fees under EPR for these countries has the potential to provide a price differential in comparison to others. In reality this would be less than 0.6% from the lowest to the highest difference as a result of the need to factor in operational expenditure in those Member States for which capital investment has taken place. In this respect a differential of up to 0.4% is a likely potential outcome.
Dynamic competitiveness impacts	This measure has the potential to improve research and development for reuse and recycling in a coordinated manner by providing direct funding by PROs to such activities. This is important given the economic challenges facing both repair and recycling markets in the EU at present in comparison to the prices of new and virgin products.
Export competitiveness impacts	As noted above, limited, if any, impacts of exports of EU textile products are expected under this measure. Increase waste collection, sorting and treatment under this measure are likely to reduce the volumes of used textiles exported from the EU to third countries, particularly as more material are collected for recycling within the EU. This would potentially reduce the incomes of used textile exporters

	within the EU as whole due to the reduced volumes available to market whilst increasing the volumes available for EU textile recyclers.
Strategic competitiveness impacts	This measure offers the opportunity to reduce the need for imports of textiles in the future as greater reuse and repair within the EU replaces the need for new textile goods to be purchased and improvements in recycling reduce the need for imports of virgin textile materials – in particular natural fibres for which the EU relies heavily on third country imports.

Measure 2.14 – Setting reporting obligations for textiles

Assessment of impact Measure 2.14

Economic impacts

The adjustments to existing reporting mechanisms would ensure that the entire management process of textiles within the EU is better understood at present and in the future to improve the ability to identify infrastructure investment needs more easily. Whilst data on the post-consumer fraction of textiles would be subject to an improvement by eliminating reporting on textile wastes that are not related to the waste fraction of concern under this initiative – removing textile packaging reporting from the scope of textiles - the most significant change would be achieved for the data on pre-consumer, post-commercial and post-industrial wastes for which little information is available at the level of granularity necessary to monitor waste management practices at national and EU levels, their compliance with the waste hierarchy and waste management planning. For these waste generation sources, the data would be most valuable to identify the recycling potential since the waste generated is expected to be of more homogeneous and known composition and consistency and purity in quality.

More cohesive data flow management would also reduce the burdens on the economic operators that operate across several Member States and improve the level playing field among them.

Given the limited cost of additional reporting foreseen (see the administrative burden assessment presented below) represents approximately 1 thousandth of one percent of the turnover for the clothing and apparel sector no noticeable additional cost increases in textile goods are likely to take place to address the additional costs of reporting.

Environmental impacts

No direct environmental impacts are expected as a result of the additional data collected. However, it is expected that an improved knowledge base on the sectors generating textile waste will lead to better targeted measures to improve their treatment in line with the waste hierarchy and the inherent environmental benefits it brings.

Social impacts

No social impacts have been identified in relation to this measure.

Administrative burden assessment

The WFD already lays down several obligations for Member States regarding the collection and reporting of waste data; therefore, the necessary data management systems are already in operation at national, regional and local levels. In the majority of the Member States, electronic data management systems are in use.

With regard to the adaptation of the reporting practices for the post-consumer textiles (i.e. those subject to measure 2.9 and defined in accordance with the approach in measure 1.1.1.2), the expected administrative burden is no or low cost, because the data is largely already collected and reported and changes would concern small scope adjustments, inclusion of certain operations that are currently voluntary, but concern data that would already exist with the economic operators.

In relation to data on pre-consumer, post-industrial and post-commercial textiles wastes, data collection and verification will require more significant adaptations from the current system used for reporting under the Waste Statistics regulation to a system that ensures textile specific data collection from the economic operators as well as data on waste management operations across the end-of-life chain and ensure traceability from the point of waste generation to its final treatment to attribute waste performance to specific Member States and enable monitoring to underpin possible future waste management target setting. The data collection processes should build on the existing ones applied for compliance with the Waste Statistics Regulation and in that process also improve the quality of data reported under that instrument.

The obligation entails data collection and verification by member States and reporting to the European Commission. Waste management operators will be required to generate and report data to competent authorities, as a minimum on the following: waste generated in tonnes, separate collection in tonnes, sorted in tonnes, prepared for reuse in tonnes, recycled in tonnes, energy recovery in tonnes, other recovery in tonnes, disposal in tonnes.

It is expected that in relation to existing waste management operators at the commercial level, the additional data to be reported would already be collected by:

- commercial collectors of waste for which volumes of waste generated and separately collected will already be recorded for contractual purposes between the producer and collector.
- commercial recyclers, where they differ from waste collectors, once again for contractual purposes between those who deliver waste for recycling and those who recycle it.
- the amounts sent for energy recovery and disposal will be collected at the point of recovery or disposal.

The elements missing are in relation to the volumes sorted and the volumes prepared for reuse. It is expected that for a large proportion of these wastes recycling rather than reuse will be the waste management operation of choice as these wastes are more suitable for recycling than reuse. Consequently, the biggest data gap will be in relation to volumes that are sorted for which

additional data would be required to be gathered by those performing sorting prior to further treatment or re-use. This information should be readily available or generated by sorters based on the amounts entering a facility, sorted materials in bales for re-use and preparation for re-use and other fractions that are sorted for recycling, energy recovery or disposal.

In 2020, the last year of reported data, there were around 20 000 enterprises involved in waste collection in the EU and 7 700 involved in waste treatment and disposal[111]. However, only a proportion of those enterprises are likely to serve those producers involved in pre-consumer, post-industrial and post-commercial textiles wastes, particularly as such wastes represent just under 1 million tonnes of waste generated in comparison to 171 million tonnes of waste generated in the manufacturing sector overall[112]. A conservative estimate of 5% of all such enterprises handling textiles has been applied to assume that 1 385 waste management operators would be required to generate data each year.

Assuming the time taken for reporting of three days per year the total administrative burden would stand at just under €750 000 per year or approximately €540 per operator.

Finally, an additional 0.5 FTE would be required within the European Commission to adopt the necessary implementing acts setting out reporting formats and issuing guidance to the Member States (ESTAT) in support of those. Additional resources will also be required for the data flow management for all waste textiles (ESTAT).

Impact on SMEs and social enterprises

Given the majority of those involved as producers are SMEs they would tend to be impacted by the provisions to a larger extent than non-SMEs. However, the reporting obligations have been targeted to build on already existing obligations to minimise the additional administrative burden impacts that would result. Compliance costs for social enterprises linked to reporting obligations on waste collected and further treated would partially be new, since waste related reporting would already be a national obligation linked to waste permits that they generally have, but it is expected that the generation of the required data already takes place and would be offset by the reduction of costs in the management of residual waste in accordance with measure 2.9.

Stakeholder evidence

In both stakeholder workshops, industry, NGO and Member State stakeholders recognised that improved knowledge base across the end-of-life value chain is a significant barrier to improved waste management of used textiles and textile waste. Improvements in the reported data nationally and at EU level would address the need for more transparent data to allow for measurement of the environmental impact of the textile industry. This would need to be cross-boundary, with shared

[111] Source Eurostat Annual enterprise statistics by size class for special aggregates of activities (NACE Rev. 2) as extracted in 2022 using 2020 data

[112] Eurostat, 2022. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Waste_statistics#Total_waste_generation

definitions, standardised indicators and reporting procedures, as well as accountability requirements[113][114]. If measured and tracked properly and consistently across the EU, the data would allow monitoring of the performance on waste prevention and residual waste and available feedstocks for developing preparation for re-use and recycling infrastructure[115]. Concerns were also raised over the cost implications and the added value of the more granular data on textiles in terms of environmental benefits.

Table 25 : Summary of impacts for measure 2.14

Stakeholder affected	Economic impacts	Environmental impacts	Social impacts
Producers, waste managers (encompassing collectors, sorters and managers)	This measure would create administrative burden on businesses for compliance with data reporting. The total administrative burden is estimated at 750 000 euro per year. Such costs might result in a barrier to entry for SMEs. However, it would improve the level playing field through harmonised data reporting requirements across the EU and improve the knowledge base on textile value chain to inform decisions on further investments in textile waste management and re-use operations.		

[113] Interview with Teko & Svenskhandel
[114] Evidence from workshop
[115] Interview with Policy Hub

Public authorities	This measure would create administrative burden on public authorities to set up data collection systems and receive and verify additional data flows from economic operators and report to the Commission.		This measure would improve the level of data on textiles to enable better waste management planning.
Citizens			
All stakeholders		Limited direct environmental impacts are expected under this measure.	

Impacts on competitiveness

The following impacts on competitiveness have been assessed under this measure.

Table 26 - impacts on competitiveness of measure 2.14

Price competitiveness impacts	No significant price impacts have been identified under this measure.
Dynamic competitiveness impacts	No significant dynamic competitiveness impacts have been identified under this measure.
Export competitiveness impacts	No significant export competitiveness impacts have been identified under this measure.
Strategic competitiveness impacts	No significant strategic competitiveness impacts have been identified under this measure.

Option 3: Prescribing performance targets

One of the advantages of using a target-based approach is that it is a top-down approach that aims to reach the same goal for all Member States thereby ensuring a level playing field whilst providing flexibility to Member States as to how the targets are achieved in practice thereby respecting the subsidiarity principle. This means that the measures implemented can be tailored to the specific challenges of each Member State. Different types of targets can be set to encourage improvement in different aspects of waste management. These include targets for waste generation separate collection for reuse preparation for reuse and recycling as well as a combined reuse and recycling one. These have been considered in this assessment.

The biggest challenge in relation to setting targets is to make sure that the targets themselves remain realistic. The problem definition explains the data challenges that exist and measure 2.14 describes how they could be resolved. However, even with the most ambitious of timetables, consistent data to enable the setting of targets would realistically only be available in 2031 after 2 to 3 sets of annual data are available based on improved reporting framework under measure 2.14. Waste management targets are generally set with waste generation data as the denominator and with a baseline figure at a given starting year against which progress could be prescribed and subsequently assessed. However, the current data on textile waste generation is not robust partly because of the fragmented understanding of whether what is collected is waste or not. There is currently no sound method of estimating textile waste (collected and discarded in mixed municipal waste).

Key missing data/information to set sound targets and other uncertainties

- Assessment of the robustness of the data on re-use of textiles to be reported to the Commission for the first time in mid-2023 under the WFD.
- Estimated apparent consumption and textile waste generated need to be fine-tuned to better assess the amounts of unsold and returned goods as well as those that are stored by consumers in their households (difference between apparent textile consumption and post-consumer waste) even though these numbers are likely to be relatively small (around 5%).
- Updated assessment of the implementation of separate collection systems in the Member States.
- Improved projections of future capacities for recycling plants based on realistic capacity growth rates.
- Assessment to better understand the economic feasibility for recycling plants.
- Stakeholder feedback.

As explained in Annex 10, the JRC is working on a feasibility assessment for setting future recycling targets and their work is planned for conclusion by the end of 2023.

Setting targets based on non-robust data is risky because the levels set could be unrealistic and threaten the Member States' commitment to achieve them. Indeed, the commitment from Member States is an additional challenge as such. There are several examples when targets set under EU law have proven to be challenging to achieve, for example, those related to the objectives of the

Water Framework Directive,[116] the recycling targets in the WFD itself and the Air Quality Directives[117]. The assessments of the status quo have demonstrated the challenges in achieving targets sometimes due to a series of problem drivers.

Therefore, the sections below for measures 3.1, 3.4, 3.5, and 3.8 examine the feasibility of the mechanism by which a target could be set in the future and the impacts of that process and not the actual levels of targets. In relation to setting a target for collection, a more detailed assessment based on an interim low ambition target is presented. The setting of targets is likely to have a number of common impacts as outlined below.

Economic impacts

Setting targets would involve additional costs in those Member States that are below the targets set and where relevant measures are not already foreseen to achieve them. Such impacts would include investments that would have to come from public or private funding to address several elements:

1. Collection infrastructure.
2. Sorting infrastructure
3. Repair infrastructure to enable reuse
4. R&D to develop recycling technologies at industrial scale
5. Recycling infrastructure to enable greater levels of recycling

As noted under Measure 2.9, the maximum likely additional cost per item would be an increase in product costs of 0.6%. In countries where EPR applies or is planned to apply then the costs would fall on the producer. Producers would either have to absorb those costs that would lower their profitability or increase the costs to consumers of the products themselves. Where EPR is not applied then costs may be met via the likes of disposal fees applied at the point of disposal or general taxation. The spread of costs between producers and consumers would be defined at the Member State level.

At the same time, however, increased collection of textiles and the potential resulting increased reuse and recycling would result in positive economic impacts in relation to the materials reused and recycled driving investment in the waste management sector and the second-hand textiles market.

Environmental impacts

The setting of targets would result in reductions in the environmental impact of textiles that would otherwise be predicted to remain in residual waste and subsequently be disposed. This would reduce the environmental impacts that currently result from the disposal of textiles including GHG emissions and air pollution water pollution and soil and groundwater impacts including in relation to microplastics.

[116] SWD (2019) 439
[117] SWD (2019) 427 final

Social impacts

Additional collection would be expected to lead to additional employment in the collection and downstream sorting and further treatment of materials that would otherwise be disposed of. Furthermore, in relation to the social impacts of waste textiles in receiving environments targets would effectively lower these effects that is particularly important given the large proportion of EU used textiles exported to third countries where environmental controls are generally lower than those employed within the EU.

Impacts on competitiveness

The following impacts on competitiveness have been assessed under this group of measures qualitatively. It should be noted that actually quantifying these impacts is not possible except in relation to measure 3.6. This is as a result of the fact that no specific targets are proposed for the other target measures and the extent of the targets and the distance away from those targets would determine the majority of competitiveness impacts.

Table 27 - impacts on competitivenss of measure 3.1, 3.4, 3.5 and 3.8

Price competitiveness impacts	Price competitiveness impacts would generally be related to the level of compliance with the targets foreseen under the baseline and the decisions taken at the Member State level with regard to how achievement of the targets themselves should be financed in the absence of EPR. Taking, for example, targets on reuse – for those Member States with higher levels of reuse and repair in place the costs of complying with a reuse target would be lower than those for which reuse rates are low and the repair sector is limited. In the case of Member States with low rates and reuse and repair the investments necessary would be larger than for other Member States and the costs to comply would be higher, placing pressure on producers, customers and or waste managers depending on the manner in which a Member State chose to look to fund the necessary investments to comply with the target. This in turn may affect the price competitiveness of that Member States textile production and discarded textile management enterprises in comparison to Member States where the necessary investments have been made.
Dynamic competitiveness impacts	These measures have the potential to share improve research and development across the EU in relation to waste prevention, reuse and recycling depending on the stringency of the targets set with more stringent targets generally driving the need for greater innovation to achieve those targets.

Export competitiveness impacts	The measures are likely to reduce the volumes of used textiles exported from the EU to third countries. This would potentially reduce the incomes of used textile exporters within the EU as whole due to the reduced volumes available to market.
Strategic competitiveness impacts	The measures offer the opportunity to reduce the need for imports of textiles in the future as greater reuse and repair within the EU replaces the need for new textile goods to be purchased for those targets that address prevention and reuse and improvements in recycling for those measures addressing recycling reducing the need for imports of virgin textile materials – in particular natural fibres for which the EU relies heavily on third country imports.

Measure 3.1 – Setting an EU textile waste reduction target

The objective of this measure would be to drive Member States to reduce textile waste generated in the first place. In terms of implementation this could be achieved through measures addressing reduction of textile consumption for example through information campaigns for consumers or through specific support to the textile repair and reuse sectors. It would also look to improve the way Member States collect textiles for reuse as a way of reducing textile waste by diverting reusable that are currently disposed of.

Impact on SMEs and social enterprises

Most producers of textiles within the EU are SMEs as are most actors involved in collecting textiles that are mainly social enterprises. The separate collection obligation for textiles would at least in part be expected to be implemented by these enterprises in collaboration with Member States. As noted above with increasing collection the revenue from reuse and recycling is also likely to increase to partly offset the additional costs that will be required to implement the sorting requirements. The intention of the measure is to avoid disrupting the business model of social enterprises and with this in mind Member States should work alongside social enterprises to limit any such disruption in meeting this target. Therefore, a waste reduction target would be likely to fall mainly on SMEs to a certain extent on social enterprises. The precise impacts would be dependent upon the approaches employed by Member States to meet the targets concerned.

Stakeholder evidence

All stakeholders in both of the textile workshops agreed that there was a need to reduce the fraction of textiles in mixed household waste. However, it was suggested that, where an EPR is established, in its early stages targetsare not a priority and could be implemented later and – where applied –

should focus on waste prevention and resource efficiency[118] [119]. Some actors notably Member States classified the measure as not useful. The feedback outlined that the measures need to go beyond solely targets[120] to avoid the potential for divergent approaches taking place across Member States which could cause uncertainty and complexity and unnecessary costs to the economic operators[121]. There was sentiment that unless measures are mandatory they will not be implemented. The question was also raised of how the targets would be enforced in view of data uncertainty and the design of the EPR[114].

In designing the targets there were questions in the second stakeholder workshop over whether this would be directed towards preventing the generation of textile waste through circular business models or by reducing what is placed on the market. There was also uncertainty over whether the targets are set at the national member state level or would require further reporting or independent initiatives and who would need to report as well as the processes for doing so. Comments from the workshop were that targets should be used to measure the overall flow of resources consumed and waste produced in the market while reducing the environmental footprint of textiles. There were questions on how this would be defined and agreement that this would need to be designed carefully to ensure it was clearly defined including whether it would be per kg per capita etc and would need to be supplemented by a reuse and recycling and consumption reduction targets and material consumption reduction targets[122]. This could be further incentivised through eco-modulation under EPR schemes and financial penalties for not meeting targets.

Waste reduction targets are difficult to operationalise. Some actors – such as commercial or C2C platforms – could be incentivised through regulation to monitor and report textile waste prevention. Overall, the targets were considered not strong enough to create the change required with participants suggesting investment in infrastructure that can allow for separate collection and adoption of circular business models (i.e. product use extension) is more critical.

Table 28 : Summary of impacts for measure 3.1

Stakeholder affected	Economic impacts	Environmental impacts	Social impacts
Producers, waste managers (encompassing collectors, sorters and managers)	Increases cost of textile waste data collection and reporting. Enable a level playing field as all operators would		

[118] Interview with Ellen MacArthur Foundation.
[119] Interview with Recycling Network.
[120] Interview with Eurocommerce.
[121] Interview with Recycling Netwerk Benelux.
[122] Evidence from workshop

	contribute to the reduction target, subject to specific characteristic.		
All stakeholders		Improve air, soil and water quality thanks to reduced waste disposal practices. Protect landscapes thanks to reduced landfilling.	Increase information and data on textile waste.

Measure 3.4 – Setting a preparation for reuse target for textiles

The objective of this measure would be to drive Member States to improve their reuse of textiles by setting a realistic preparation for reuse target in comparison to solely relying on the application of the separate collection of textiles under Article 11(1) of the WFD. Preparing for reuse in the context of textiles means checking, cleaning or repairing recovery operations by which textile products that have become waste are prepared so that they can be reused without any other pre-processing. Presently the costs of preparation for reuse within the EU generally mean that such preparation is limited as the economic costs of such preparation are higher than the value added to the repaired product. However, one of the expected impacts of the EU strategy for sustainable and circular textiles is to facilitate the reuse and repair sector such that repair within the EU becomes more profitable and a preparation for reuse target would be set with this expected outcome in mind.

Table 29 : Summary of impacts for measure 3.4

Stakeholder affected	Economic impacts	Environmental impacts	Social impacts
Producers, waste managers (encompassing collectors, sorters and managers)	Increased cost of data collection and reporting. Enable a level playing field as all operators would contribute to the reduction target subject to specific characteristic		

Public authorities	Increase the administrative costs of setting a preparation for reuse target developing indicators for monitoring progresses, ensure compliance and update upon need. Increase costs of data collection and reporting on prepared for reuse waste.		
All stakeholders		Improve air soil and water quality thanks to reduced waste disposal practices.	Increase information and data on prepared for reuse waste. Availability to consumers of low cost sustainable textile alternatives to new textiles.

Measure 3.5 – Setting a reuse target

The objective of this measure would be to drive Member States to improve their reuse of textiles by setting an overall reuse target that they should achieve in comparison to a baseline. Reuse poses an additional challenge in terms of how to measure it. The World Economic Forum (WEF) recently examined the need for a robust and standardised framework for reuse measurement[123]. The WEF Consumers Beyond Waste initiative focussed most of its effort on primary plastic packaging. The two reuse metrics to be piloted in 2023 are less relevant for textiles as they focus on the total number of loops a packaging unit achieves over the course of its lifetime as well as the share of volume of products designed or developed to be reused. Specifically in relation to textiles Finland through the Finnish Environmental Institute collected data on C2C and B2C reuse volumes of

[123] World Economic Forum, 2022. A robust and standardized framework for reuse measurement is needed. Here's why

textiles. The data is collected through a survey sent to online and physical second-hand shops. Finland also uses a consumer barometer to provide insights into consumer behaviour concerning reuse. Further approaches are also developed in Flanders and Ireland.[124]

In accordance with Commission Implementing Decision (EU (European Union)) 2021/19 on reuse, the EEA is piloting a strategy for reporting on reuse by developing an online reporting tool, that will be available in April 2023. By combining quantitative and qualitative data the reported data on reuse will improve the understanding of the reuse sector and the impacts of the measures that the Member States have taken on waste prevention. Member States have developed different methods to collect the quantitative data on reuse flows. It is therefore necessary to await the analysis of the data submitted by Member States in accordance with this reporting obligation to determine the scope for further improvement of data on re-use of textiles and the feasibility of setting re-use targets at EU level.

Stakeholder evidence

During the discussions concerning Commission Implementing Decision (EU (European Union)) 2021/19 on reuse and development of the decision a main concern from the Member states were the administrative work that it may take to collect and report data on reuse. It was decided that in order to monitor reuse and to gain a better understanding of the reuse sector the reporting should include a combination of qualitative and quantitative data. The quantitative data should be reported every third year and the qualitative data annually.

Participants to the second textile stakeholder workshop agreed that there is not enough data to be able to set a definitive baseline and robust targets at the moment. Therefore, setting a reuse target cannot be considered at this point[125]. Additionally, stakeholders were concerned that as there is not yet the capacity for reuse systems to deliver at volume the market isn't ready to respond to reuse targets. Feedback from the workshop outlined that the development of reuse targets should be done in consultation with industry experts and progressively increased over time as the infrastructure and data permits. This would allow for Member States and market demand (boosted by ESPR measures) / capacity to expand symbiotically in keeping with the aims of the EU strategy for sustainable and circular textiles in relation to profitable reuse and repair services. Collaboration with industry and Member States would also ensure that targets are reasonable, and stakeholders advocated for targets not to be set below what is already being achieved in some states. Importantly as with most measures harmonisation of monitoring and reporting is vital. However, stakeholders noted that this could be challenging as reused textiles are not considered waste therefore language and terminology would need to be reflected accurately in these. It was suggested that reuse targets should be developed in line with prepare-to-reuse targets but only focusing on waste and donations (excluding C2C platforms). Some feedback states that reuse targets are not practical or feasible

[124] Flanders (PDF) Measuring reuse in Flanders: The first reuse mapping study (researchgate.net) and Ireland Research_Report_405.pdf (ctc-cork.ie).

[125] Evidence from stakeholder workshop

and targets should be focused on prevention because even with better reuse and recycling issues like fast fashion are not being addressed and we should always be aiming for moving up the waste hierarchy.

Preparation for reuse targets were seen as an option which could form part of the EPR with a recycling target on the fraction that would not be prepared for reuse (remaining fraction[126].) An example of this in action is the Netherlands that uses a combination of targets relating to preparation for reuse and recycling and allow producers to choose[127]. Separate reuse and recycling targets would be required to ensure everything doesn't end up being recycled for instance design for recycling. Reuse should only be considered if it takes place within Europe due to lack of end-of-life information for exports out with the area. Additional measures would also need to be in place to ensure preparation leads to reuse. This would also drive the reuse market within the EU boundaries[128]. Another option when developing the target could be to consider the textiles that currently end up in municipal waste to increase the amount of material entering preparation for reuse and decreasing household waste[129]. Where respondents agreed with the targets there was still caution against setting a target straight away. Due to other legislative changes – namely the 2025 textiles collection obligation – there will be a significant increase in collection of non-reusable fractions of textile which will make it non-feasible to significantly increase prepare-for-reuse in the first few years. There is also a lack of harmonised data for collection rates which would be necessary to provide a reporting framework and baseline[130].

Like other target-based measures stakeholder mentioned potential challenges in measurement and enforcement. There were questions raised around who would measure the data and how it could be collected. It was felt that prevention was an easier metric to measure as this can be monitored by amounts POM[131]. There were some interviewees who felt the measure was relevant and useful[132] [133]. It was suggested the preparation-for-reuse would be better suited as a KPI which would take into account social aspects of the production process[134]. It was felt that if measured and tracked properly the measure could support the reduction of textiles ending up in landfills or incineration and increase those used as feedstocks; however, this would depend on them being collected and sorted efficiently which could improve the recycling infrastructure.

An interviewee expressed that they did not see the purpose of a target as the market is self-regulating. As reuse operators and sorters will seek to make the maximum value from materials the commercial process will automatically drive the preparation for reuse element[135]. Currently,

[126] Interview with Ellen MacArthur Foundation
[127] Interview with Recycling Netwerk Benelux
[128] Feedback from workshop
[129] Interview with TOMRA.
[130] Interview with TOMRA.
[131] Interview with Eurocommerce.
[132] Interview with Policy Hub.
[133] Interview with RREUSE.
[134] Interview with Municipal Waste Europe.
[135] Interview with Euric.

collection and sorting are financed by reuse and only around 10% of what is collected can be resold in the EU as the market requires a higher quality than elsewhere. As the process of sorting is labour intensive the costs for this increase every year but the quality decreases. There is therefore a significant cost implication for this which – if not supported through a wider EPR or national system – will fall to the businesses. This will further drive down the volume of textiles able to be reused. Stakeholders highlighted that to ensure textile reuse there must be a high-level of reusable items or demand for recycling which is economically feasible[136].

Table 30 : Summary of impacts for measure 3.5

Stakeholder affected	Economic impacts	Environmental impacts	Social impacts
Producers, waste managers (encompassing collectors, sorters and managers)	Increase cost of data collection and reporting. Enable a level playing field as all operators would contribute to the reduction target, subject to specific characteristics.		
Public authorities	Increase the administrative costs of setting a preparation for reuse target, developing indicators for monitoring progresses, ensure compliance and update upon need. Increase costs of data collection and reporting on reused waste.		
Citizens	Greater availability of options for the purchase of second		

[136] Interview with Euric.

	hand textile products at a lower cost		
All stakeholders		Improve air, soil and water quality thanks to reduced waste disposal practices. Protect landscapes thanks to reduced landfilling.	Increase information and data on prepared for reuse waste.

Measure 3.6 – Setting a separate collection target for textile waste

The apparent lack of sufficient collection infrastructure to manage the expected volumes of textile waste generated hampers the ability further down the textile management process to ensure that textiles that could be reused or recycled are diverted from residual waste. On the other hand, the uncertainty of the available reuse possibilities and the immaturity of several recycling technologies tend to dis-incentives Member States from speeding up the setting up of efficient separate collection systems.

Economic impacts

Setting a 50% separate collection target would involve additional costs only for those Member States and producer responsibility organisations (PROs) that are unlikely to meet a 50% collection target by 2035. The list of Member States concerned and the likely shortfall in tonnes is presented below.

Table 31 - Additional tonnes to be collected to achieve a 50% collection target

Member State	Predicted collection rate in 2035	Additional tonnes to be collected to hit 50% collection target
BG	45.50%	1,321
CY	47%	77
CZ	45.50%	3,122
EE	44%	1,236
EL	45.50%	3,922
ES	47%	11,218
HR	44%	2,925
HU	45.50%	3,162
LV	42.50%	1,534
PL	45.50%	14,489
PT	44%	7,652
RO	45.50%	5,964
SI	42.50%	926
SK	42.50%	2,909
Total		60,456

The costs of collection are dependent on the type of additional infrastructure that would be required. In keeping with most collection being achieved by separate bins, it is considered that shortfalls in separate collection would be met by adding additional separate collection bins for the Member States concerned.

This measure would also have a benefit in reducing disposal of textiles in the household mixed waste. Treatment of mixed waste is more expensive that treatment of separately collected waste. This benefit would be apparent to those responsible for municipal waste collection, typically municipalities. In cases where the polluter pays principle is applicable, i.e., where households pay (or may more) for their mixed waste than for separately collected waste, this saving would be directly apparent to households. It was not possible to quantify this benefit as the applications of the polluter pays principle is not applied by all municipalities and where it is, it is implemented in a variety of ways, by weight, by volume, by collection, by bag etc.

Data from the CESME project that considered the Humanita textile recycling programme in BG[137] indicates that addressing approximately 3 400 tonnes of textile per year came with combined container transport and storing costs of 367 000 euro per year leading to an average cost of 108 euro per tonne collected. This figure appears low in comparison to data from the ECAP study on used textile collection in European Cities[138] that indicates costs of collection in the NL of 165 euro

[137] https://www.cesme-book.eu/book/level-1-d/3.1-best-practices/3.1.2-humanita-textile-recycling
[138] ECAP, 2018. Used Textile Collection in European Cities

per tonne. In applying these costs to the Member States above would lead to the following additional annual collection and onward sorting and treating costs:

Table 32 - Additional costs to achieve a 50% collection target

Member State	Additional Tonnes to be collected to meet a 50% separate collection target	Additional collection costs in EUR	Additional sorting and treatment costs in EUR
BG	1,321	217,965	858,650
CY	77	12,705	50,050
CZ	3,122	515,130	2,029,300
EE	1,236	203,940	803,400
EL	3,922	647,130	2,549,300
ES	11,218	1,850,970	7,291,700
HR	2,925	482,625	1,901,250
HU	3,162	521,730	2,055,300
LV	1,534	253,110	997,100
PL	14,489	2,390,685	9,417,850
PT	7,652	1,262,580	4,973,800
RO	5,964	984,060	3,876,600
SI	926	152,790	601,900
SK	2,909	479,985	1,890,850
Total	60,457	9,975,405	39,297,050

The additional collection and sorting costs remain relatively low at 39.2 million euro. This reflects both the predicted distance to 50% collection by 2035 where most Member States would be close to that target already as well as the scale of textile waste generation where the countries listed are generally smaller generators of textile waste in comparison to DE or FR that would already be collecting over the 50% target by 2035 (and in the case of DE is already collecting beyond that target). In countries where EPR applies or is planned to apply then the costs would fall on the producer. Producers would either have to absorb those costs that would lower their profitability or increase the costs to consumers of the products themselves. Where EPR is not applied then the costs of additional collection and sorting may be met via the likes of disposal fees applied at the point of disposal or general taxation. The extent of these additional costs is difficult to determine. As noted in Annex 4, the total costs for all wastes account for an approximate increase per product of around 0.6%. However, as the additional volumes listed above that fall above the baseline are lower (in some cases up to 7.5% more at a Member State level in comparison to the baseline) then maximum increase would be 7.5% of the 0.6% maximum i.e. 0.045%. Consequently, were the additional costs of collection, sorting and treatment to be applied for the additional volumes only and the cost spread over all relevant textile products sold in total then a very conservative estimate would place those costs at an additional cost of 0.1% in the countries concerned by requiring

additional action to meet the target. The extent to which these costs may be absorbed by producers or consumers is not possible to be separated and will rely on decisions at the Member State level.

At the same time there would be benefits from the materials recovered. The baseline assumes that 42% of what is separately collected would either be close-loop or open loop recycled representing 18 250 tonnes additionally going to closed loop recycling and 7 150 tonnes going to open loop recycling. Using values from Fashion for Good [139] an additional ~30 200 tonnes of reusable textiles collected would have a value of 23 million euro per year and the additional recyclable material a value of 5 million euro per year. Only 8% of separately collected waste would be disposed[140].

Additional costs would be expected for competent authorities to enforce compliance with a collection target. However, the activities that are required to contribute to the target are already required to be managed by competent authorities under existing waste permitting requirements for collection, sorting and treatment facilities; therefore, allowing for synergies with the existing enforcement processes. Furthermore, given the relatively modest increases in tonnes to be collected by the Member States concerned as a maximum such costs would incur a 15% increase in total in comparison to the baseline for those Member States furthest from the 50% target i.e. LV, SI and SK, with lower total cost increases expected for the other Member States that are predicted to be closer to the 50% target. The additional reporting costs under this measure are addressed under Measure 2.14. In case the reporting would be through PROs, the administrative burden would be even lower given that PROs would need to report the required data to assess the separate collection target anyway. There would also be no additional administrative burden on Member States.

However, as shown in Annex 10, the heterogeneity of predicted separate collection rates across different studies may make it challenging to set a specific target at this stage and should therefore be carefully considered.

Environmental impacts

The additional collection rate that would be applied to the Member States concerned to hit a 50% separate collection target is likely to reduce the environmental impact of textiles that would otherwise remain in residual waste and subsequently be disposed. This would reduce the environmental impacts that currently result from the disposal of textiles including GHG emissions and air pollution, water pollution and soil and groundwater impacts including in relation to microplastics.

Social impacts

[139] Fashion for Good, 2021. Sorting for circularity Europe – an evaluation and commercial assessment of textile waste across Europe

[140] Fashion for Good, 2021. Sorting for circularity Europe – an evaluation and commercial assessment of textile waste across Europe

Additional collection would be expected to lead to additional employment in the collection and downstream sorting and further treatment of materials that would otherwise be disposed of.

Impact on SMEs and social enterprises

Given the majority of those currently involved in collecting textiles are SMEs, mainly social enterprises, the obligation to collect textiles is expected to fall at least on these enterprises in collaboration with Member States. As noted above, with increasing collection the revenue from reuse and recycling is also likely to increase to offset the additional costs that will be required to implement the sorting requirements. The intention of the measure is to avoid disrupting the business model of social enterprises and with this in mind Member States should work alongside social enterprises to limit any such disruption in meeting this target.

An additional 0.2 FTE would be required within the European Commission to adopt the necessary implementing act setting out harmonised methodology for the measurement of the collection performance by the Member States.

Administrative burden assessment

In order to inform the target and compliance with the target data would be required to be complied and reported at the Member State level in relation to those wastes or products forming both the numerator and denominator. These requirements would fall on all Member States and not just those for which additional collection would be required to be implemented above the baseline. The full costs of this burden are addressed in Measure 2.14.

Impacts on competitiveness

The following impacts on competitiveness have been identified under this measure:

Price competitiveness impacts	Impacts of price competitiveness are linked to the possible increases in collection, sorting and treatment as described under economic impacts above. However, given the likely volumes impacted by this measure no significant price impacts have been identified.
Dynamic competitiveness impacts	No significant dynamic competitiveness impacts have been identified under this measure.
Export competitiveness impacts	No significant export competitiveness impacts have been identified under this measure.
Strategic competitiveness impacts	No significant strategic competitiveness impacts have been identified under this measure, albeit limited amounts of additional recycled fibres would be recovered in comparison to the baseline as described under economic impacts above.

Stakeholder evidence

The consensus was that increasing collection is only useful to the extent that there is available infrastructure to manage those quantities. Typically, as this will lead to an increase in material

flows and end of life considerations, there must be sufficient collection and sorting in place to manage this and where targets are implemented, these need to be carefully designed and possibly phased in[141]. It was suggested at the second stakeholder workshop that separate targets for household and commercial waste should be outlined in the WFD and there was general agreement that targets should be aligned with the waste hierarchy.

Table 33 : Summary of impacts for measure 3.6

Stakeholder affected	Economic impacts	Environmental impacts	Social impacts
Producers, waste managers (encompassing collectors, sorters and managers)	Increase cost of data collection costs 123 million per year. Increase sorting costs 98.5 million per year. Increased reporting costs. Enable a level playing field as all operators would contribute to the reduction target, subject to specific characteristic. Recovery value of 57.5 from reused textiles and 12.7 from recycled textiles.		
Public authorities	Increase the administrative costs of setting a preparation for reuse target, developing indicators for monitoring progresses, ensure		

[141] Feedback from workshop

	compliance, and update upon need. Increase costs of data collection and reporting on prepared for reuse waste.		
All stakeholders		Improve air, soil and water quality thanks to reduced waste disposal practices. Protect landscapes thanks to reduced landfilling.	Increase information and data on prepared for reuse waste.

Measure 3.8 – Setting a recycling target for textiles

The objective of this measure would be to drive Member States to improve their recycling of textiles and thereby increase recycling capacity by setting a realistic recycling target that takes into account likely changes in recycling capacity and technologies – see for example the ReHubs initiative that looks to achieve 2.5 million tonnes of fibre-to-fibre recycling by 2030. This target would be in comparison to solely relying on the application of the separate collection of textiles under Article 11(1) of the WFD to provide more textiles available for recycling.

Taking inspiration from the way FR and NL have set combined targets for reuse and recycling the objective of this measure would be to drive Member States to improve both their reuse of textiles and their recycling of textiles by setting a realistic combined target. This would avoid the undesired effect of a recycling target where textiles that could be treated further up the waste hierarchy would be sent to recycling to achieve the target. This would also offer some flexibility to Member States to achieve the combined target in the way that is more appropriate based on the size and prospects of the reuse market as well as the availability of recycling facilities.

Stakeholder evidence

The apparel and footwear industry[142] considers that any recycling target should be set in consultation with the industry experts and that the targets should be progressively increased over time in line with the development of relevant infrastructure in the Member States and the market

[142] Policy Hub call for evidence position paper

demand for secondary raw materials. National and regional public waste organisations echoed the need to align the targets to relevant infrastructure.[143]

Social enterprises active in reuse, repair and recycling as well as MWE and the Swedish environmental agency[144] emphasised the need to prioritise reuse over recycling in keeping with the waste hierarchy and that this needs to be considered in the setting of recycling targets that may otherwise result in reusable materials being sent for recycling. A recycler supports mandatory targets on recycling and recycled content at the EU level to both boost demand and supply for recycling.[145]

In addition, during the second textiles workshop, stakeholders called for recycling targets being established which – supported by clarity and consistency – would help create a market for secondary material and facilitate collection and prioritised use[146].

Table 34 : Summary of impacts for measure 3.8

Stakeholder affected	Economic impacts	Environmental impacts	Social impacts
Producers, waste managers (encompassing collectors, sorters and managers)	This measure would increase cost of data collection and reporting. This measure would enable a level playing field as all operators would contribute to the recycling, subject to specific characteristic. This measure would require additional investment in recycling infrastructure in		

[143] MWE
[144] REEUSE, MWE and the SE EPA
[145] TOMRA call for evidence position paper
[146] Evidence from workshop

	order to meet the targets set. This measure would recover the economic value of textile fibres through recycling in comparison to their loss through recovery and/or disposal.		
Public authorities	This measure would increase the administrative costs of setting a recycling target, developing indicators for monitoring progresses, ensure compliance, and update upon need. It would increase costs of data collection and reporting recycling of textile waste.		
All stakeholders		This measure would improve air, soil, and water quality thanks to reduced waste disposal practices. Similarly, it would protect landscapes thanks to reduced landfilling.	This measure would increase information and data on recycling. This measure would increase employment in the recycling sector.

Overall impacts of the measures

For textiles, the table below summarises the net impacts of the measures that are included in each option. For each measure, the direction of impact is indicated as positive, negative or neutral using + - and +/- to indicate these impacts. Additionally, where indirect impacts are identified these are shown between brackets, e.g. (+) would demonstrate an indirect positive impact. The table below sets out the economic, environmental and social impacts by measure covering all relevant stakeholders: public authorities, industry (including SMEs), citizens and workers and third countries. For those measures that contained alternatives, the table presents the ratings for the selected alternatives within each measure.

Table 35 : Overview of the economic environmental and social impacts of the measures

Policy option and measure	Economic impacts	Environmental impacts	Social impacts	Competitiveness impacts	Comments
Option 1 - Supporting Member States to implement and enforce current WFD provisions.					
Measure 1.1 – Clarifying definitions in relation to textiles and textile waste	+	+	+	+/-	Measure 1.1 is split into two sub-options, the first of which has three alternatives to address the scope in relation to textiles and second of which has two alternatives to address the definition of textile waste. Alternatives 2 and 3 in relation to the definition of textiles would offer greater clarity and a greater scope for admin burden reduction in comparison to sub-option 1. An increase in scope under sub-option 1 would also increase costs of management of textile wastes, with the greatest impact on price competitiveness falling on those Member States that have taken little action to address textile wastes to date that would have an even broader task to comply. All three definition alternatives would incentivise research and development to manage the textiles listed as well as providing potential feedstocks of recycled textile materials reducing reliance on third country imports of such materials in future. With regard to the definition of waste, two sub-options are considered. The first one would possibly lead to a negative economic impact for producers and waste managers as a result of deterioration in the quality to textiles collected as well as increasing administrative costs for a minority of collectors. The second sub-option

Policy option and measure	Economic impacts	Environmental impacts	Social impacts	Competitiveness impacts	Comments
					would lessen environmental controls compared to the baseline.
Measure 1.2 - Adopting EU wide waste prevention indicators for textiles	+	+	+	+	The reduction of textile waste generation is strongly linked to waste prevention at the top of the waste hierarchy. The success of this measure is dependent on the information available and the reporting by Member States but would set prevention indicators to gauge efforts across the EU in textile waste prevention as week as to assist in the identification of best practices in individual Member States that could be applied in others. Additionally, support to the reuse and repair sectors and a reduction in imports of textiles in the future would provide a boost to EU competitiveness.
Measure 1.3 – Providing Member States with guidance and support in dialogue on the management of textile waste between actors involved	+	+	+	+/-	The measure would imply resourcing and related costs to develop guidance and recommendation as well as to operate a stakeholder platform for dialogue between stakeholders. The cost of guidance is 135 000 euro per guidance developed. These costs are expected to be outweighed by the economic benefits resulting from these new tools. Impacts of price competitiveness are linked to the possible increases in collection, sorting and treatment with those Member States that currently collect a small share of textile wastes and have little capacity for sorting and treatment impacted with cost impacts falling on the waste management sectors in each of those Member States accordingly. At the same time the measure

Policy option and measure	Economic impacts	Environmental impacts	Social impacts	Competitiveness impacts	Comments
					would improve dynamic competitiveness by sharing best practices, as well as increasing reuse and recycling and, thereby, lessening dependence on third countries for textiles and textile products in future.
Option 2 – Proposing additional measures to align waste management to the waste hierarchy.					
Measure 2.5 – Setting sorting obligations for separately collected textiles and textiles waste	-	+	+	+/-	There would be additional recovery of the value of from textile wastes of up to 533 million euro for reuse and 117 million euro for recycling per year. However, there would be additional costs for sorting waste as a result of a sorting obligation of 913 million euro per year. Over 70% of these costs would likely be recovered by the additional value of textiles available for reuse and recycling. However, the impacts would still be overall negative economically. At the same time the environmental impacts of these materials would be averted, most notably in terms of GHG emissions via a reduction of 160 000 tonnes of CO2eq emissions per year whilst providing additional employment of up to 8 740 FTE. The largest price competitiveness impacts are likely to be felt in those Member States that have significant levels of collection but low levels of national sorting capacity as the need for additional sorting capacity under this measure potentially drives up competition for the sorting capacity available. At the same time research and innovation in sorting and treatment would be supported by this measure as well as a reduction

Policy option and measure	Economic impacts	Environmental impacts	Social impacts	Competitiveness impacts	Comments
					on reliance on imports of textiles and textile products from third countries.
Measure 2.6– adopting end of waste criteria	+	+	+	+	The development of EU wide end of waste criteria will address the issue of inconsistent approaches to how this applies to textiles in different Member States at present. This should assist in the subsequent reuse market, allowing textiles that have reached end-of-waste to move freely whilst ensuring relevant pre-treatment has taken place to minimise the environmental and social risks of such materials. This measure has the potential to incentivise the repair and reuse market as well as the recycling markets in Member States by potentially allowing easier movements of reusable and recyclable materials that would no longer be categorised as waste in the future whilst reducing the need for imports of textiles and textile products from third countries.
Measure 2.8– Setting requirements for the shipments of textiles	-	+	+	+/-	The economic costs largely relate to additional administrative costs related to record keeping of 208 euro per operator. Minor price competitiveness impacts are likely to be felt by those Member States that most heavily rely on exports of discarded textiles to third countries.
Measure 2.9 – Mandating the use of EPR	+/-	+	+	+/-	Economically the measure would increase the costs of placing textile products on the market as a result of the EPR fees applied. Additionally, costs of application of EPR would

Policy option and measure	Economic impacts	Environmental impacts	Social impacts	Competitiveness impacts	Comments
					disproportionately affect micro-enterprises should they not be excluded from the provisions on EPR. At the same time the measure would enable a playing field across the EU in relation to textiles EPRs, would simplify administrative practice, would result in additional support to the reuse and repair sector as well as the textile recycling sector. This is the reason for the +/- approach to determining economic impacts. The total sift in costs for effective textile waste management in the EU of 2.2. billion euro would also lead to the recovery of value of textiles for reuse of 1.1 billion euro and recycling value of 167 million euro. Impacts of price competitiveness are linked to the shift of the costs of managing textiles at the point of discard in comparison to the status quo with the largest impacts on those Member States that currently lag behind on textile waste management. At the same time, better organised funding can be targeted at repair and recycling markets as well as reductions in the need for imports of textiles and textile products from third countries.
Measure 2.14 – Setting reporting obligations for textiles	-	+	+	NA	The economic costs relate to additional administrative burden related to new reporting requirements in particular for businesses that currently report little data in terms of their waste generation of €750 000 for the EU overall (508 euro per operator). At the same time, it would set

Policy option and measure	Economic impacts	Environmental impacts	Social impacts	Competitiveness impacts	Comments
					a more level playing field for reporting requirements across the EU.
Option 3 – Prescribing targets and restrictions					
Measure 3.1 – Setting an EU textile reduction target	+/-	+	+	+/-	The measure would increase the cost of textile waste data collection and reporting that accounts for the negative economic impact. However, the measure would also enable a more level playing field via a common target on textile reduction across the EU resulting a positive economic impact. It is considered at present that setting a target at the EU level is not feasible due to shortcomings in the data presently available. Price competitiveness impacts would generally be dependent upon the level of compliance with the target set, with Member States far behind a target facing the greatest price competitiveness impacts. At the same time, support for research and innovation and reduced reliance on imports from third countries would be likely to result.
Measure 3.4 -setting a preparation for reuse target for textiles	+/-	+	+	+/-	This measure would carry administrative costs in the development and monitoring of compliance against the preparation for reuse target set. It would also require additional investment in infrastructure for the collection, sorting and reuse and repair sectors. At the same time, the economic value of the textiles otherwise disposed of would be better recovered through increased reuse.

Policy option and measure	Economic impacts	Environmental impacts	Social impacts	Competitiveness impacts	Comments
					It is considered at present that setting a target for preparation for reuse at the EU level is not feasible due to shortcomings in the data presently available. Price competitiveness impacts would generally be dependent upon the level of compliance with the target set, with Member States far behind a target facing the greatest price competitiveness impacts. At the same time, support for research and innovation and reduced reliance on imports from third countries would be likely to result.
Measure 3.5 - Setting a reuse target for textiles	+/-	+	+	+/-	This measure would carry administrative costs in the development and monitoring of compliance against the reuse target set. It would also require additional investment in infrastructure for the collection, sorting and reuse and repair sectors. At the same time, the economic value of the textiles otherwise disposed of would be better recovered through increased reuse. It is considered at present that setting a target for reuse at the EU level is not feasible due to shortcomings in the data presently available. Price competitiveness impacts would generally be dependent upon the level of compliance with the target set, with Member States far behind a target facing the greatest price competitiveness impacts. At the same time, support for research and innovation and reduced reliance on imports from third countries would be likely to result.

Policy option and measure	Economic impacts	Environmental impacts	Social impacts	Competitiveness impacts	Comments
Measure 3.6 - Setting a separate collection target for textiles waste	+/-	+	+	+/-	This measure would carry administrative costs in the development and monitoring of compliance against the collection target set. It would also require additional investment in infrastructure for the collection of textiles with likely increases in sorting, reuse and recycling infrastructure required a as a result of the additional textiles collected. At the same time, the economic value of the textiles otherwise disposed of would be better recovered through increased reuse and recycling. Given the already existing obligation with regard to separate collection of textiles under Article 11(1) of the existing WFD this target could be set based on the data available. Limited competitiveness impacts were identified for this measure.
Measure 3.8 – Setting a recycling target for textiles	+/-	+	+	+/-	This measure would carry administrative costs in the development and monitoring of compliance against the recycling target set. It would also require additional investment in infrastructure for the collection, sorting and recycling sectors. At the same time, the economic value of the textiles otherwise disposed of would be better recovered recycling of textiles that are not suitable for reuse. It is considered at present that setting a target for recycling at the EU level is not feasible due to shortcomings in the data presently available.

Policy option and measure	Economic impacts	Environmental impacts	Social impacts	Competitiveness impacts	Comments
					Price competitiveness impacts would generally be dependent upon the level of compliance with the target set, with Member States far behind a target facing the greatest price competitiveness impacts. At the same time, support for research and innovation and reduced reliance on imports from third countries would be likely to result.

Table 36 : Overview of the costs and benefits and overall balance of the measures

Policy option and measure	Costs	Benefits	Competitiveness impacts	Net impacts
Option 1 - Supporting Member States to implement and enforce current WFD provisions				
Measure 1.1 – Clarifying definitions in relation to textiles and textile waste	+	+	+/-	Net positive
Measure 1.2 - Adopting EU wide waste prevention indicators for textiles	+	+	+	Net positive but limited
Measure 1.3 – Providing Member States with guidance and support in dialogue on the management of textile waste between actors involved	+	+	+/-	Net positive but limited
Option 2 – Proposing additional measures to align waste management to the waste hierarchy				
Measure 2.5 – Setting sorting obligations for separately collected textiles and textiles waste	-	+	+/-	Net positive
Measure 2.6 – Adopting end of waste criteria	-	+	+	Net positive
Measure 2.8 – Setting requirements for the shipments of textiles	-	+	+/-	Net positive
Measure 2.9 – Mandating the use of EPR	+/-	+	+/-	Net positive
Measure 2.14 – Setting reporting obligations for textiles	-	+	NA	Net positive
Option 3 – Prescribing targets and restrictions				
Measure 3.1 – Setting an EU textile reduction target	+/-	+	+/-	Likely net positive
Measure 3.4 – Setting a preparation for reuse target for textiles	+/-	+	+/-	Likely net positive
Measure 3.5 - Setting a reuse target for textiles	+/-	+	+/-	Likely net positive
Measure 3.6 - Setting a separate collection target for textiles waste	+/-	+	+/-	Likely net positive
Measure 3.8 – Setting a recycling target for textiles	+/-	+	+/-	Likely net positive

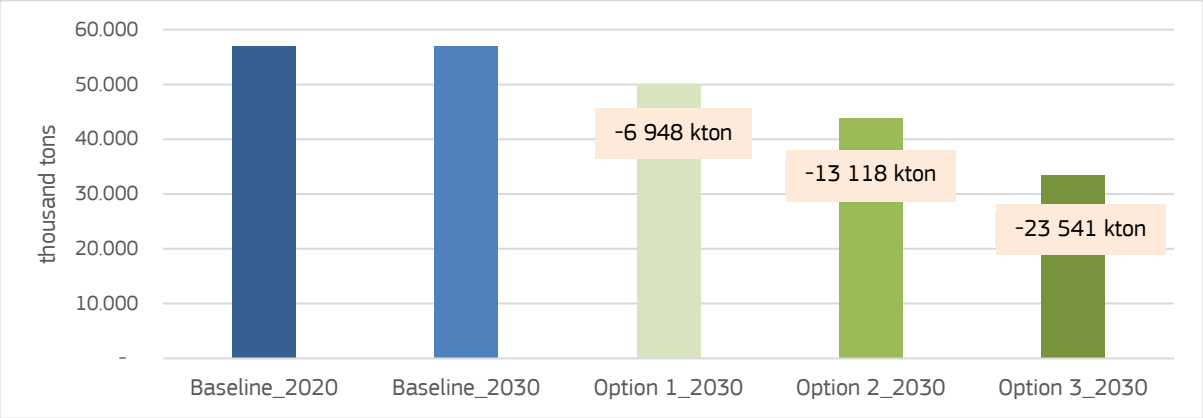
2. Food waste[147]

This Annex presents results of the MAGNET model and other analysis for the options setting legally binding food waste reduction targets (Option 1 to Option 3). As regards Option 4, it is not possible to assign specific reduction level (but only a range of reduction), therefore the MAGNET model was not run for this option and therefore not included in this Annex. As the impacts for Option 4 are expected to be in the range between the Baseline (2030) and Option 1, its impacts are described (in the main document) by reference to impacts from these options.

2.1. Impact of reduction scenarios on food waste quantities

The reduction of food waste increases with a broader coverage of the food supply chain and increased target levels. Figure 1 depicts the baseline food waste numbers in 2020 and 2030 and compares it with the three main scenarios: Option 1, Option 2 and Option 3. Option 1 leads to an estimated reduction of food waste of around 7 000 ktons, while the expected food waste reductions are around 13 000 ktons for Option 2 and around 23 500 ktons for Option 3.

Figure 1 – Total EU27 food waste quantities in the baselines and the three options

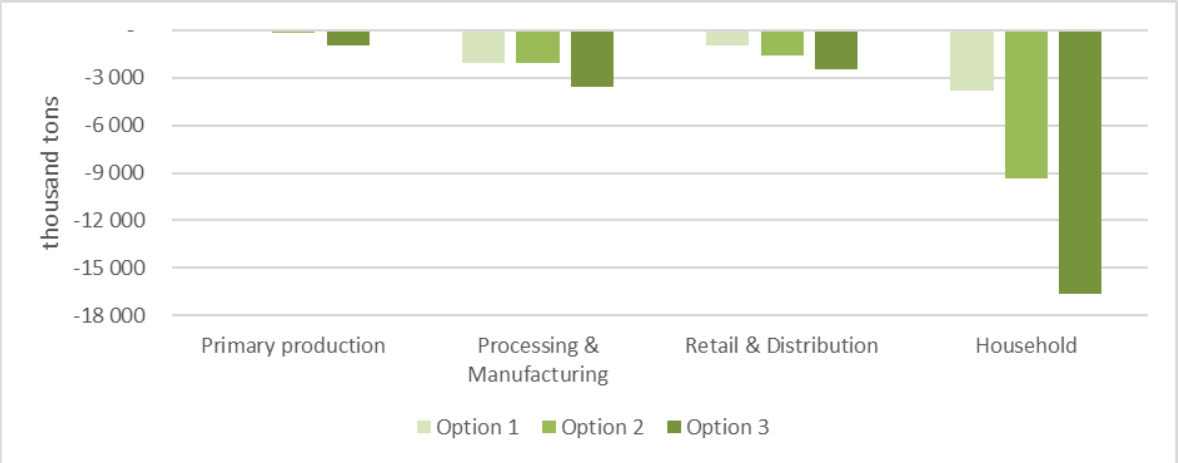


Source: MAGNET simulation results (2020 baseline based on ESTAT 2022)

The ambitious food waste reduction in Option 3 can be traced back to the high reduction target rates (50%) at the household level as most food waste occurs at this stage. On the other hand, an increased reduction of food waste in the other main segments of the food supply chain under all three options, has more limited impact compared to the consumption segment (Figure 2). This is due to the smaller share of total food waste attributed to upstream stages of the food supply chain. For instance, Option 3 leads to an estimated food waste reduction of nearly 17 000 ktons at the household level, while the expected decrease at the retail and distribution level only amounts to 2 400 ktons of food waste.

[147] This assessment is based on: De Jong B, Boysen-Urban K, De Laurentiis V, Philippidis G, Bartelings H, Mancini L, Biganzoli F, Sanyé Mengual E, Sala S, Lasarte-López J, Rokicki B, M'barek R. *Assessing the economic, social and environmental impacts of food waste reduction targets. A model-based analysis.* Publications Office of the European Union, Luxembourg, 2023, doi:10.2760/77251, JRC133971.

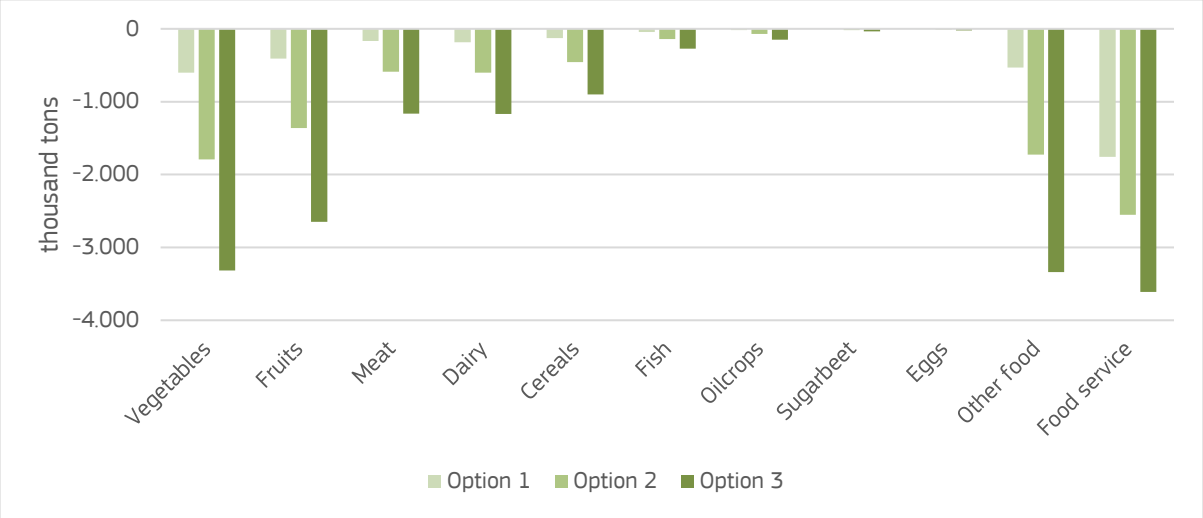
Figure 2 – Deviations in EU27 food waste quantities at the industry and consumption stage, Options vs baseline 2030



Source: MAGNET simulation results

Per food commodity group, the largest food waste reductions are expected to happen in sectors where food waste generation is the highest. Vegetables and fruits constitute over 40% of food waste by households with the result that household waste reductions fall commensurately in these sectors. Hence, Option 3 results in food waste reduction by more than 3 000 ktons for vegetables and more than 2 500 ktons for fruits (Figure 3). Households' out-of-home consumption of food waste is depicted by the food service sector as a whole, and the food waste reductions at this level is also significant (over 3 500 ktons in Option 3). Other food sector comprises mostly packaged and prepared food, where noteworthy reductions are also expected.

Figure 3 – Change deviations in household food waste quantities per commodity group for EU27 options vs baseline 2030



Source: MAGNET simulation results

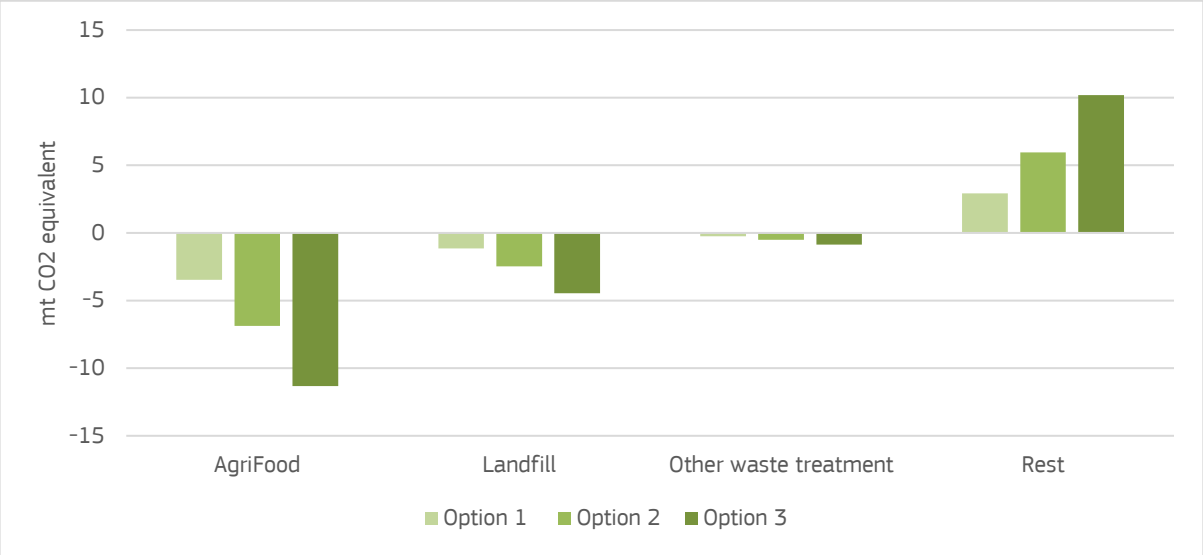
2.2. Environmental impacts

2.2.1. MAGNET model

2.2.1.1. Emissions

The results show that savings in amounts of food waste at any stage of food supply chain have a significant positive environmental impact on emissions both within the EU and globally. As explained in the methodological chapters, it is assumed that reduced household food expenditures result in rising non-food expenditures (savings rates are assumed fixed across all options) such that there is an increase in emissions from other economic activities (Figure 4).

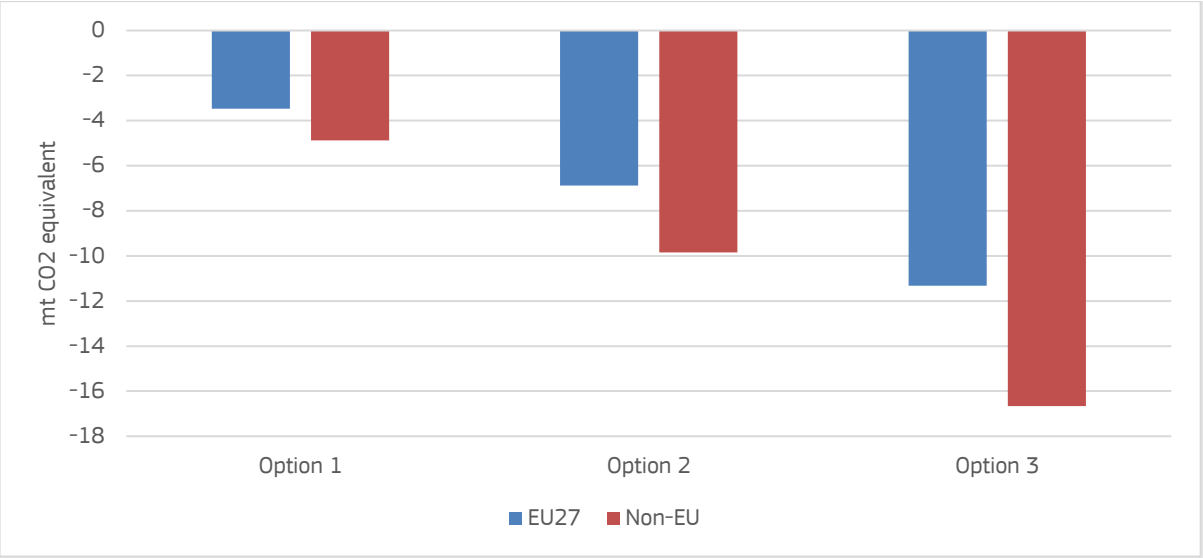
Figure 4 – Absolute deviation of direct emissions in the EU27 (mt CO2 equivalent) options vs baseline 2030



Source: MAGNET simulation results

Figure 5 depicts absolute deviations of direct emissions associated with agri-food for the EU and non-EU. In connection with food waste reduction in the EU, a decrease in direct emissions in the rest of the world is also expected, resulting from the EU's reduced agri-food import demand in particular.

Figure 5–Absolute deviation of direct emissions associated with agri-food (mt CO2 equivalent) options vs baseline 2030



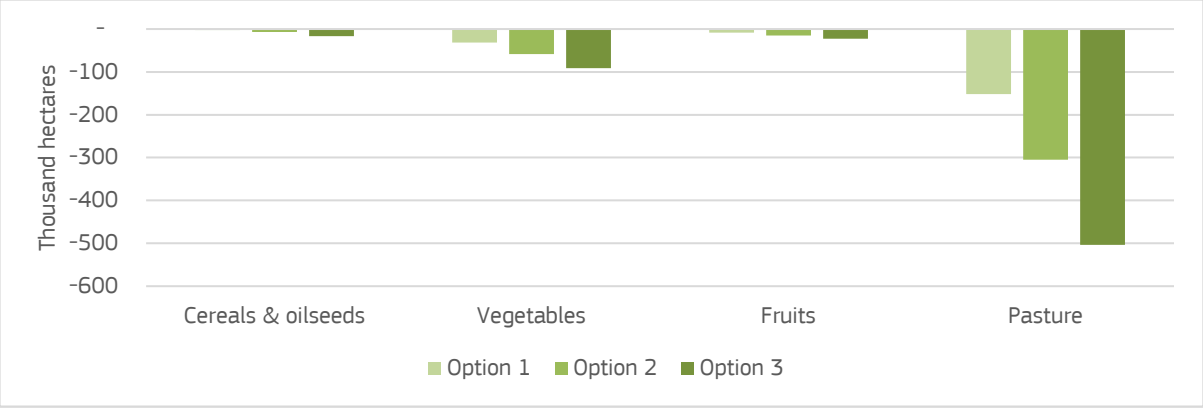
Source: MAGNET simulation results

It should be noted that the modelling does not take into account other policy constraints, such as the national greenhouse gas emissions reduction targets established in the EU. In reality the rebound effect may actually translate in the need to take less measures in other sectors to achieve the agreed GHG reduction targets, reducing overall mitigation costs in the economy with the same environmental effect

2.2.1.2. Land use

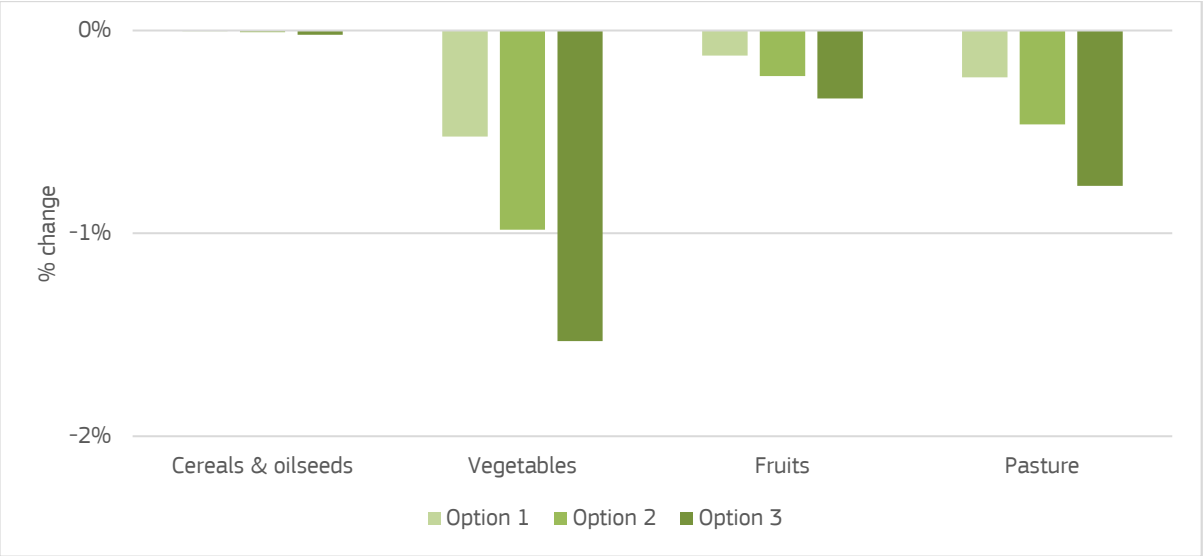
Food waste reduction options in general lead to slight decreases in land use driven by changes in demand and production. The highest decrease (by hectare) is expected to occur in pastureland, with a decrease of 500 000 hectares in Option 3 (Figure 6). However, this e only corresponds a decrease of up to 0.77% (Figure 7). Although limited, the highest percentage change in land demand is expected in the vegetables sector as a result of decreasing demand and production in this sector.

Figure 6: Absolute deviation in land use in the EU (thousand hectares) options vs baseline 2030



Source: MAGNET simulation results

Figure 7: Deviation in land use in the EU (% change) options vs baseline 2030 (baseline in 2020 =100)



Source: MAGNET simulation results

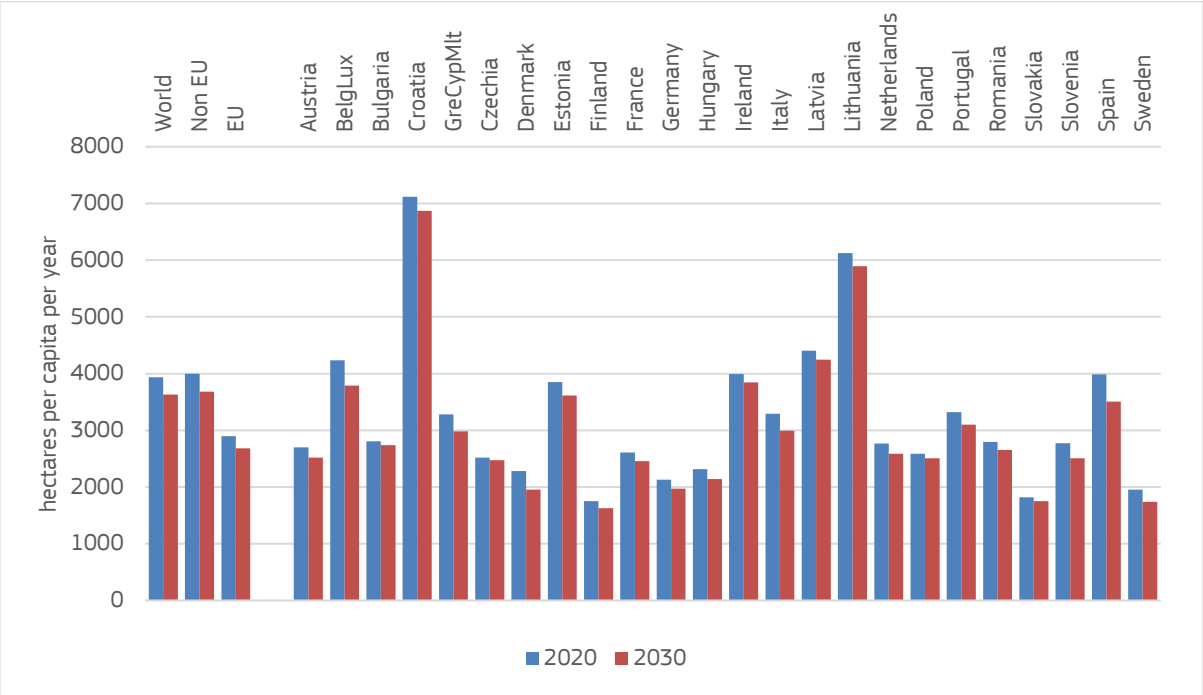
2.2.1.3. Footprints (consumption, households)

This section shows the environmental impacts of different food waste reduction targets using household food demand-driven footprints of land, emissions and energy, which measure the intensity of land use (i.e., emission and energy use associated with food consumption).

Figure 8, Figure 10 and Figure 12 show the development of the land (m^2), emission (kg CO2 equivalents) and energy footprints (mega joules, MJ) per capita per year in the baseline for the years 2020 and 2030. Whereas, Figure 95, Figure 11 and Figure 13 show the land, emission and energy savings due to the reduction of waste by comparing the footprints of the scenarios with the footprints in the baseline in 2030.

While the land footprint of the EU27 is already lower than world average in 2020, Figure 8 shows that the land footprint across Member States significantly differs but decreases for all Member States from 2020 to 2030.

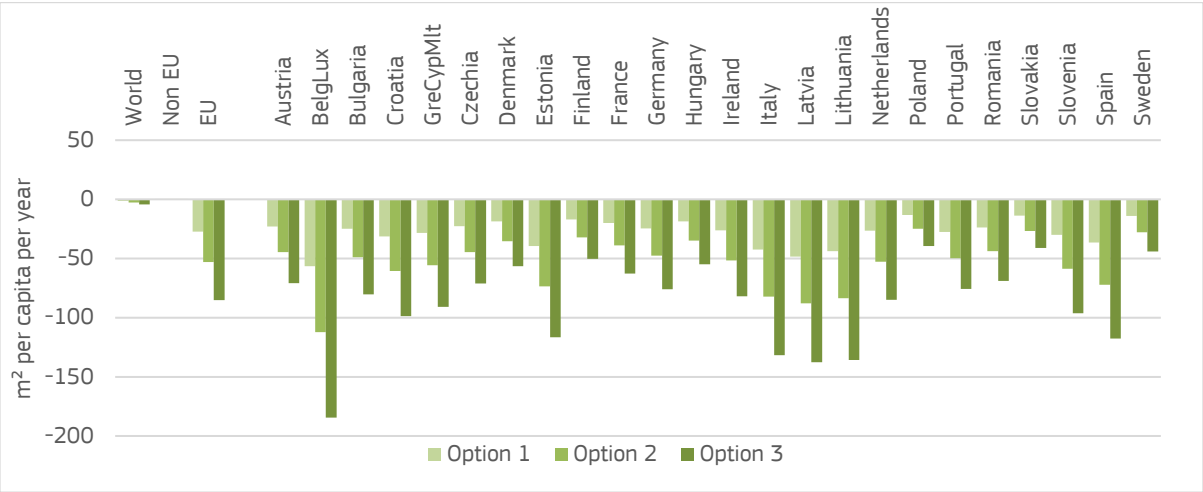
Figure 8: Land footprint associated with household food consumption (m^2 per capita per year) – baseline 2020 and 2030



Source: MAGNET simulation results

Food waste reduction in the EU leads to a reduction of the land footprint associated with household food consumptions of the EU and of all Member States, while it leads to an increase of the land footprint in non-EU regions. As the impact on the non-EU region is very small, the world land footprint tends to decrease in 2030 compared to the baseline. The magnitude of these land use savings increases with an increase in the food waste reduction targets, thus scenario Option 1 leads to the smallest savings, while scenario Option 3 leads to the highest savings. The extent of these savings largely differs across Member States- between 2% and 5% in Option 3.

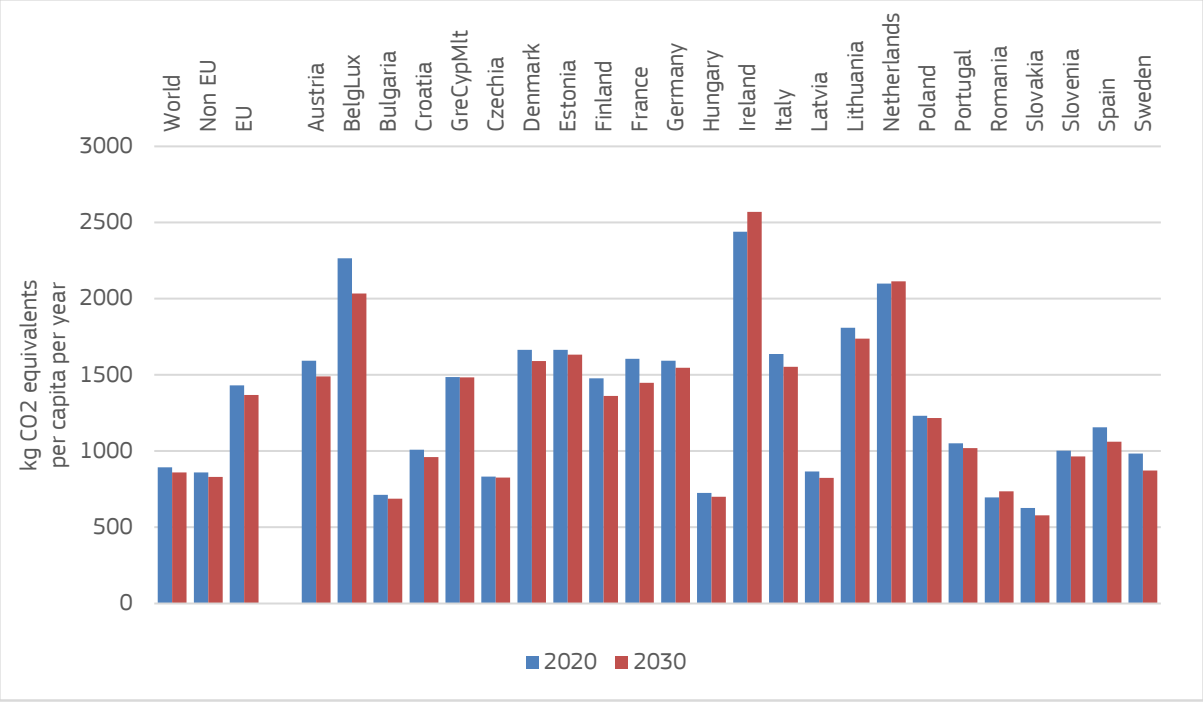
Figure 9: Land footprint associated with household food consumption (m² per capita per year) – savings, options vs baseline 2030



Source: MAGNET simulation results

By contrast to the land footprint, the emission footprint of the EU is higher than the world average in the baseline in 2020. Figure 10 also shows significant differences across Member States. While the emission footprint of the EU decreases from 2020 to 2030, the development of the Member States' footprints is mixed. The emission footprint tends to decrease less in the EU-13 Member States[148] and even increases in Member States that showed the highest footprints in 2020.

Figure 10: Emission footprint associated with household food consumption (kg CO2 equivalent per capita per year) –baseline 2020 and 2030

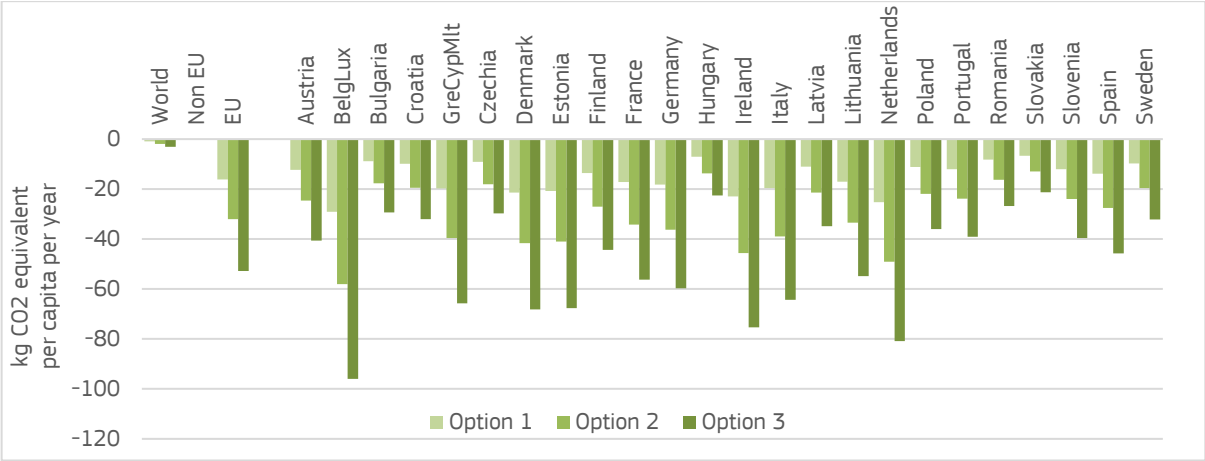


Source: MAGNET simulation results

In line with the findings related to the land footprint, the emission footprint of the EU and of all Member States also decreases when reducing food waste, with the highest effects observed in the scenario "Option 3". However, the extent largely differs across Member States and varies between around 3% to 5% in emission savings.

Figure 11: Emission footprint associated with household food consumption (kg CO2 equivalent per capita per year) – savings per options vs baseline 2030

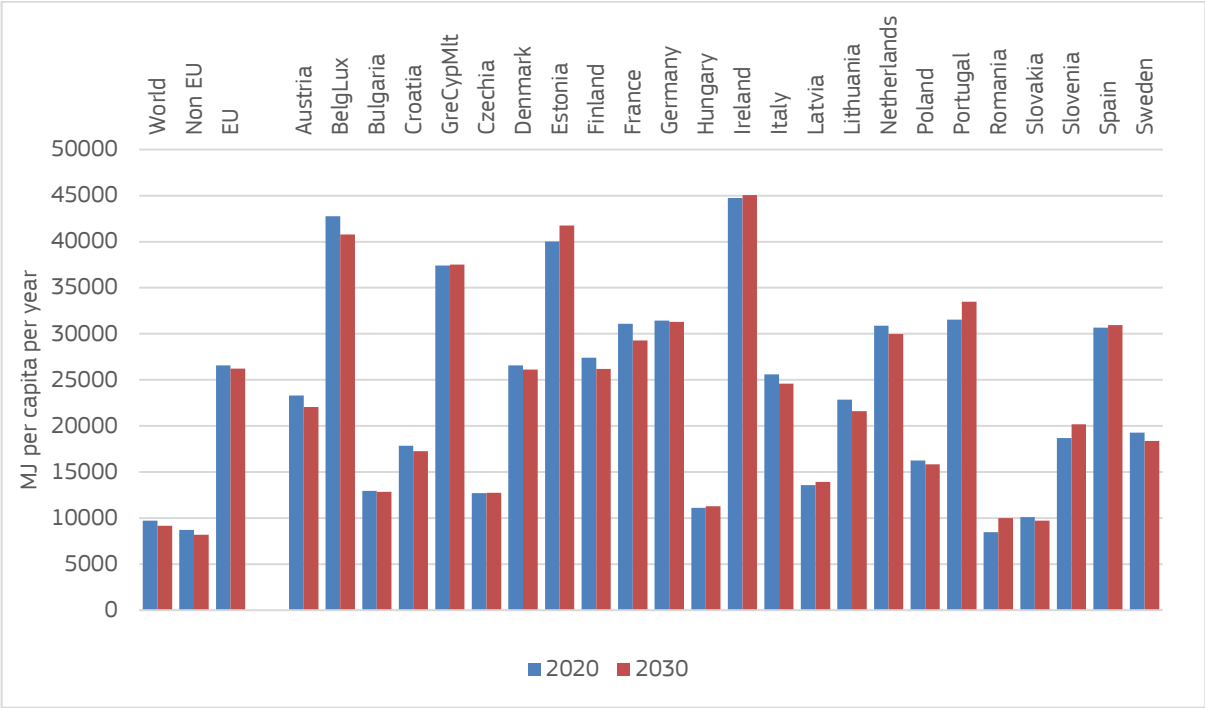
[148] Bulgaria, Croatia, Cyprus, Czechia, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia



Source: MAGNET simulation results

Also, the energy footprint of the EU is higher than the world average in the baseline in 2020 and Figure 12 shows significant differences across Member States. While the energy footprint of the EU decreases only minimally from 2020 to 2030, the development of the Member States' footprints is mixed. The energy footprint tends to increase or remain unchanged in many EU Member States; only very few Member States show a decrease in their footprint.

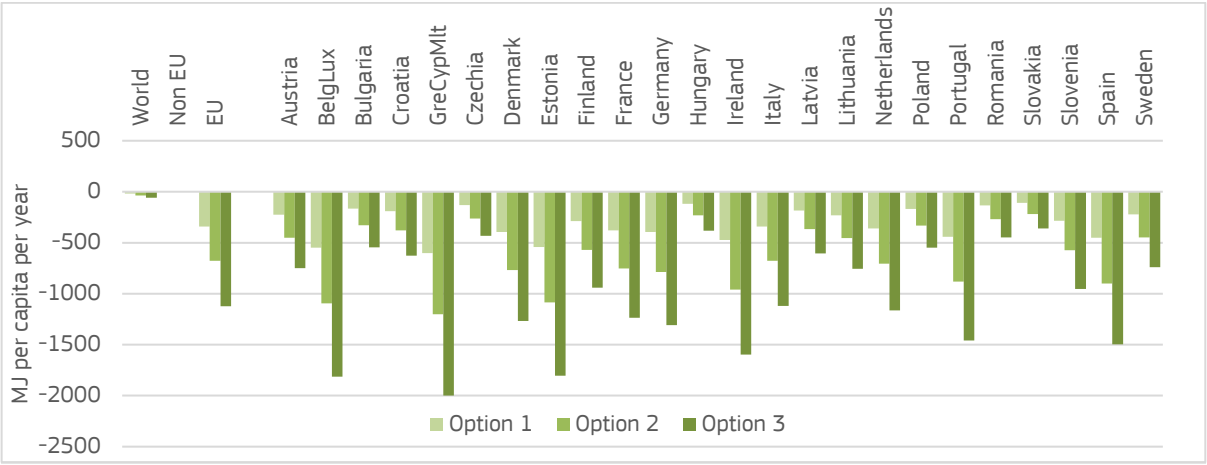
Figure 12: Energy footprint associated with household food consumption (MJ per capita per year) – baseline 2020 and 2030



Source: MAGNET simulation results

Figure 13 shows that food waste reduction leads to savings with regard to energy use in household food consumption, with the highest reduction of the energy footprint observed in "Option 3". Member States save around 3-5% of energy related to household food consumption in the most ambitious scenario.

Figure 13: Energy footprint associated with household food consumption (MJ per capita per year) – savings per options vs baseline 2030



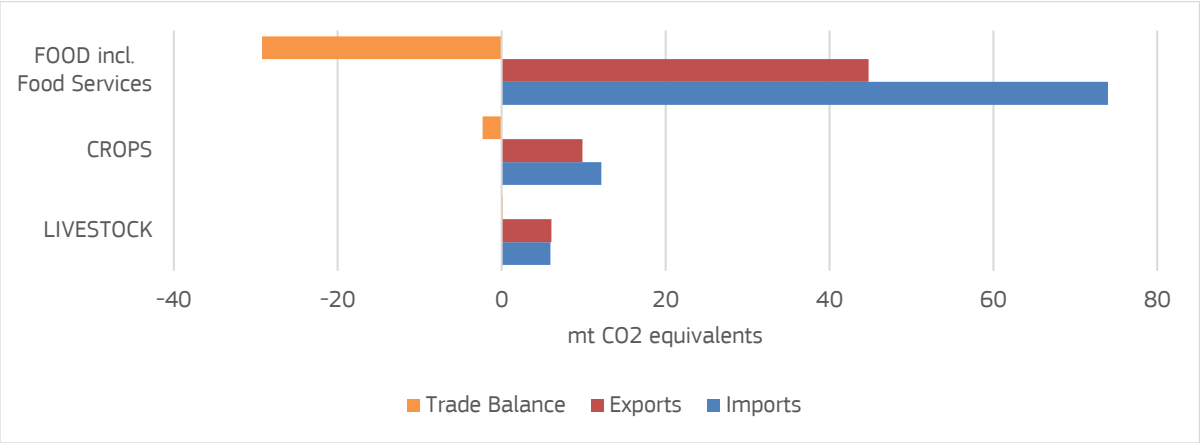
Source: MAGNET simulation results

2.2.1.4. Virtual trade – systemic view

The footprints presented in the previous section consider emissions and land use associated with household food consumption in the EU, hence accounting for the quantity of the virtual (i.e., non-tradable) commodity embedded within imported and domestic EU final food consumption. The underlying virtual flows and their concomitant cross-boundary trade impacts are presented in the figures below.

Figure 14 shows that the EU is a net-emission importing region that is represented by the negative trade balances for both livestock and food. In other words, EU consumers generate emissions 'leakage' through their food consumption patterns. However, the negative trade balance for food is much larger than for livestock. Virtual emission trade related to food is in general larger than for crops and livestock, particularly as livestock is not traded much and all meat and dairy trade is included in food. In addition, virtual emission trade related to food is unbalanced as virtual exports only account for around two thirds of virtual imports, while virtual emission trade related to crops is rather balanced.

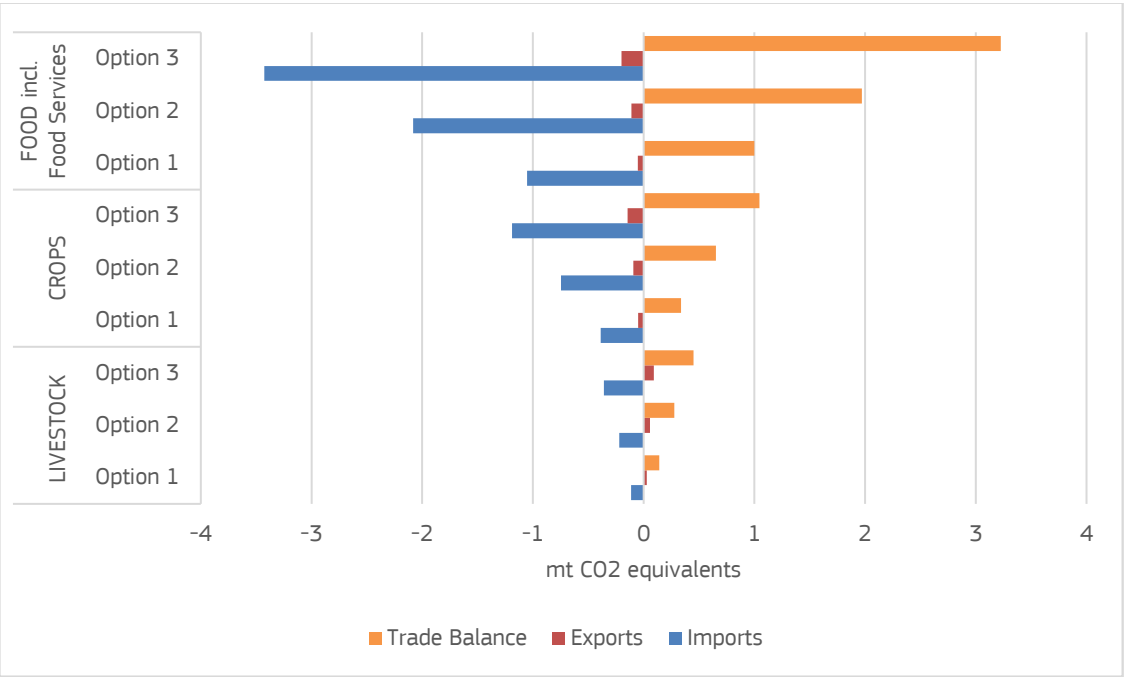
Figure 14: EU virtual emission trade flows (mt CO2 equivalents) in the baseline 2030



Source: MAGNET simulation results

Reductions in food waste lead to reductions in virtual emissions imports and exports associated with livestock and food trade. The extent to which virtual emissions imports are reduced significantly outweighs the impact on virtual emissions exports, so that the virtual emissions trade balance improves. Virtual emission exports associated with trade in crops tend to increase while virtual imports decrease, hence also improving the virtual emission trade balance. However, the impact of the reduction in food waste on virtual emissions trade is rather small so that the net position as a net emissions import region tends to improve only slightly. The more ambitious the food waste reduction target, the larger the effect is on the trade balance (Figure 15).

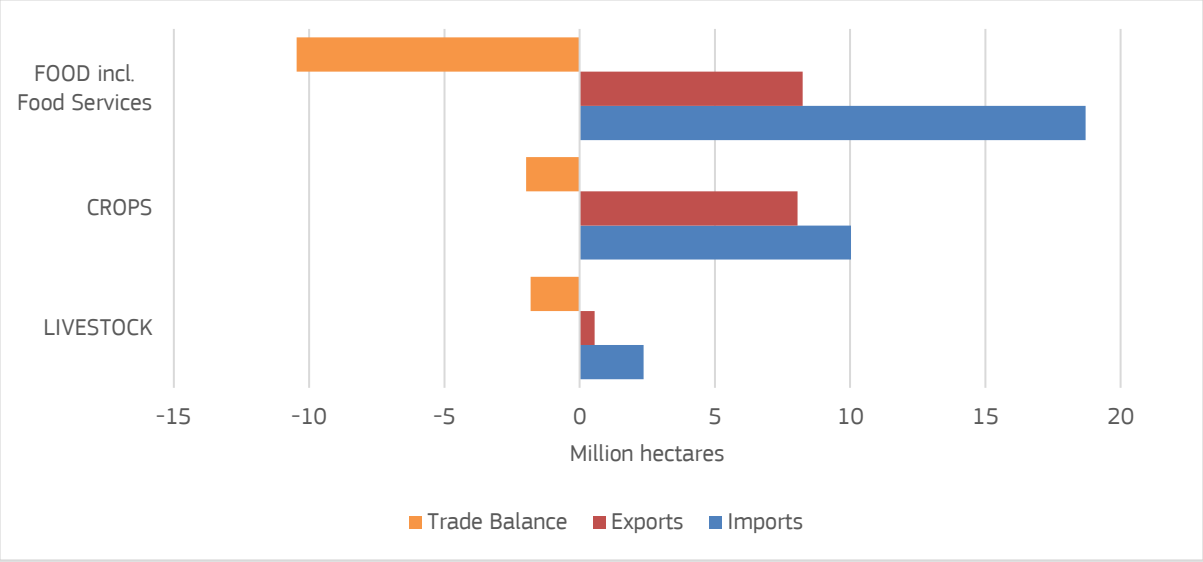
Figure 15: Absolute deviation of EU virtual emission trade flows (mt CO2 equivalents) options vs baseline 2030



Source: MAGNET simulation results

Figure 16 shows that the EU is a net-importing region with regard to the virtual trade of land, with the largest negative trade balance associated with the trade of food and food services.

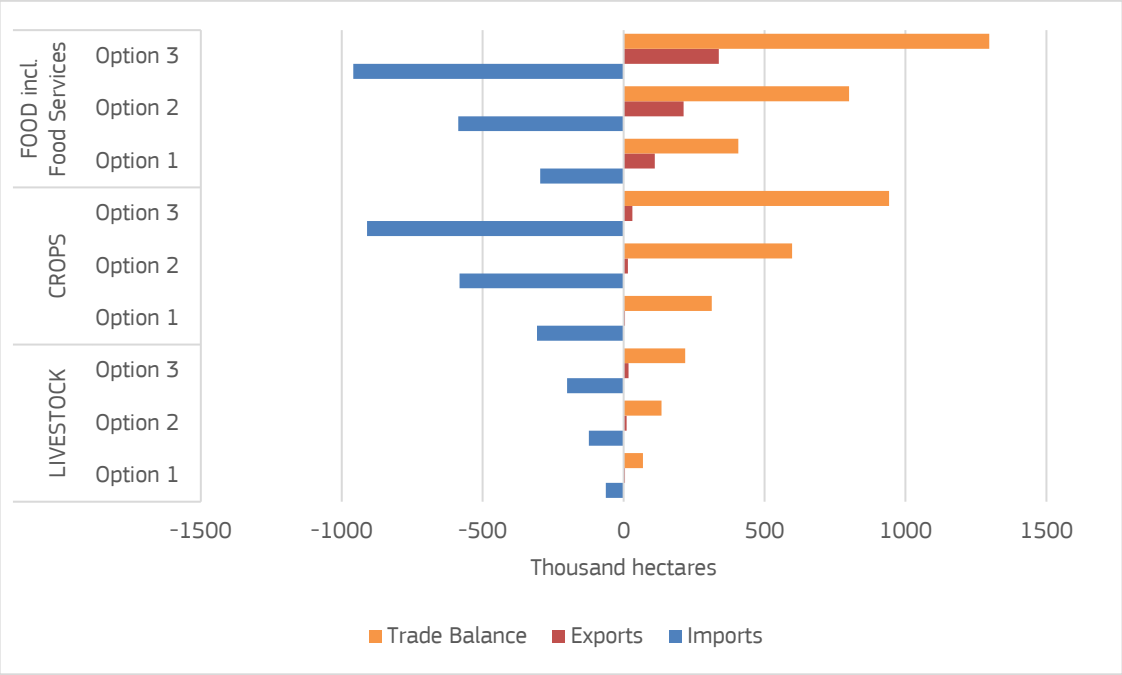
Figure 16: EU virtual land trade flows (million hectares) in the baseline 2030



Source: MAGNET simulation results

The virtual land trade balance also improves with the reduction of food waste, revealing the smallest changes with regard to crops followed by livestock and food. By contrast to virtual emission trade, virtual exports of land tend to increase for all commodity groups, while virtual land imports tend to decrease. As the effect on virtual land imports clearly outweighs the effect on virtual land imports, the virtual land trade balance improves for all three commodity aggregates. Figure 17 also supports the previous statement that the more ambitious the food waste reduction target, the larger are the effects on virtual land trade.

Figure 17: Absolute deviation of EU virtual land trade flows (thousand hectares) options vs baseline 2030



Source: MAGNET simulation results

2.2.2. Bottom-up analysis

This chapter presents the results of a complementary modelling approach that was applied to the analysis of food waste prevention targets in order to support the policy impact assessment. The approach relies on the application of the Life Cycle Assessment (LCA) method, which allows assessing the environmental impacts of food and food waste by modelling individual food products in their entire life cycle (from agriculture production to food waste management). In this way the environmental benefits deriving from the application of food waste reduction targets are estimated, based on the quantities of food waste avoided in the different policy options and on the environmental impacts of representative food products of the modelled food groups assessed in the Consumption Footprint, (EC - European Commission, 2022; Sala and Sanye Mengual, 2022). Details of the methodology are provided in Annex 4.

Table 37 shows the environmental impacts caused by food waste generation in the baseline, while the avoided environmental impacts (and relative monetised values) for the EU27 obtained as a consequence of food waste reduction targets set in the three policy options are displayed in Table 38 and Figure 18 for four selected environmental impact categories.

Table 37- Environmental impacts of food waste in the baseline used for the impact assessment

Impact category	Climate change	Land use[149]	Marine eutrophication	Water use[150]
Unit	MtCO2eq.	Trillion Pt	Million kg N eq.	Billion m3 water eq.
Baseline 2030	244	8.4	2069	332

Table 38 - Overview of results on environmental savings associated to the policy options and their equivalent estimated monetary values

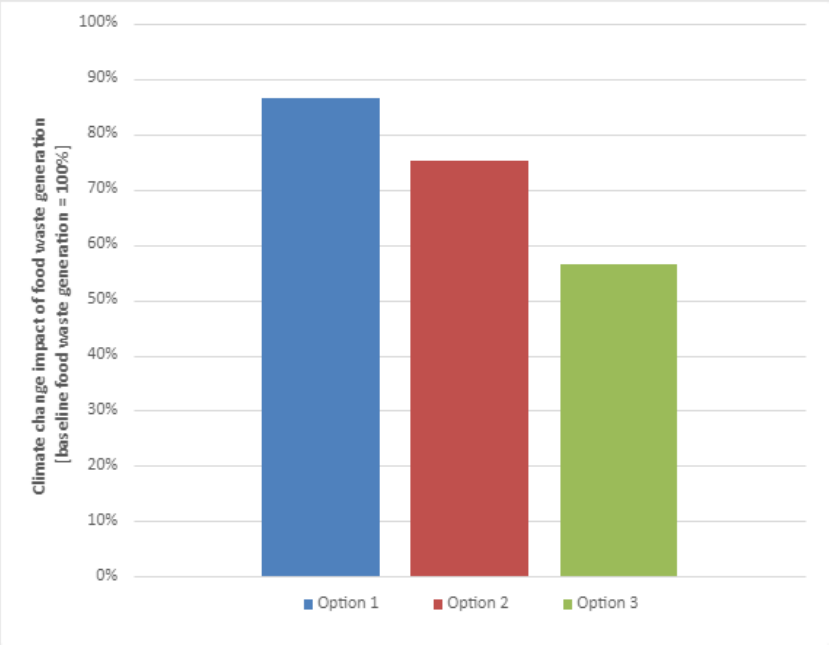
Impact category	Climate change	Land use	Marine eutrophication	Water scarcity	Overall environmental savings monetised
Unit	MtCO2eq.	Trillion Pt	Million kg N eq.	Billion m3 water eq.	Billion Euros
Main scenarios					
Option 1	-33.1	-1.16	-283	-43	5-12
Option 2	-62.0	-2.16	-532	-80	9-23
Option 3	-107.8	-3.75	-922	-141	15-40

Figure 18 shows the relative reductions for the impact on climate change achieved with the three policy options. Similar results can be observed for the other impact categories.

149 Impact of land use on soil assessed considering impacts on four soil properties: biotic production, erosion resistance, groundwater regeneration and mechanical filtration

150 A m3-world eq. represents a cubic meter consumed on average in the world. The average refers to a consumption-weighted average, and hence represents the locations where water is currently consumed

Figure 18: Relative differences in climate change impact between the three policy options.



Considering the various steps of the supply chain, Figure 19 shows the contribution of primary production, processing and manufacturing, retail and distribution and consumption phases in the reduction of climate change impact under the three policy options. The consumption phase has a major role in the overall avoided impact, due to the fact that the largest share of food waste is generated at this stage, and that, in a life cycle perspective, the products reaching the consumer have higher impacts than earlier in the supply chain as the impacts cumulate along the supply chain.

Figure 19: Avoided climate change impact obtained with the three policy options considering the various steps of the supply chain.

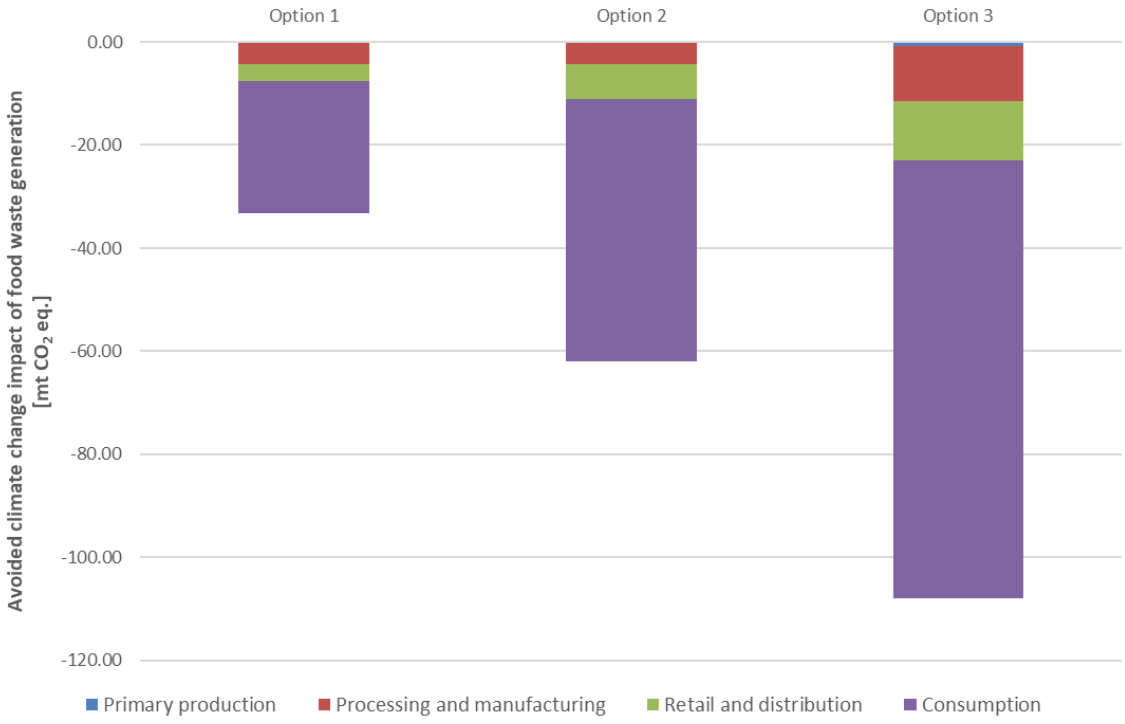


Figure 20 and Figure 21 show the contribution of avoided waste treatment and avoided food production in the total environmental savings that can be achieved applying the various policy options. Avoided food production plays a bigger role for all the impact categories but, in the case of climate change, the contribution of waste treatment is slightly higher than for the other impact categories.

Figure 20: Avoided climate change impact due to food production and waste treatment in the three policy options

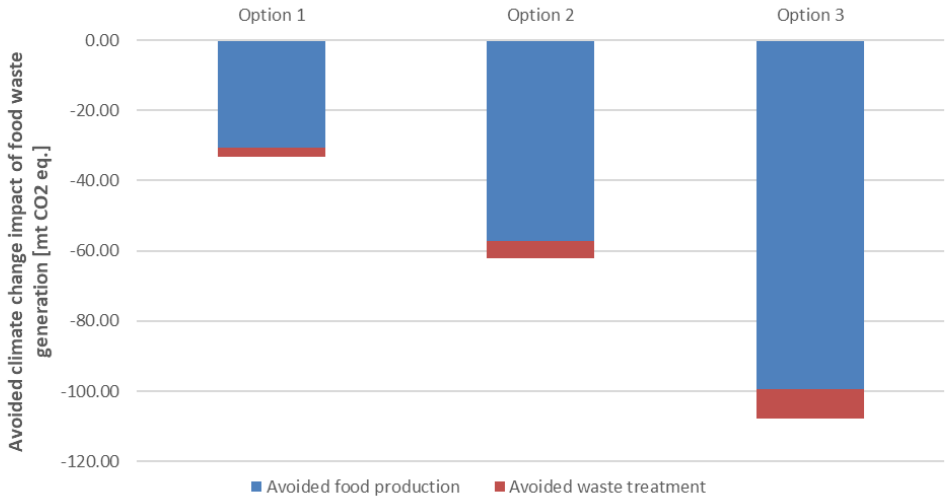
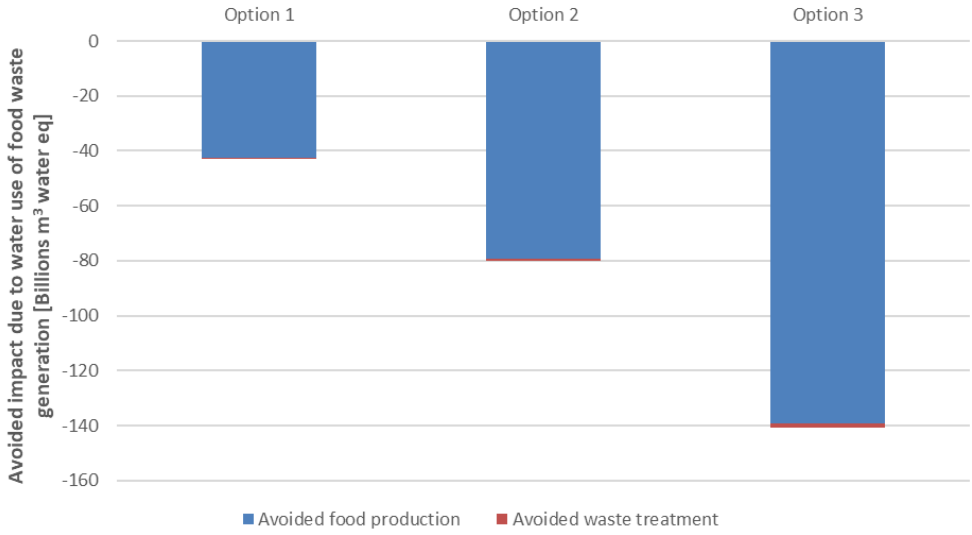
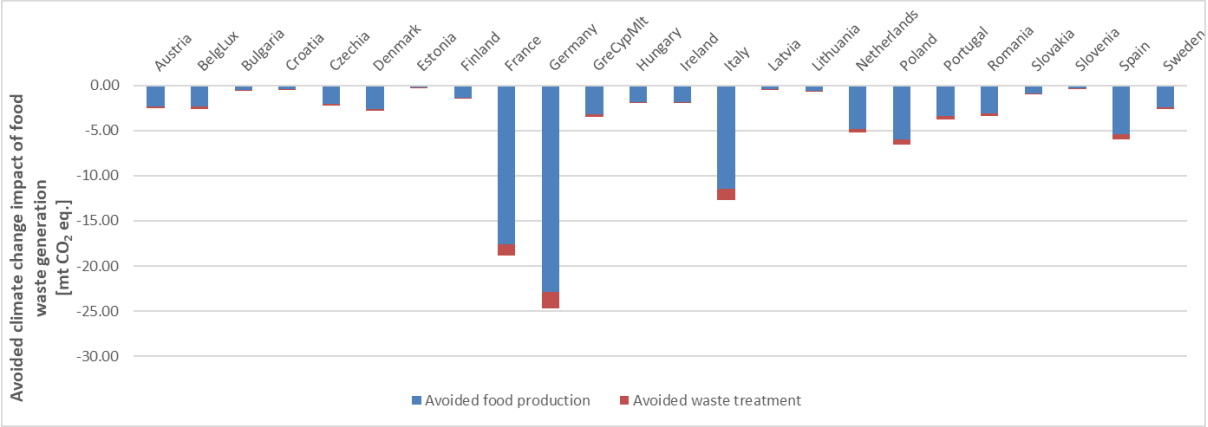


Figure 21: Avoided impact on water use due to food production and waste treatment in the various policy option



The climate change impacts avoided in each Member State under the third policy option are shown in Figure 22. The highest impacts are in Germany, France and Italy, which are also the countries with the biggest amounts of food waste and biggest population.

Figure 22: Avoided climate change impact in the Member States with option 3



2.2.3. Comparison of the two approaches

Environmental impacts presented in this section are calculated with two different approaches: the MAGNET model (section 4), providing impacts in terms of emissions and land use, and the bottom-up analysis (Section 5), which uses the metrics proposed by the Environmental Footprint method (EC - European Commission, 2021). The common metric used by both approaches are greenhouse gas emissions (expressed as $kgCO_2eq$) and therefore a comparison between the two approaches could be performed for this impact category.

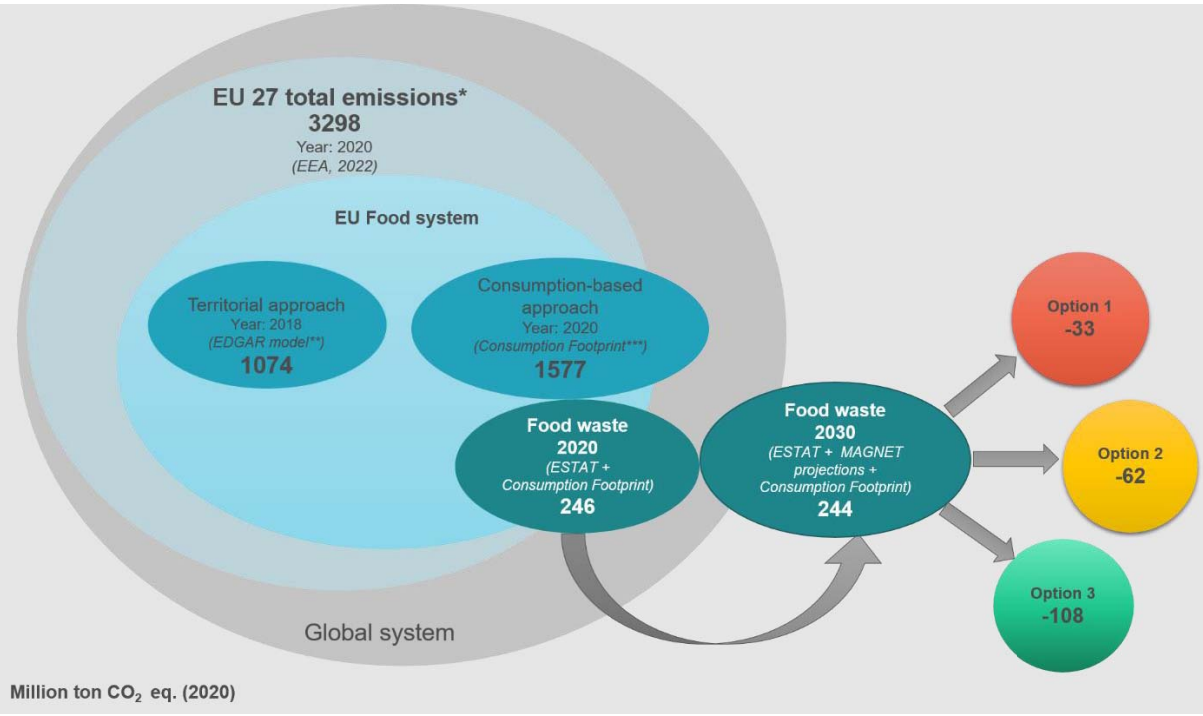
Differences between the two approaches are significant and reflect the different methodological basis. In the case of the bottom-up approach, the avoided environmental impacts are calculated

considering that a reduction of food waste brings benefits linked to: (i) the avoided impact of producing and distributing the food items saved up to the point of the FSC where the food waste is avoided and (ii) the avoided impact of the food waste disposal following the approach presented in (De Laurentiis et al., 2020). The assessment is entirely based on biophysical flows and assumes a linear relation between the amount of reduced food waste and reduced environmental impacts.

Figure 23 shows the potential climate change reductions due to food waste reduction targets assessed with the bottom-up approach in the context of the overall climate change impact due to the EU-27 economy (3298 Mt CO2 eq.), as reported by EEA (2020). The contribution of the EU food system is estimated as one third of the total when considering a production-based emissions (territorial approach) (Crippa et al., 2021). This share is higher when considering the emissions embodied in the imported goods with the Consumption Footprint (CF) approach (around a half of the total), which estimates the impact of food consumption as 1577 Mt CO2 eq. Climate change impact of food waste in 2020 (based on reported food waste quantities, ESTAT (2022) is quantified as 246 Mt CO2 eq. (16% of the impact of food systems) and 244 Mt CO2 eq. in 2030 (based on projections of food waste derived applying the production changes used in MAGNET). The emissions reductions obtained with the three policy options range between 33 and 108 Mt CO2 eq. These values do not include possible rebound effects, which are instead captured in MAGNET and that seem to contribute substantially to offsetting the environmental benefits of these policy measures.

Figure 23:

Reductions in climate change impact due to the application of food waste targets, in the context of the global impact of the EU 27 system and the impact due to food systems. All amounts are million tonnes of CO_2 eq.



Notes. (*) excluding Land Use, Land Use Change and Forestry (LULUCF) and international aviation and international maritime transport (EEA, 2022); (**) EDGAR is the Emissions Database for Global Atmospheric Research developed by the JRC[151] (Crippa et al., 2021); (***) The Consumption Footprint (CF) approach is based on the calculation of impact at product level and considering the full life cycle of products[152] (Sanyé-Mengual and Sala, 2023).

Source: Author's own elaboration based on data from (EEA (2022), Crippa et al., (2021), Sanyé-Mengual and Sala (2023), ESTAT (2022), bottom-up approach

In the case of the MAGNET model, the emissions reductions are calculated within an (economic) general equilibrium model approach which takes into account market dynamics and interrelations between different economic sectors., Similar to the results of the bottom-up analysis, though based on different assumptions, food waste reductions at all stages of the food supply chain have a significant positive environmental impact on emission savings, both within the EU and globally.

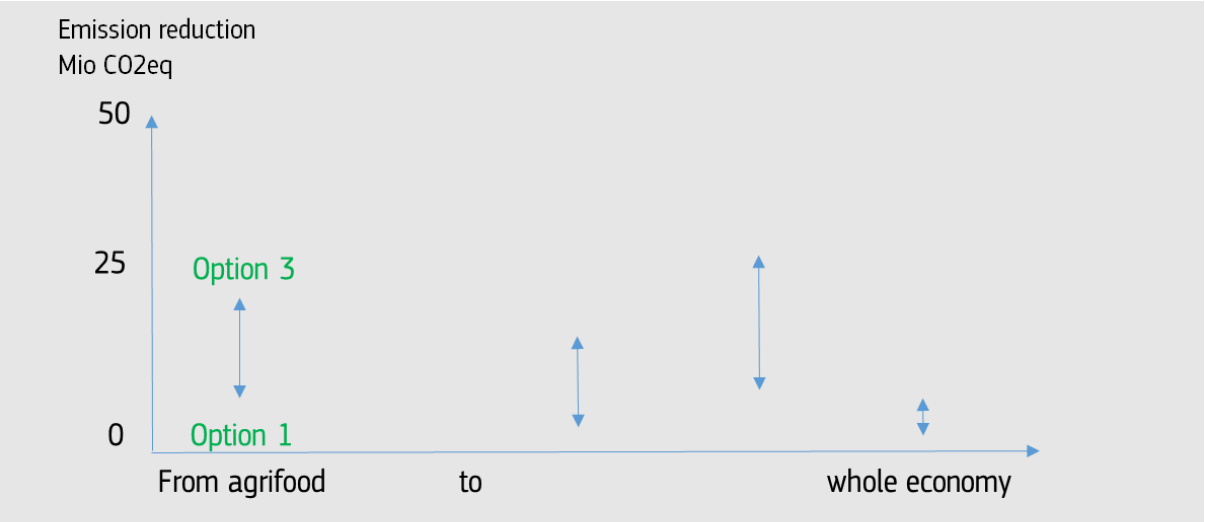
The so-called rebound effect arises when reduced household food expenditures result in rising non-food expenditures (savings rates are assumed fixed across all scenarios) such that there is an increase in emissions from other non-food economic activities. As shown, the larger is the final demand redistribution effect resulting from higher household waste reductions, then the larger is the rise in emissions in non-food and waste management/treatment activities.

Therefore, depending on the spatial and sectorial coverage as well as calculation method, results are diverging (see sections 4.3.4.1 and 4.3.4.3).

Figure 80 shows the range of emission reductions in the scenarios (from Option 1 to Option 3). On the left-hand side, the reductions of the aggregated emission footprint associated with household food consumption for the EU are depicted (in Mio CO2eq Option 1: -7.4, Option 2: -14.6, Option 3: -24.1). Looking at the right-hand side, the emissions are presented as reductions in the EU food chain including the waste treatment (-4.9, -9.8, -16.7), including the global food chain (-8.3, -16.7, -28.0) and, finally, the EU whole economy including rebound effects (-2.0, -3.9, -6.5). It should be noted that there is a high uncertainty related to the assumptions regarding the waste treatment (e.g. share of food waste in landfill etc.).

Figure 24: Overview of different emission calculations within MAGNET range of reduction in Mio CO2eq from Option 1 to Option 3

[151] https://edgar.jrc.ec.europa.eu/
[152] https://eplca.jrc.ec.europa.eu/sustainableConsumption.html

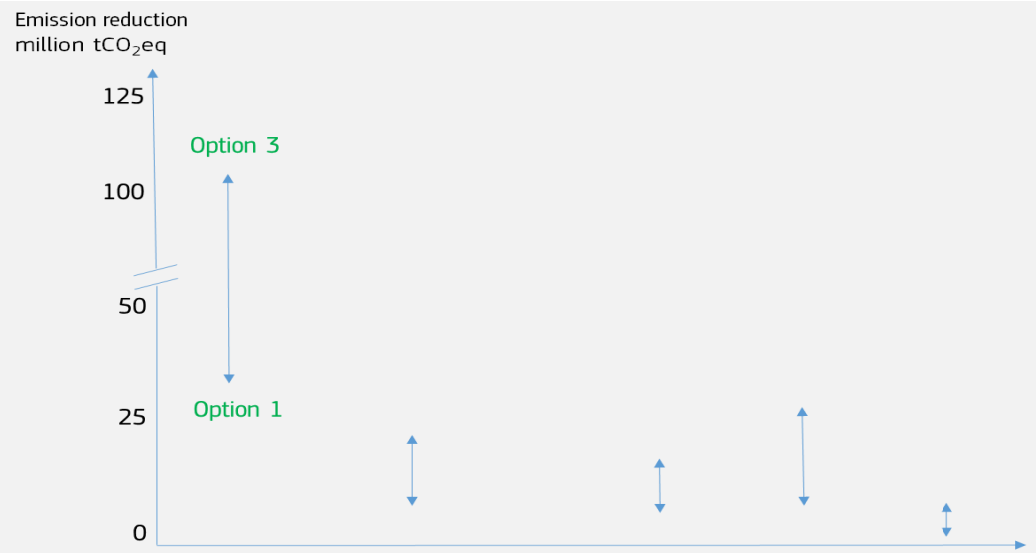


Coverage	EU households, food footprint		EU, food chain and waste treatment	Global Food chain	EU Whole economy

Source: MAGNET simulation results

Figure 25 presents a comparison of the bottom-up analysis and the general equilibrium model with regard to the resulting emission savings. Apart from different assumptions on the estimated emissions per ton of food commodity, the choice of a linear (maximum benefit through full substitution of market commodity) or non-linear (considering rebound effects) approach as well as the spatial and sectorial coverage explain the differences.

Figure 25: Overview of different emission calculations by Consumption Footprint (life cycle assessment based) and within MAGNET range of reduction in Mio CO2eq from Option 1 to Option 3



Coverage	EU, Food chain and avoided waste treatment	EU households, food footprint		EU, food chain and waste treatment	Global Food chain	EU Whole economy
Model	Consumption Footprint (bottom-up approach)	MAGNET		MAGNET	MAGNET	MAGNET

Source: MAGNET simulation and bottom-up approach results

2.3. Economic impacts

This section assesses the impact of the selected policy options on economic variables such as changes in consumer demand, agricultural production and market prices and the impact on international trade. The aim is to show how the reduction of food waste affects different markets along the supply chain and to highlight the impact of possible direct and indirect rebound effects through the interlinkages of different markets. This section concludes with an economic cost-benefit analysis focusing on the costs associated food waste reduction and the resulting impact on GDP and welfare.

This study simulates the targeted consumer food waste reductions by increasing the cost of generating waste and accounting for both price and quantity effects associated with a reduction in food waste as outlined in earlier. In doing so 50%, 30% and 15% respectively of the initial food waste is recovered as food for human consumption. In addition, food waste reduction at retail, processing, and primary production stages affects output and market prices. Reducing food waste increases cost of waste generation relatively to the price for food commodities. As a result, the waste rate will fall as more food commodities are purchased when looking at relative prices; however, in addition some of the initially demanded food commodities will be recovered for food production. Thus, agricultural and food production could be produced by demanding fewer food commodity inputs. However, by how much this translates into lower market prices for agri-food commodities depends on the cost associated with food waste reduction.

Regarding the latter, on the production side, for each leverage point in the food supply chain, the costs for food waste reduction represent an internalisation of a market failure (which is food waste). The additional cost (represented by a tax) proxies for the adjustment costs (i.e.,

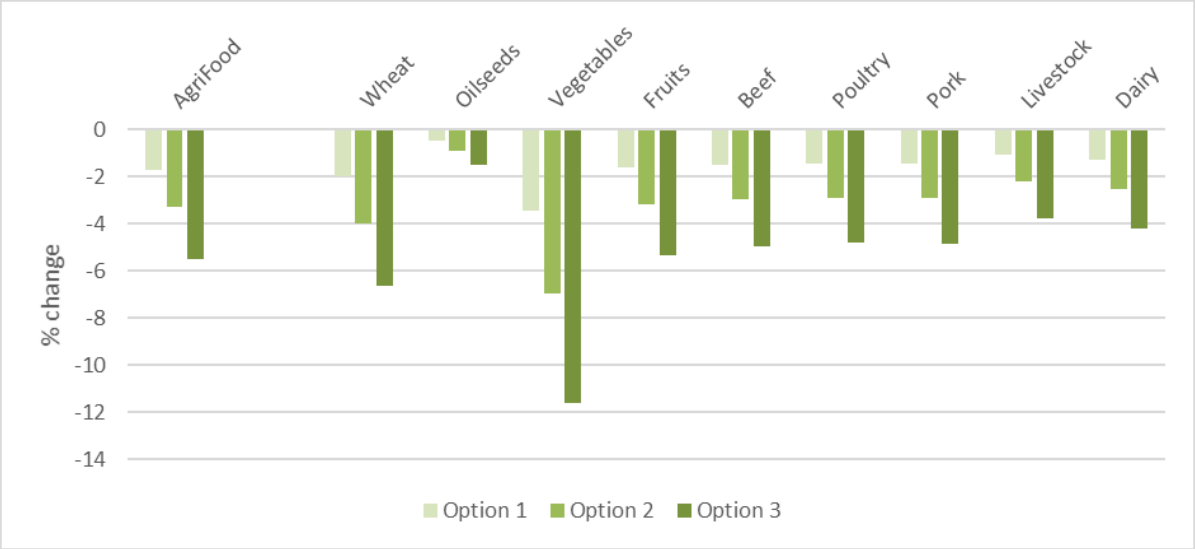
improvements in harvesting, labelling, storage, distribution) that inevitably result from (partly) removing these supply chain inefficiencies.

On the demand side, the slightly rising cost per unit of food consumption to the consumer is a market signal that reflects the behavioural adjustment required to reduce food waste (increased planning and preparation times, and/or market signals to incentivise food consumption behaviour). It should be noted, however, that market prices still fall because aggregate demands for food fall (quantity effect), which outweighs the rising per unit cost effect noted above

2.3.1. Demand impacts

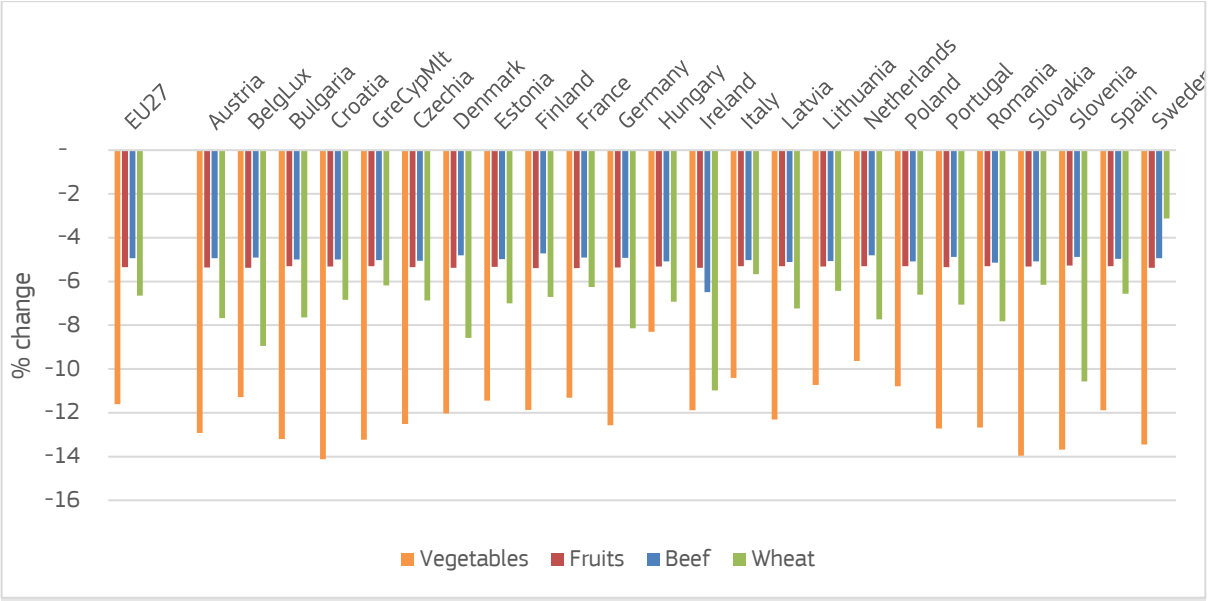
Figure 26 shows the changes in consumer demand in the three policy options compared to the baseline in 2030 for selected commodities. As expected, consumer demand falls are greater when moving from the scenario "Option 1" to the scenario "Option 3" as more food waste is reduced and can be recovered for human consumption (quantity effects) and also increasing the relative price of generated waste to food commodities (price effect). On average, agri-food demand drops up to 5.5% in Option 3. In general, the reduction in consumer demand is highest for vegetables, cereals and fruits as these are the commodities with the highest waste shares, thus the uniform reduction of waste across commodities affects these commodities the most. Figure 27 shows demand changes of selected food groups at the MS level for Option 3.

Figure 26: Changes of EU27 consumer demand (%) for selected commodities, options vs baseline 2030



Source: MAGNET simulation results

Figure 27: Changes in consumer demand (%) in EU MS for selected commodities, Option 3 vs baseline 2030

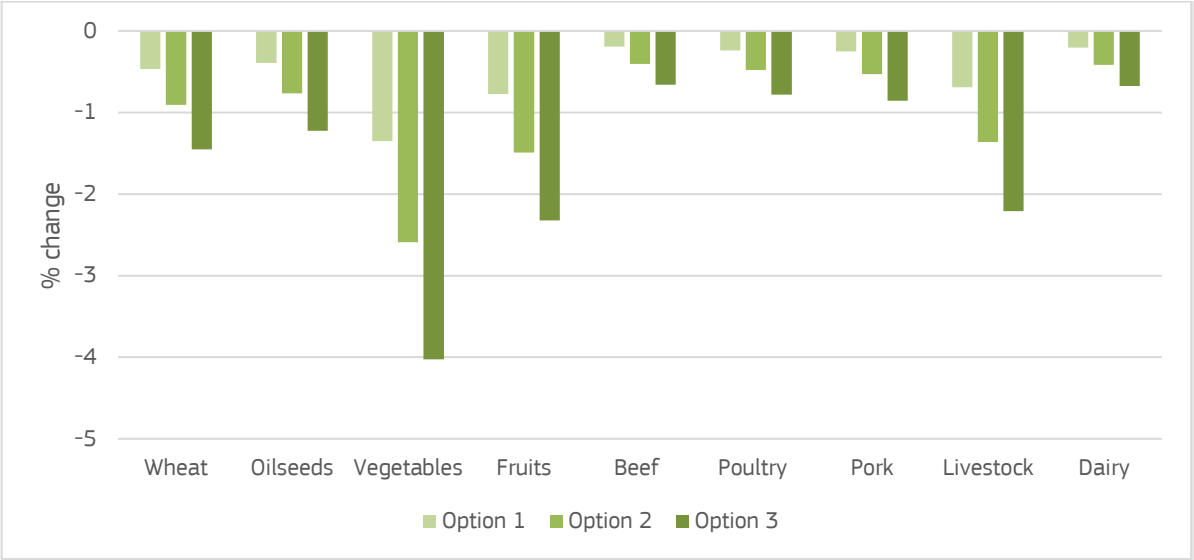


Source: MAGNET simulation results

2.3.2. Price impacts

Figure 28 shows the percentage deviations of EU27 market prices compared to the baseline in 2030 and Figure 85 shows the changes at MS level. As consumer food demand decreases, also prices for agricultural and food commodities decrease. The effects are particularly pronounced for vegetables and fruits and marginal for animal protein. The average price of agri-food decreases from 0.3% (Option 1) to 1% (Option 3).

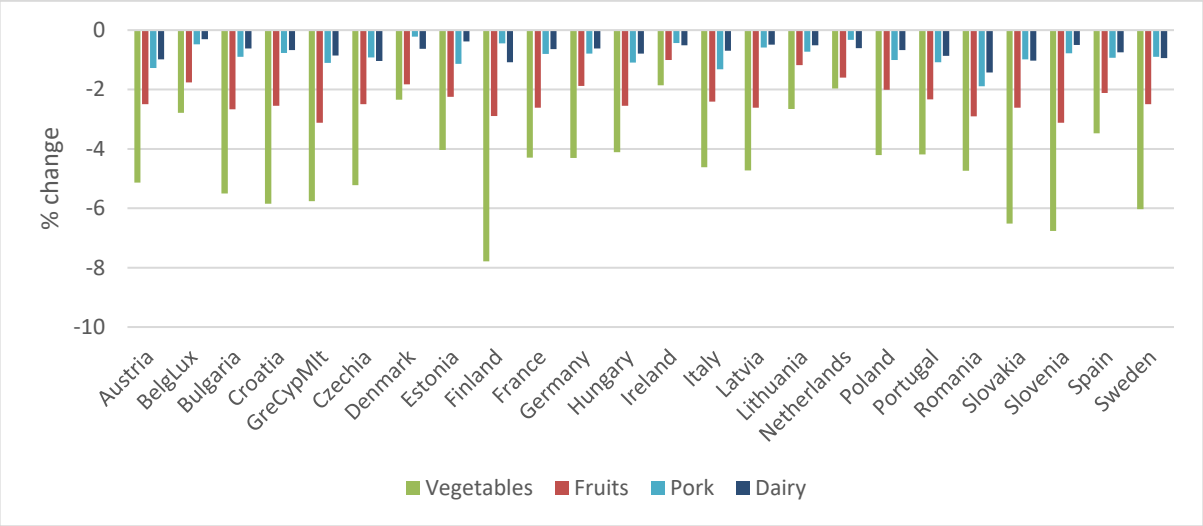
Figure 28: Changes of EU27 market prices (%) for selected commodities, options vs baseline 2030



Source: MAGNET simulation results

However, the prices changes significantly differ across Member States. These effects are mainly driven by the underlying waste shares that determine how much of food is recovered by achieving a certain target, and thus have a clear influence on price and quantity effects.

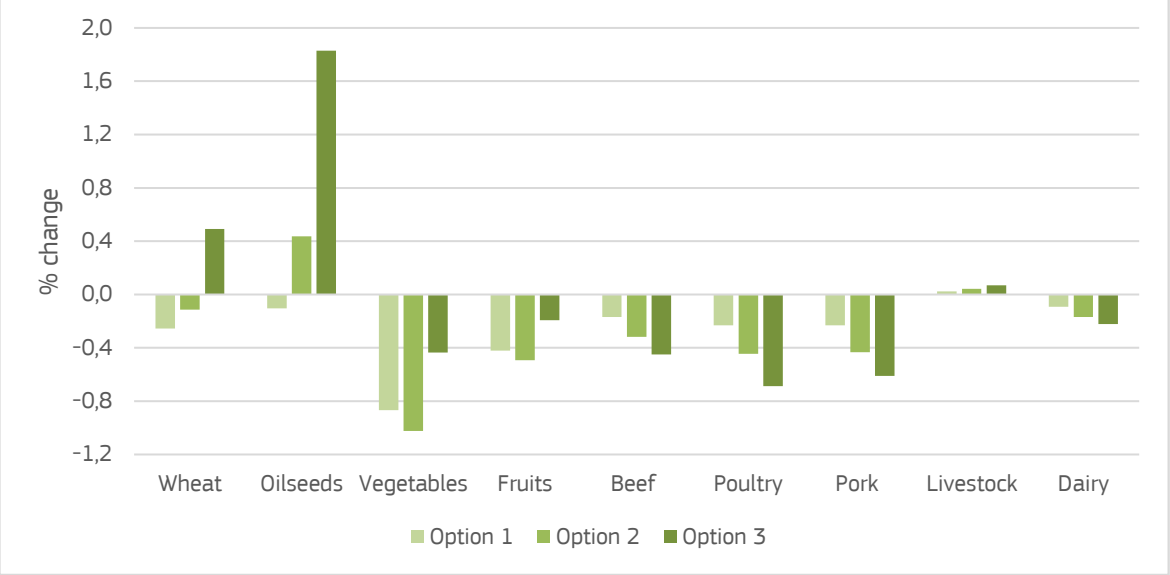
Figure 29: Changes of market prices (%) in EU MS for selected commodities, Option 3 vs baseline 2030



Source: MAGNET simulation results

We see higher and mixed movements in consumer prices than that of market prices for particular sectors (see Figure 30). That is because consumer prices also include the cost of reducing food waste to the households. Thus, the consumer price change reflects the net effect. While in some commodities prices increase, in other commodities price decreases occur at the EU level. For instance, price of oilseeds is to increase by more than 4% in the most advanced scenario but for animal protein there are price decreases. We also see mixed impact of scenarios. In most cases, higher food waste reduction targets lead to higher changes – either decreasing or increasing. However, consumer price of vegetables and fruits decrease in Option 1 and Option 2 whereas they increase in Option 3.

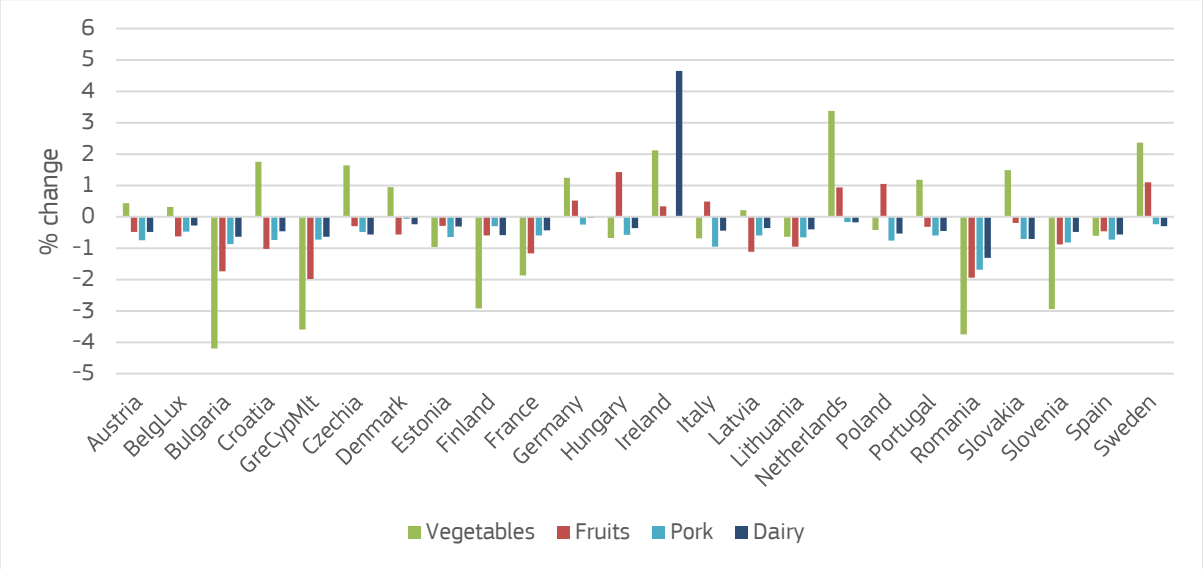
Figure 30: Changes in EU27 consumer prices (%) for selected commodities, options vs baseline 2030



Source: MAGNET simulation results

Similar to market prices, deviations in consumer prices change significantly across Member States and across sectors. One of the highest price changes are observed in the vegetables sector – up to 10% increase in the Netherlands. However, in some MSs there are price decreases.

Figure 31: Changes in consumer prices (%) in EU MS for selected commodities, Option 3 vs baseline 2030



Source: MAGNET simulation results

Reductions in demand for agri-food in the EU and the price impact that it creates is also reflected in land prices. As shown in Figure 32, there is also a decrease in land prices for primary agriculture in the EU, which reaches up to 5% in the highest target scenario Option 3. The decrease for crops and pasture are in similar ranges in all scenarios.

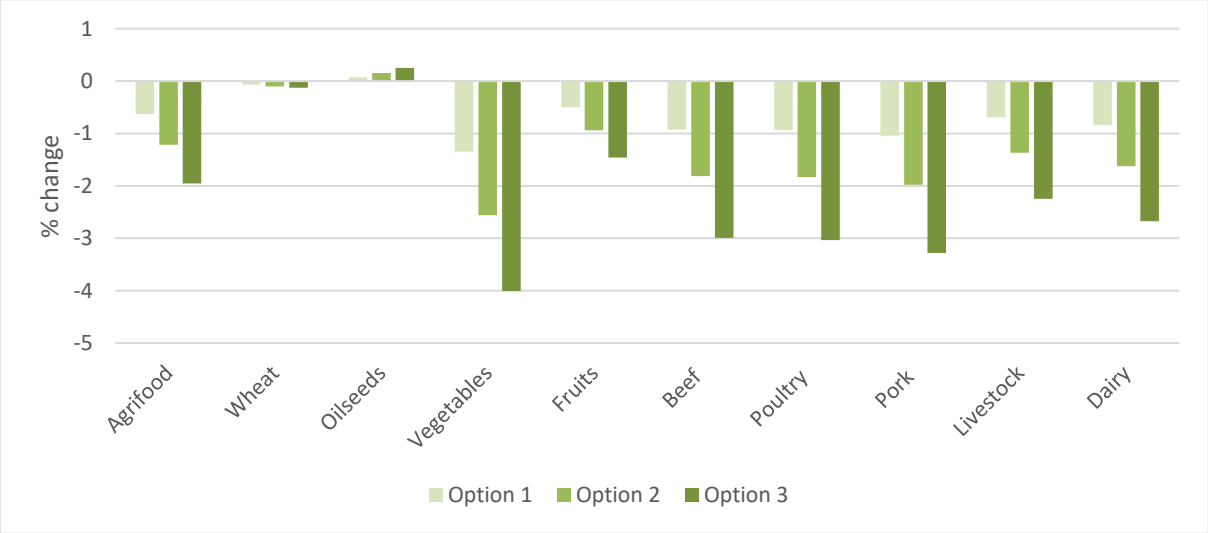
Figure 32: Change in land prices in EU (% change, options vs baseline 2030

Source: MAGNET simulation results

2.3.3. Production impacts

Reducing food waste associated with primary agricultural production (i.e., post-harvest losses) leads to an increased availability of agricultural commodities at each given price so that prices would need to decrease in order to achieve a new market equilibrium at which less agricultural commodities are sold at lower market prices. In our simulations we consider food waste reduction at processing, retail and consumer stages that result in an additional decrease of agricultural and food commodity demand, which in return leads to a fall in market prices and a reduction of agricultural and food supply to achieve a new market equilibrium. Figure 33 shows the percentage changes of agricultural and food supply in the selected policy options compared to the baseline in 2030. On average agri-food production is estimated to decrease from 0.6% (Option 1) to -2% (Option 3), however at the commodity level there are differences. While most of the commodities show a reduction in output, the effect on wheat and oilseeds differs. This can be explained by less waste shares in cereals and oilseeds than mainly that of vegetables and fruits. Also, the small increase in oilseeds production can be traced back to the decreasing demand and production of vegetables and fruits - the land that is freed up from the production of this sector which is now potentially filled by oilseeds over time as a rebound effect.

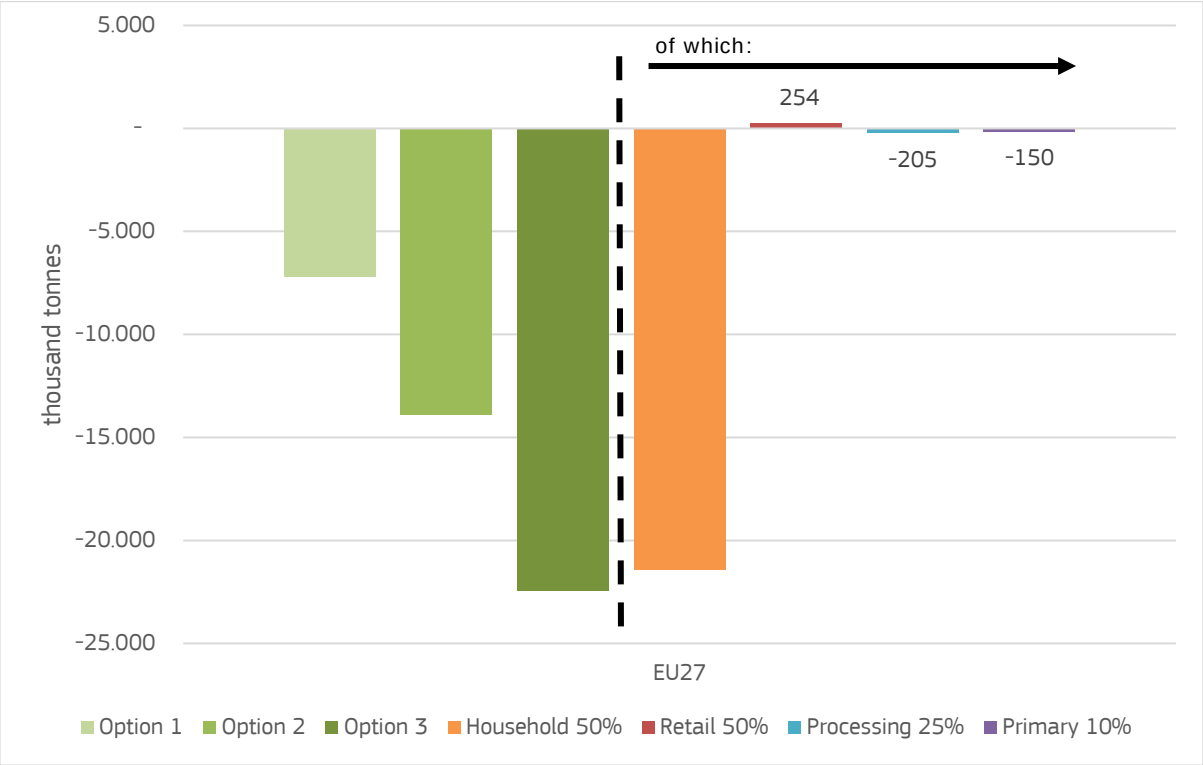
Figure 33: Change in EU27 agricultural production for selected commodities, options vs baseline in 2030



Source: MAGNET simulation results

The higher the reduction target, the larger is the impact on agricultural and food output. Figure 34 shows the decomposition of the results by stage of the supply chain considering absolute deviation of agricultural and food output expressed in ktons compared to the baseline in 2030, which shows that the results are driven by the reduction of food waste at the consumer level while the other stages contribute much less. This is partially explained by the reduction target to be achieved, which is highest for the consumer level and by the waste share of each stage but also by the cost associated with achieving the reduction of food waste.

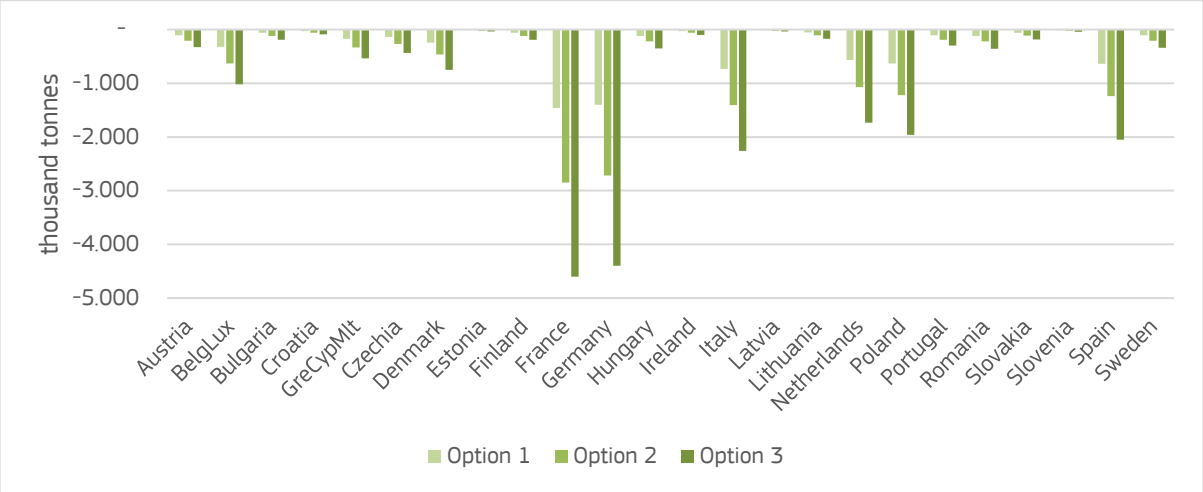
Figure 34: Changes in EU27 agricultural production compared to the baseline in 2030



Source: MAGNET simulation results

In addition to that, Figure 35 shows the absolute changes compared to the baseline in 2030 by Member State for the selected options while Figure 36 shows the absolute changes by Member State for selected food commodities for Option 3.

Figure 35: Changes in agricultural production (kton) in EU MS for agri-food commodities, options vs baseline 2030



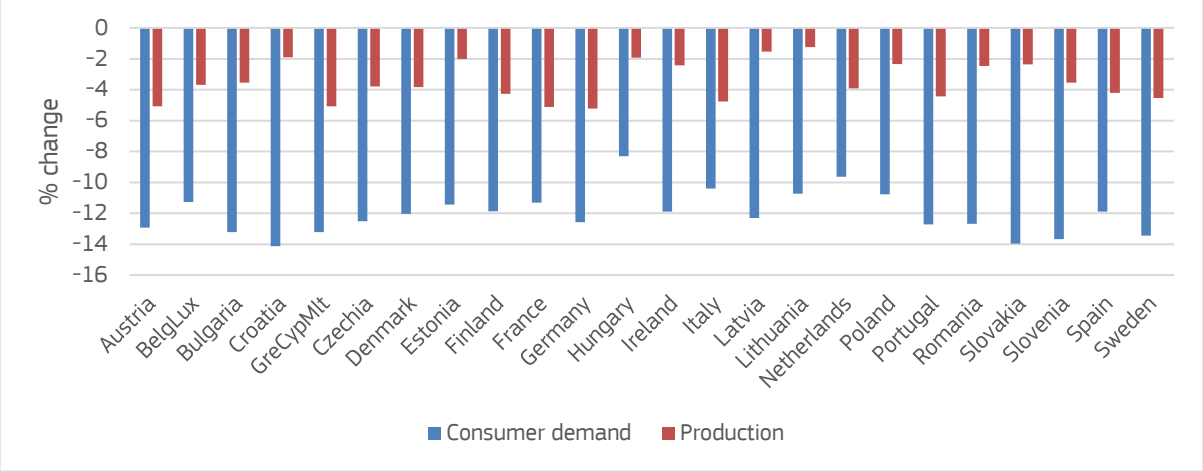
Source: MAGNET simulation results

Figure 36: Changes in agricultural production (thousand tonnes) in EU MS for selected commodities, Option 3 vs baseline 2030

Source: MAGNET simulation results

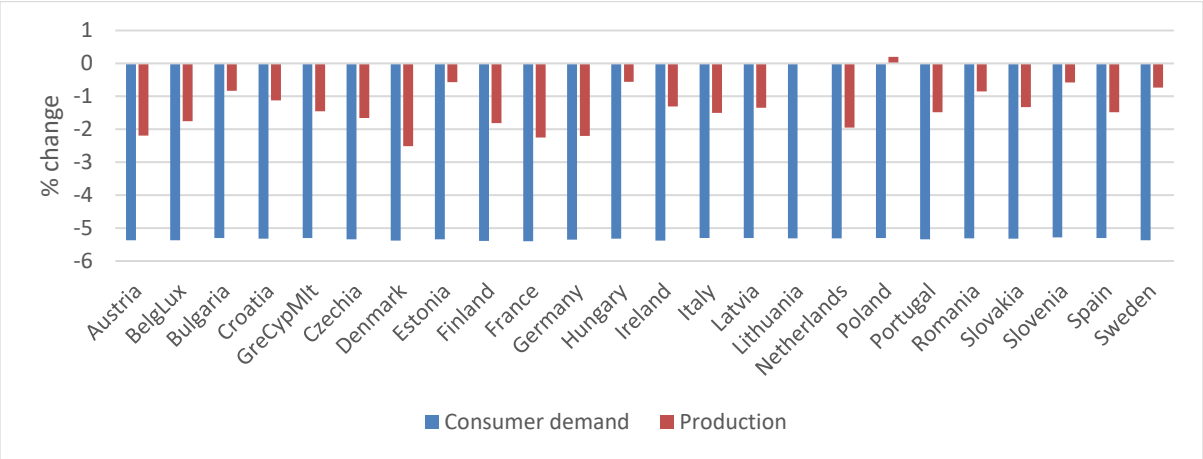
Taking vegetables (Figure 37) and fruits (Figure 38) as an example, the graphs show the percentage changes of production and consumption compared to the baseline in 2030. It becomes apparent that food waste reduction results in a larger percentage reduction of consumer demand compared to the decrease or in some cases increase of production. As market prices in the EU fall, producers become more competitive on the world market, and thus could potentially increase their export to the world market in order to buffer the demand shock.

Figure 37: Vegetables: Changes in agricultural production and consumer demand in EU MS (%), Option 3 vs baseline 2030



Source: MAGNET simulation results

Figure 38: Fruits: Changes in agricultural production and consumer demand in EU MS (%),, Option 3 vs baseline 2030



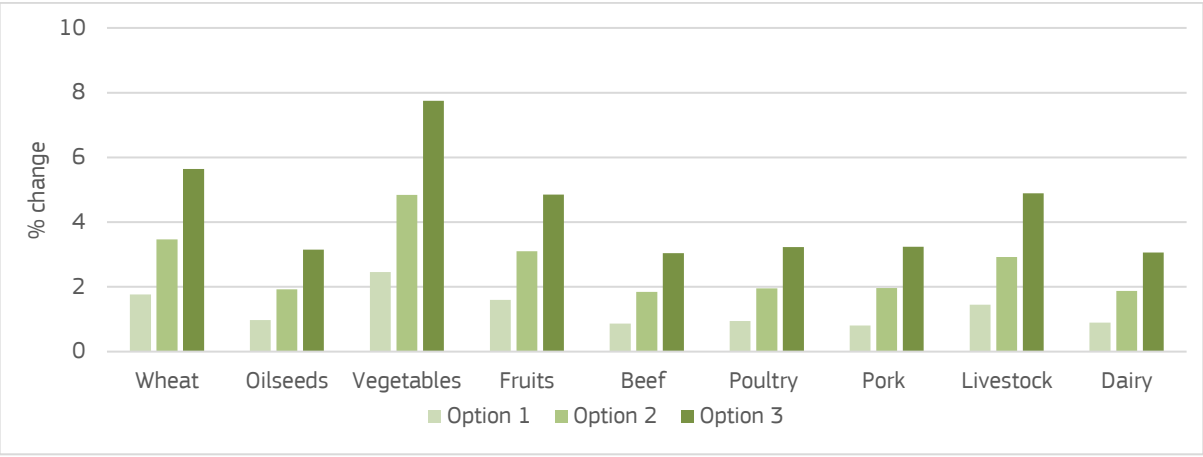
Source: MAGNET simulation results

2.3.4. Trade impacts

Food waste reduction in general could lead to higher extra-EU agri-food exports and lower agri-food extra-EU imports. Figure 39 and Figure 40 show percentage change deviations in EU's exports to non-EU countries and imports from them for a selected group of agri-food products, calculated for different policy options with respect to the baseline in 2030. Increasing the target rate for food waste reduction results in higher exports and lower imports.

Regarding extra-EU agri-food exports, the highest increase is seen in the vegetables sector (rise by 7% in Option 3). Vegetables is one of the sectors with the highest waste shares, hence reducing food waste in this sector would lead to lower demand by consumers and lower production volumes as explained in Section 2.3.1 and Section 2.3.3. In the end EU producers are expected to export more agri-food products to non-EU countries in the short to medium term.

Figure 39: Percentage change deviation in extra-EU exports, options vs baseline 2030

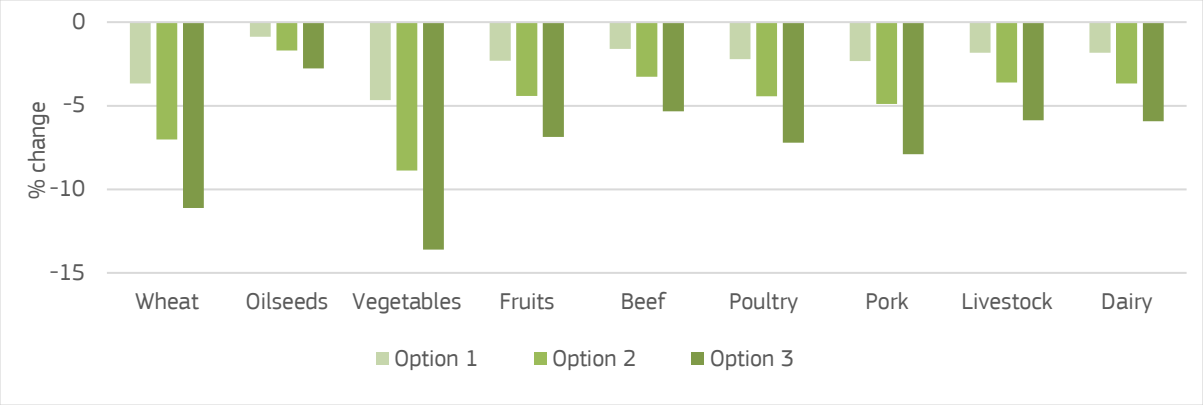


Source: MAGNET simulation results

Changes observed in extra-EU exports are reflected on extra-EU imports (Figure 40). Option 3 - that leads to a 7% increase of EU's vegetable exports- leads to a decrease 12% in EU's

imports. For wheat, the pattern is the same, with an increase of over 5% in extra-EU exports with a decrease of imports by 10% in Option 3.

Figure 40: Percentage change deviation in extra-EU imports, options vs baseline 2030

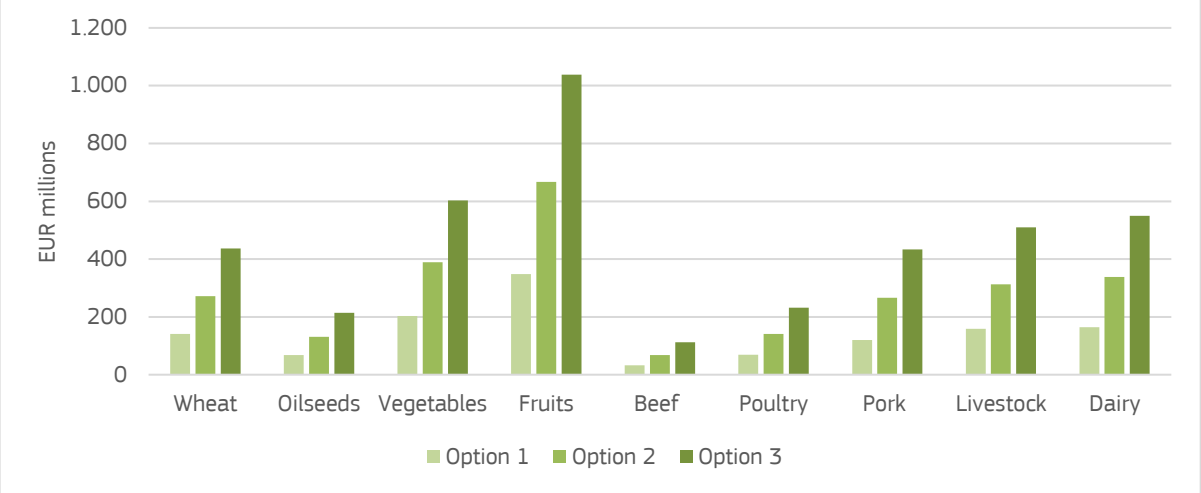


Source: MAGNET simulation results

The impact of food waste reduction scenarios on intra-EU trade is more limited than the impact on extra-EU trade. For instance, intra-EU trade of fruits could decrease by only 0.6% in Option 1 to 1.8% in Option 3. For vegetables, the expected decrease is higher by 1.5% to 4.2%.

The generally decreasing trend in extra-EU imports and increasing in extra-EU exports leads to an increase of EU's agri-food trade baseline across all options versus the baseline in 2030. In value terms, the highest increase in the agri-food trade balance is seen in the fruits sector, which is negative in the baseline. Food waste reduction leads to an improvement in the fruits trade balance that ranges from nearly EUR 350 million to over EUR one billion depending on the option (Figure 41), hence decreasing the trade deficit in fruits up to 11% in Option 3.

Figure 41: Change in EU's agri-food trade balance by food groups options vs baseline 2030

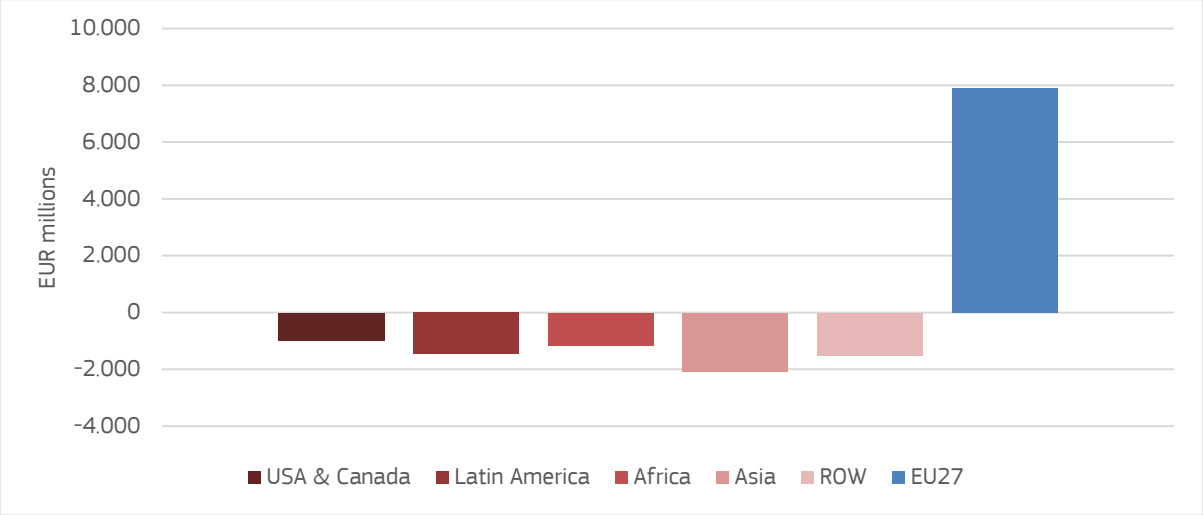


Source: MAGNET simulation results

Also driven by lower EU prices and increased competitiveness of EU producers in the world market, impact of food waste reduction is positive for the EU's agri-food trade balance – at least in the short term to the medium term until markets adapt to the generation of less food waste. With the policy Option 3, the expected increase in the EU's agri-food trade balance amounts nearly to EUR 7 900 millions, whereas we observe decreases in the agri-food trade

balance of non-EU countries. Figure 42 depicts these changes for Option 3. Asia's trade balance in agri-food is to decrease the most mainly lead by declining trade balance in dairy and livestock. For Latin America, the decrease primarily results from the fruits sector given the highest share of fruit imports of the EU from this region and expected less imports of EU.

Figure 42: Change deviation in agri-food trade balance Option 3 vs baseline 2030



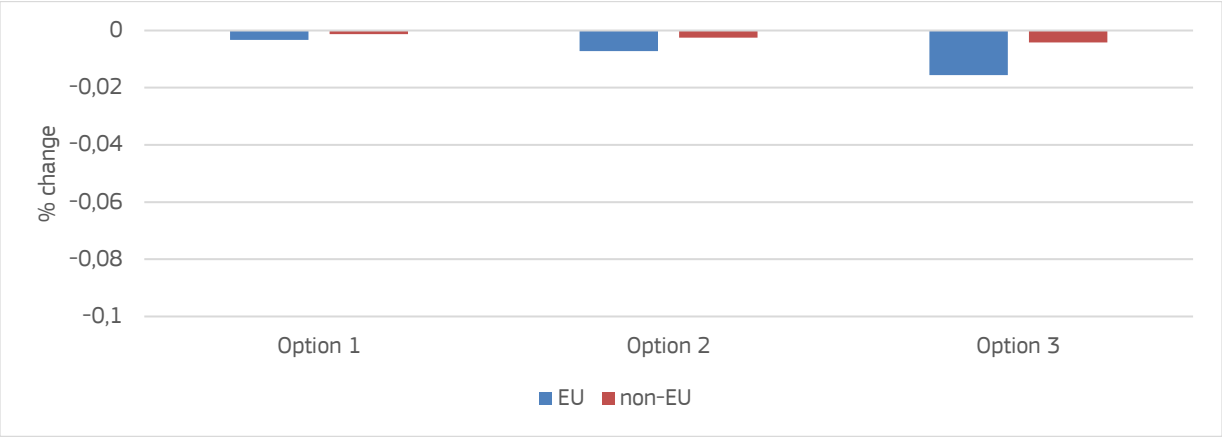
Source: MAGNET simulation results

It should be noted that this is based on the assumption that while non-EU countries may be engaging in food waste prevention as part of their commitment to the global SDG Target 12.3, they are not implementing similar food waste reduction policies (i.e., legally binding targets) and/or implementing such policies at a slower pace. If they do, the advantage of the EU will decrease proportionally to their progress.

2.3.5. GDP and income

Food waste reduction scenarios have marginal macroeconomic impact on the real GDP of the EU and non-EU countries as a total whereas the impact increases with higher food waste reduction targets (Figure 43). Even with the most advanced reduction targets, there is a decline in EU27 GDP of less than 0.02%. On the other hand, although not depicted in Figure 43, there is a small increase in GDP per capita (up to 0.05% for the EU27 average in Option 3). For the rest of the world the impact is negligible.

Figure 43: Change deviation in real GDP for EU and non-EU, options vs baseline 2030



Source: MAGNET simulation results

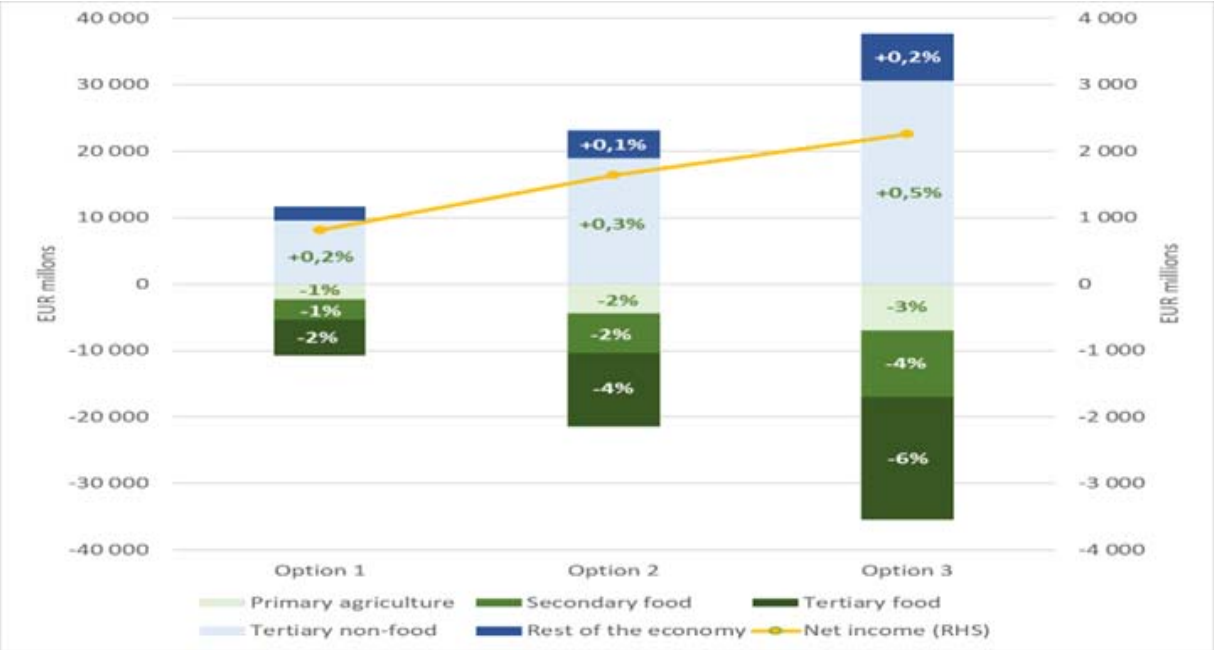
The impact of food waste reduction on the GDP of individual EU27 countries is given in Figure 44. Although the total impact on GDP is negative and small, we see a more mixed impact at the Member State level. In most cases, impacts are negative and, even with the highest reduction scenario (Option 3), they are very limited, with less than 0.1% decline. On the other hand, some countries (e.g., Bulgaria Lithuania) experience GDP growth with decreasing their food waste. However, this increase is also very limited and reaches 0 05% only in the highest case.

Figure 44: Change deviation in real GDP at MS level, options vs baseline 2030

Source: MAGNET simulation results

The effects on income (value added) in total remain unchanged for the EU aggregate: even a small increase of EUR 800 million to over EUR 2.2 billion can be observed depending on the option (Figure 45).

Figure 45: Changes in total income in EU27, options compared to baseline (2030) for different actors

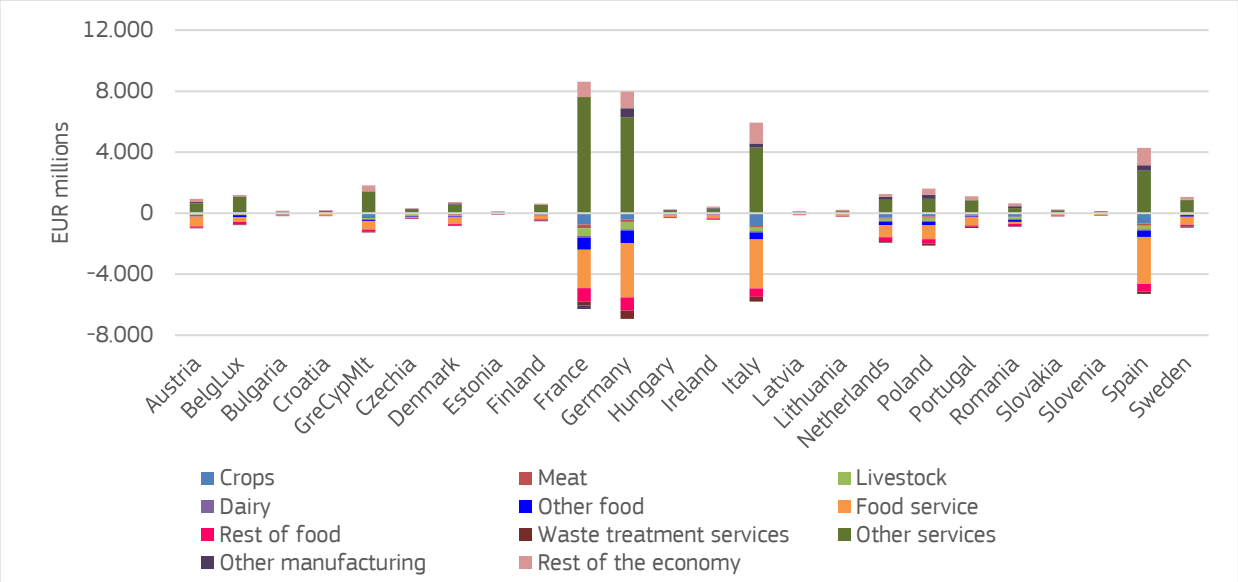


Note: Rest of the economy includes a broad number of sectors with either positive or negative income changes.

Source: MAGNET simulation results

Figure 46 shows the changes in income per Member State and per sector. The income of the agri-food sector (including food processing but not food services) experiences a slight decrease of -3.6%. Impacts are higher in the food service sector. The losses in the food sector are in general compensated by additional income in non-food sectors.

Figure 46: Changes in income in EU MS, Option 3 vs baseline 2030



Source: MAGNET simulation results

2.3.6. Estimated adjustment costs associated with food waste reduction

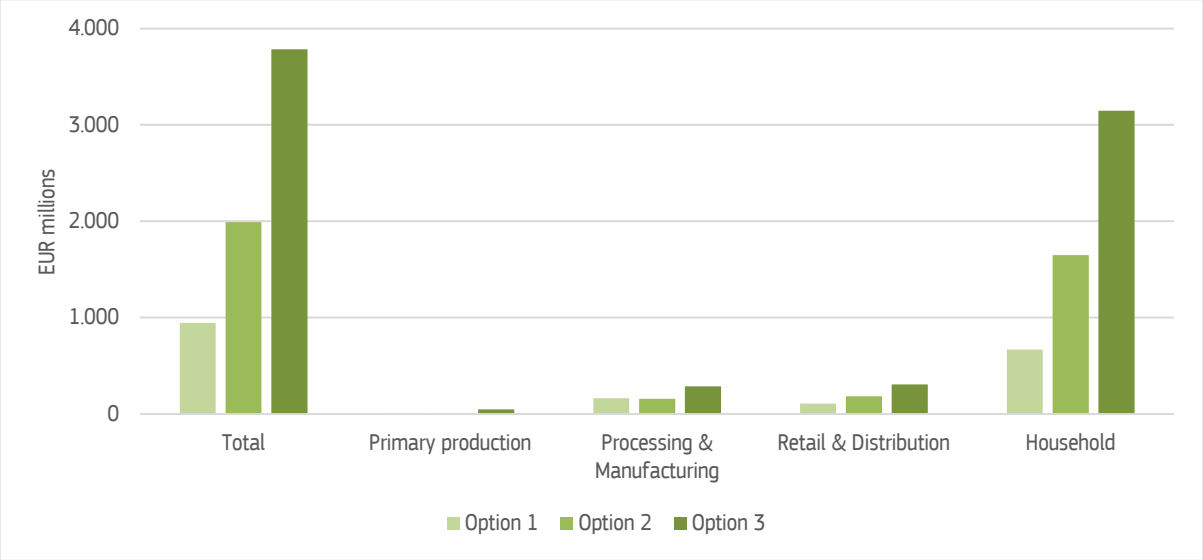
This section discusses the cost associated with food waste reduction along the stages of the supply chain to the end users. As introduced in Section **Error! Reference source not found.**

of Annex 4, waste generation in production and consumption are the resulting market externalities arising from rational agent behaviour.

To account for these negative externalities associated with food waste, and thus correct the market failure, an adjustment cost must be imposed on the corresponding agent to internalise (partly) the full (social) cost associated with waste. In the model assessment, these costs are estimated by inserting taxes on those agents that generate food waste from the farmgate to the end user.

The total adjustment costs for food waste reduction (calculated separately per supply chain and then aggregated) are estimated to be around EUR 0.9 bn for Option 1, EUR 2 bn for Option 2, and EUR 3.8 bn for Option 3 (Figure 47). Since the largest share of food waste is generated at the consumption stage, the costs associated with food waste reduction at this stage are the highest (exceeding EUR 3 bn in Option 3). The total adjustment costs for the industry are estimated to be relatively lower.

Figure 47: Estimated adjustment costs associated with food waste reduction per stage of food supply chain, EU27 – options vs baseline 2030

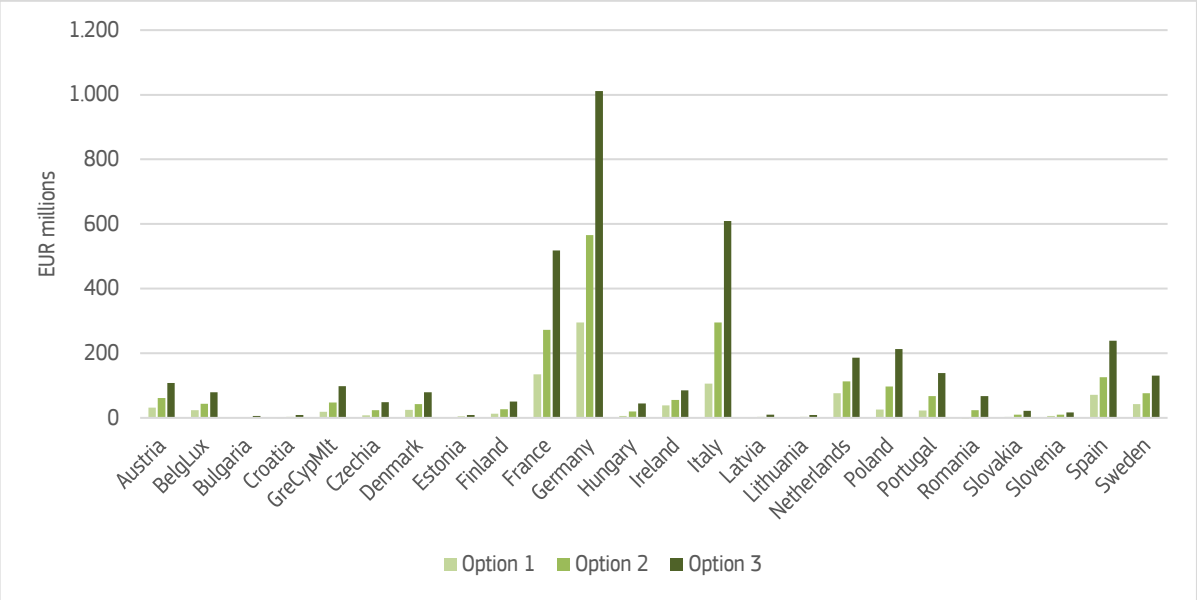


Source: MAGNET simulation results

Figure 48 below shows the total costs associated with food waste reduction in the Member States for the three options. The costs are calculated separately per supply chain and then aggregated to represent the total costs per country and per option. Reaching the targets in Option 1 comes at comparably low cost, while costs tend to increase when moving to the higher food waste reduction targets as in Option 2 and Option 3. These costs differ significantly across Member States. As shown in Figure 48, total food waste reduction costs are small in EU13[153] countries. These countries have relatively lower food waste quantities compared to the EU average in the baseline. According to the size of the countries, highest costs are observed in Germany, reaching up to 1 EUR billion in Option 3, followed by Italy (600 EUR million) and France (500 EUR million). In these Member States, absolute food waste quantities are the highest in the 2030 baseline, leading to higher amounts of food waste to be reduced per option.

[153] EU13 countries: Bulgaria, Croatia, Cyprus, Czechia, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia

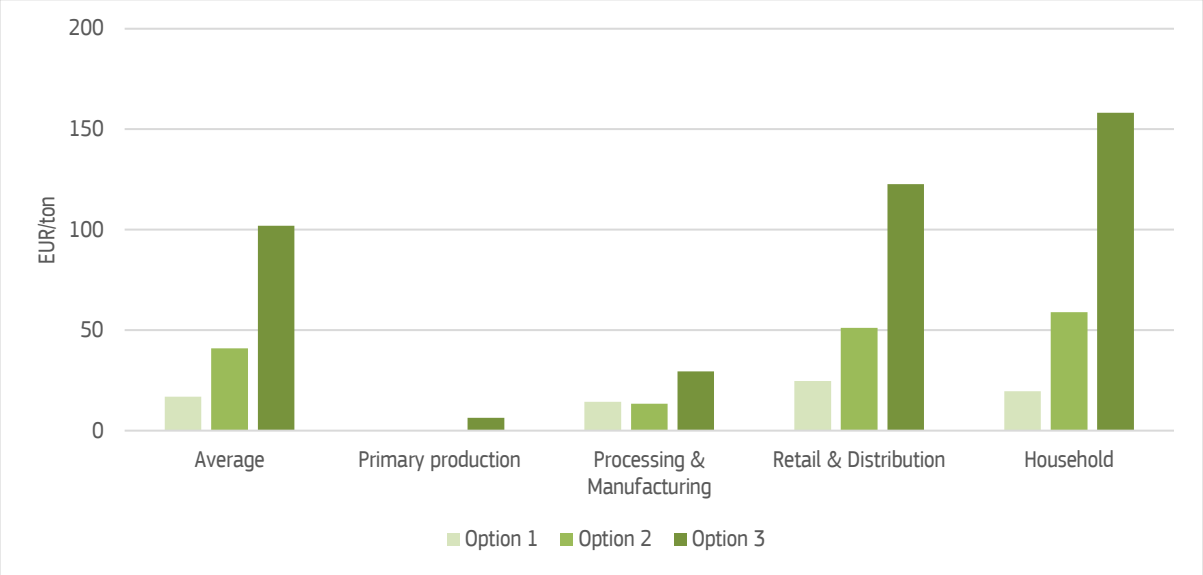
Figure 48: Total estimated adjustment costs associated with food waste reduction, EU MSs – options vs baseline 2030



Source: MAGNET simulation results

Regarding adjustment costs per ton of food waste reduced, on average, the costs range from EUR 17 per ton in Option 1 to over EUR 100 per ton in Option 3 (Figure 49). At the individual stage level, highest costs occur for households – reaching up to EUR 160 per ton (Option 3). However, costs for the retail and distribution sector are also estimated to be over EUR 100 per ton (Option 3) due to high targets of food waste reduction (50%).

Figure 49: Adjustment costs of food waste reduction per ton of food waste reduced, EU27 – options vs baseline 2030

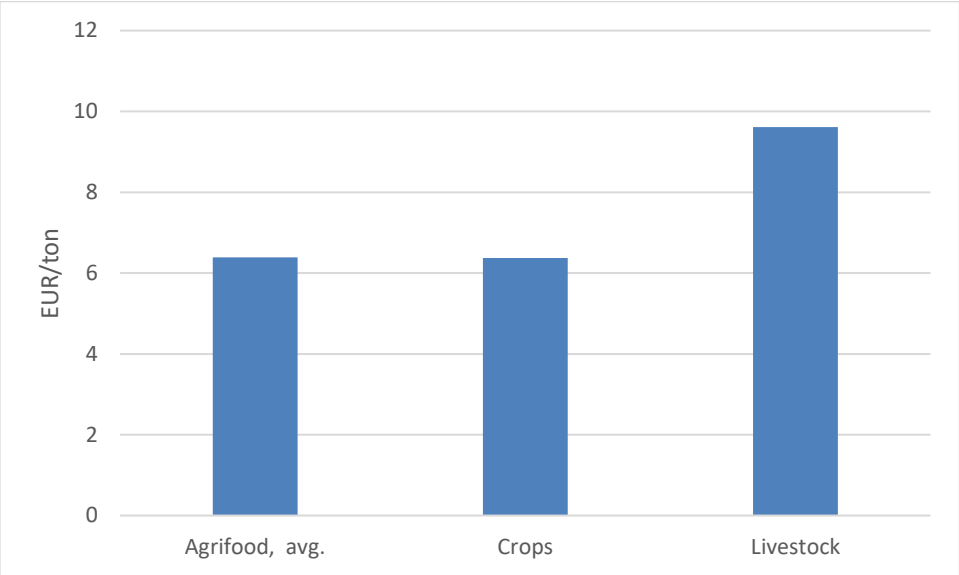


Source: MAGNET simulation results

Primary production

As only Option 3 targets food waste reductions at the primary production level, we report only the results of Option 3 in Figure 50. A 10% reduction of food waste in the production stage leads to an average adjustment cost of around 6 EUR per ton of food waste reduced. This cost is mainly driven by the waste reductions in the crop sector, with adjustment costs estimated similarly at around 6 EUR per ton. The costs for livestock production are slightly higher, however they influence the average price less than the crops sector as primary production only considers livestock farming and excludes processing.

Figure 50: Adjustment costs associated with 10% food waste reduction at the primary production stage, EU27, Option 3 vs baseline



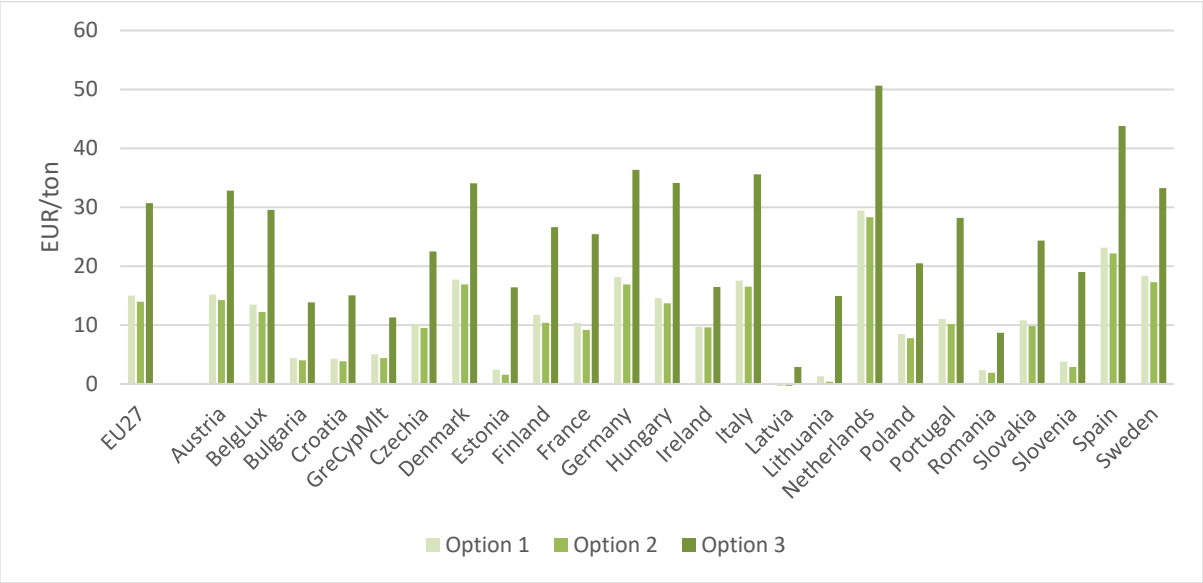
Source: MAGNET simulation results

Processing and manufacturing

Adjustment costs of food waste reduction per ton of food waste reduced at the processing and manufacturing stage, start from 19 EUR/ton in Option 1, and reaches up to 29 EUR/ton in Option 3, on average, for food and agriculture commodities, as shown in Figure 50 in the previous sub-section.

Figure 51 shows the average adjustment costs associated with food waste reduction at the processing and manufacturing sectors across MSs. While the costs vary significantly across MSs, in the majority of MSs, they are lower than the EU average. Particularly the Netherlands and Spain face the highest costs which are higher than 40 EUR per ton.

Figure 51: Cost associated with food waste reduction at the processing stage across Member States, options vs baseline 2030

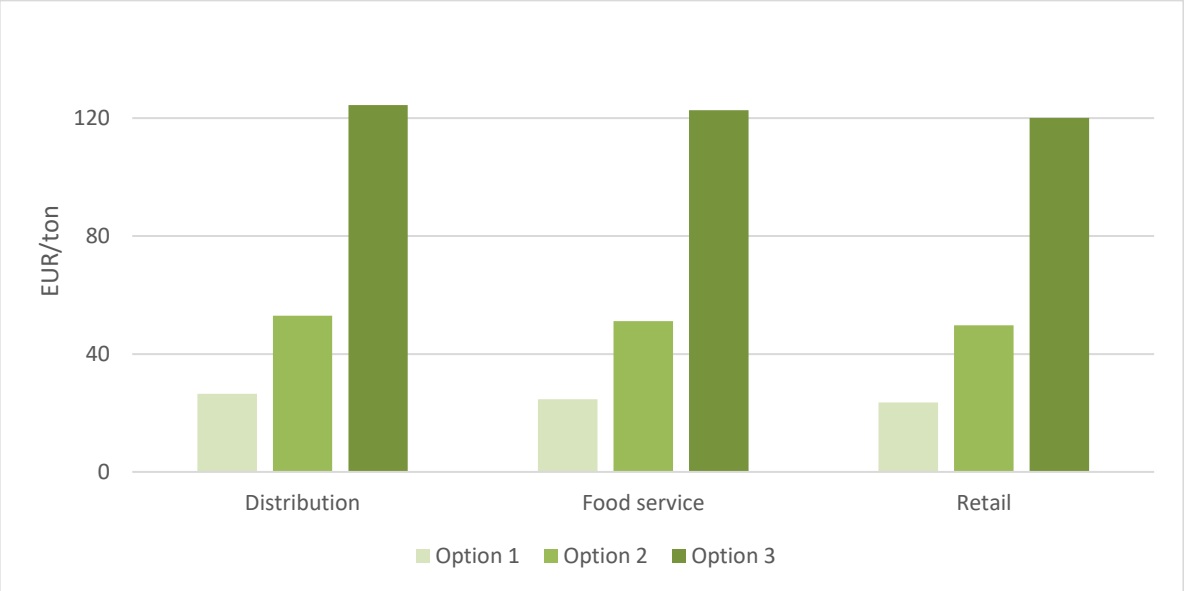


Source: MAGNET simulation results

Retail and Distribution

On average, adjustment costs of food waste reduction per ton of food waste reduced for the retail and distribution sector is estimated to start from 25 EUR/ton in Option 1 and increase up to 123 EUR/ton in Option 3. Figure 52 shows the cost associated with food waste reduction at the retail and distribution stage for the three options that is split into the following retail categories: distribution, food services, and agri-food retail. Costs increase as the ambition with regard to food waste reduction increases; however, they are within the same range across retail categories in all options.

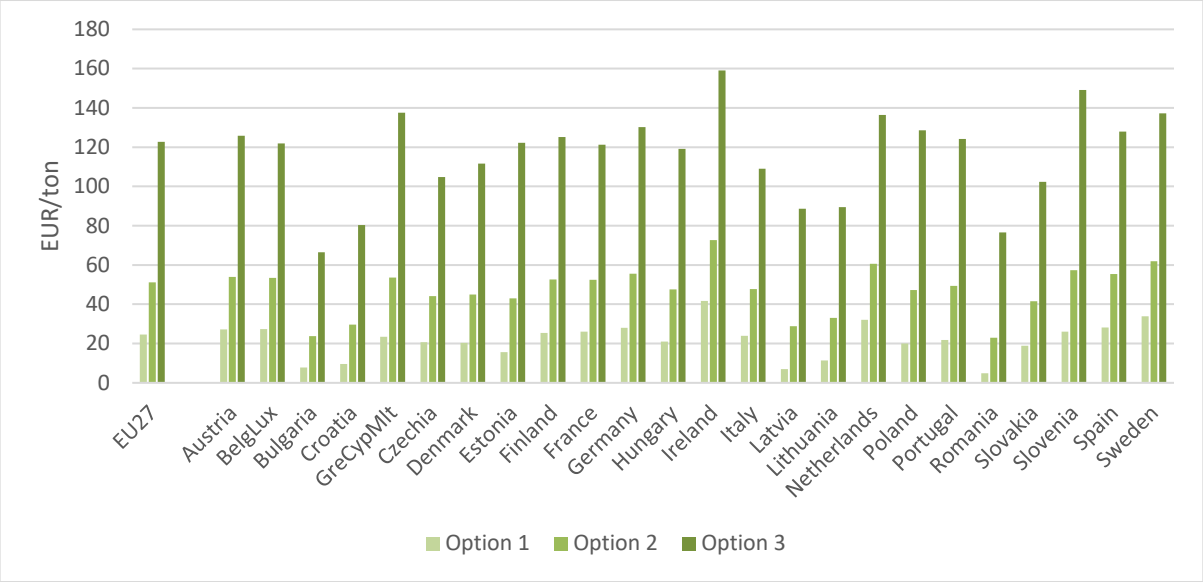
Figure 52: Adjustment costs associated with food waste reduction at the retail stage EUR/ton, EU27, options vs baseline, 2030



Source: MAGNET simulation results

Figure 53 shows the average costs associated with food waste reduction across all policy options at the individual MS level. Most countries face adjustment costs that are over 100 EUR per ton. While the lowest costs are observed for Bulgaria and Romania, the highest cost occurs in Ireland.

Figure 53: Average costs associated with food waste reduction at the retail stage across MSs, options vs baseline, 2030

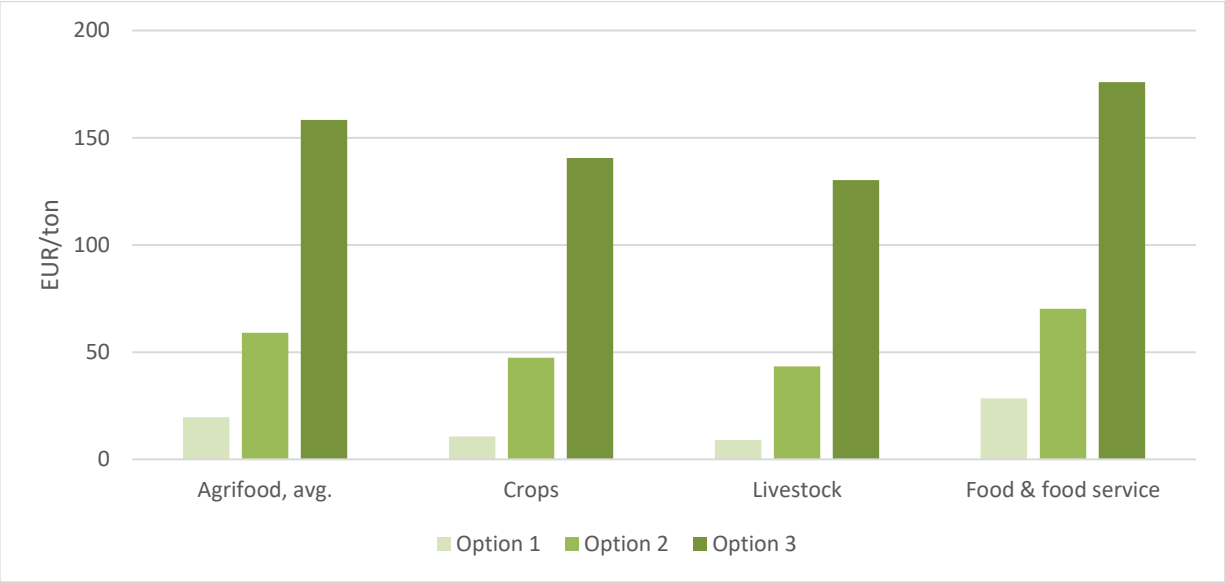


Source: MAGNET simulation results

Households

Figure 54 shows the cost associated with household food waste reduction in the EU27 for the three options, expressed in EUR per ton for the average of the food and agriculture sector, and at a more granular level for crops, livestock, and food and food services. Reaching the targets in Option 1 comes at a comparably low cost. The cost associated with food waste reduction is estimated to be 20 EUR/ton for agri-food on average, but costs tend to increase more than proportionally when moving to higher reduction targets in Option 2 (60 EUR/ton) and in Option 3 (160 EUR/ton). This more than proportional increase of costs occurs as food waste prevention actions usually first target the areas where savings are easiest to achieve, and after this point, expected costs tend to become higher. At the sector level, the highest costs are noted for food and food services

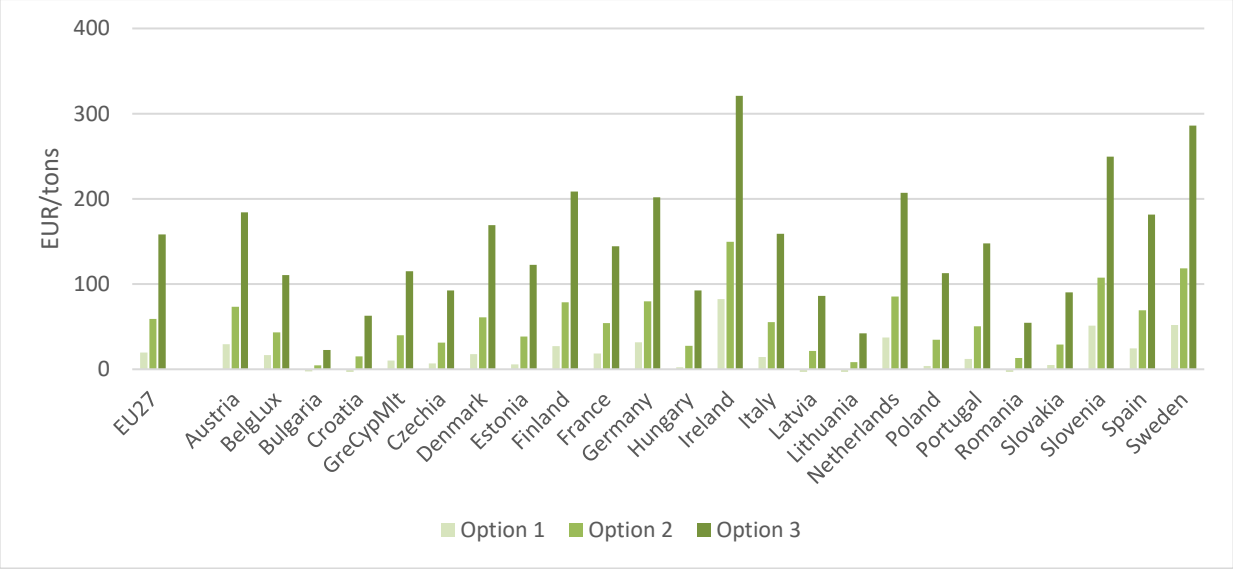
Figure 54: Adjustment costs associated with household food waste reduction, EU27, options vs baseline 2030



Source: MAGNET simulation results

Costs associated with household food reduction differ significantly across MSs. Figure 58 shows that cost tend to be lowest and below EU average in the EU13 MSs. While highest cost is observed in Ireland, food waste reduction at the household level lead to lowest costs in Bulgaria.

Figure 55: Average adjustment costs associated with household food waste reduction, options vs baseline 2030



Source: MAGNET simulation results

The survey sent to stakeholders as part of the targeted consultation (Annex 2) aimed at gathering quantitative data on food waste prevention actions provided some insights on the cost

of preventing FW[154]. It received 50 answers on the cost of running the initiatives. 42 respondents provided quantitative data on the amount of prevented food waste achieved by the initiative.

Based on these data, a total cost per tonne of avoided food waste was calculated. The mean value for the whole set of initiatives was 986 EUR/ton, while when considering the 'food redistribution' initiative type, the mean value was lower (475 EUR/ton). These values are higher compared to those derived by the MAGNET model and the few information available in literature (Garcia Herrero et al., 2023). Possible explanations for this difference are few initiatives were reported through the survey; these were were generally small and many were oriented to the achievement of additional objectives (i.e., supporting people in need, helping the professional reinsertion of unemployed people etc.). Moreover, in some cases, initiatives aimed at long term behavioural changes (e.g. school campaigns) while food waste measurements gathered only immediate food waste reductions. For these reasons, and also due to the high variability of the data on costs collected, information from the survey related to costs of food waste prevention were not directly used in the MAGNET model to calculate the macro-economic impacts of targets.

Furthermore, from the analysis of the survey responses, it resulted that, on average, 40% of the costs were linked to setting up the different initiatives with the remaining 60% linked to maintaining them. It is however important to highlight that significant variability was reported in this respect, most likely due to the heterogeneity of the types of initiatives reported but also the duration of the initiatives as the contribution of setting up costs naturally decreases with time.

2.4. Social impacts

There are two main social impacts identified from food waste reduction targets: a potential loss of jobs in food production and processing and improved food affordability. Other social impacts such as "inconvenience" or the so-called 'labour-leisure' trade-off ("lost" leisure time linked to more attention to food preparation more trips to the supermarket etc.) are hardly quantifiable but are included in the estimation of the costs linked to the reduction of food waste at consumption level. Similarly, the analysis of social impacts does not include such potential positive impacts as better understanding of impacts of food choices on health and the environment awareness-raising, potentially reducing the possible feelings of guilt and/or frustration associated with discarding food, positive social aspects of sharing food etc.

From the responses to the survey sent as part of the targeted consultation (presented in Annex 2), it emerged that food security and poverty reduction are seen as the main social benefit deriving from food waste prevention initiatives. Moreover, additional benefits related to awareness raising, training provided to employees and volunteers' education and social cohesion were also reported.

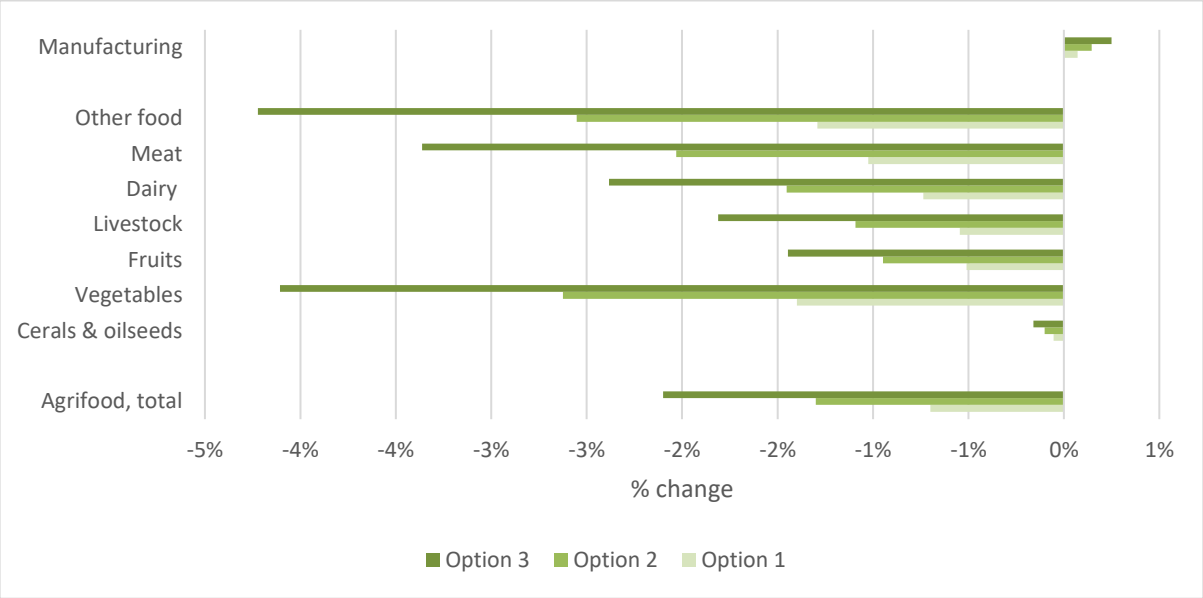
[154] More details can be found at: De Laurentiis, V, Mancini, L, Casonato, C, Boysen-Urban, K, De Jong, B, M'Barek, R, Sanyé Mengual, E, Sala, S. *Setting the scene for an EU initiative on food waste reduction targets*. Publication Office of the European Union, Luxembourg, 2023, doi: 10.2760/13859, JRC133967

2.4.1. Employment

In this section we report the estimated impact of food waste reduction on employment with a focus on agriculture and food sectors. The presented employment effects have to be interpreted taking into account the earlier described model specificities regarding the functioning of the employment market.

Looking at the agri-food sector, food waste reduction scenarios generally lead to a decrease in employment as shown in Figure 56. The magnitude of the decrease depends on the level of the food waste reduction target. The impact of lower consumer demand, hence lower production rates, is also seen as decreasing employment in the food and agriculture sector. However, the overall decrease in the total agri-food sector is limited to 2% even in the most ambitious scenario, Option 3. At the sector level, the employment in vegetables and other food sector is expected to decrease the most amongst other sectors (4% in Option 3). On the other hand, employment rises in non-agri-food sectors.

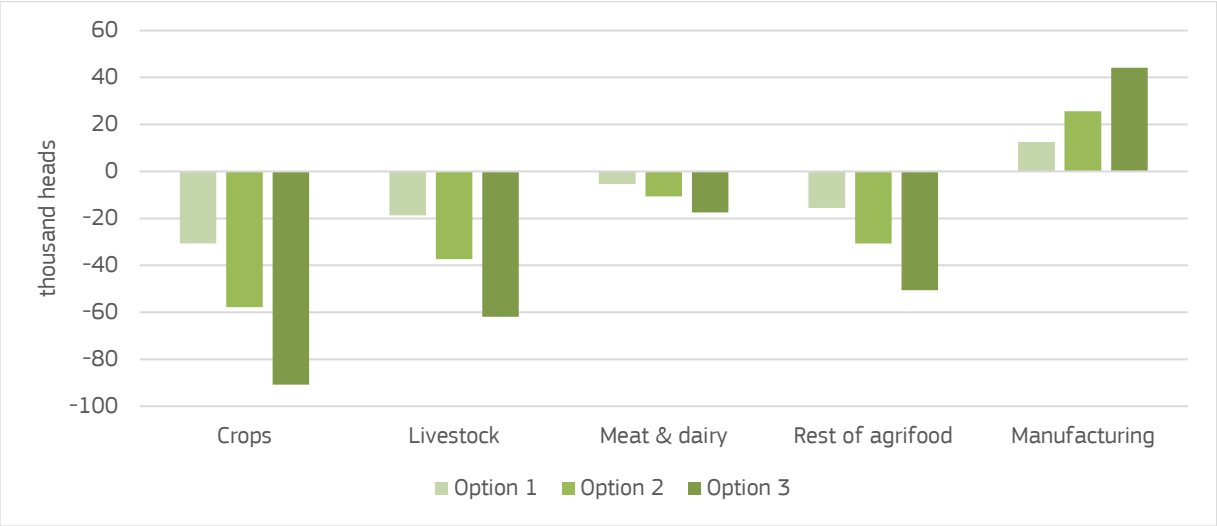
Figure 56: Change in employment in the EU (% change) options vs baseline 2030



Source: MAGNET simulation results

Figure 57 shows the absolute changes in employment for selected sectors. Job numbers decrease for the agri-food sector by 70 000 in Option 1, 135 000 in Option 2, and 220 000 in Option 3. It should be noted that in other sectors, such as manufacturing, new jobs are created.

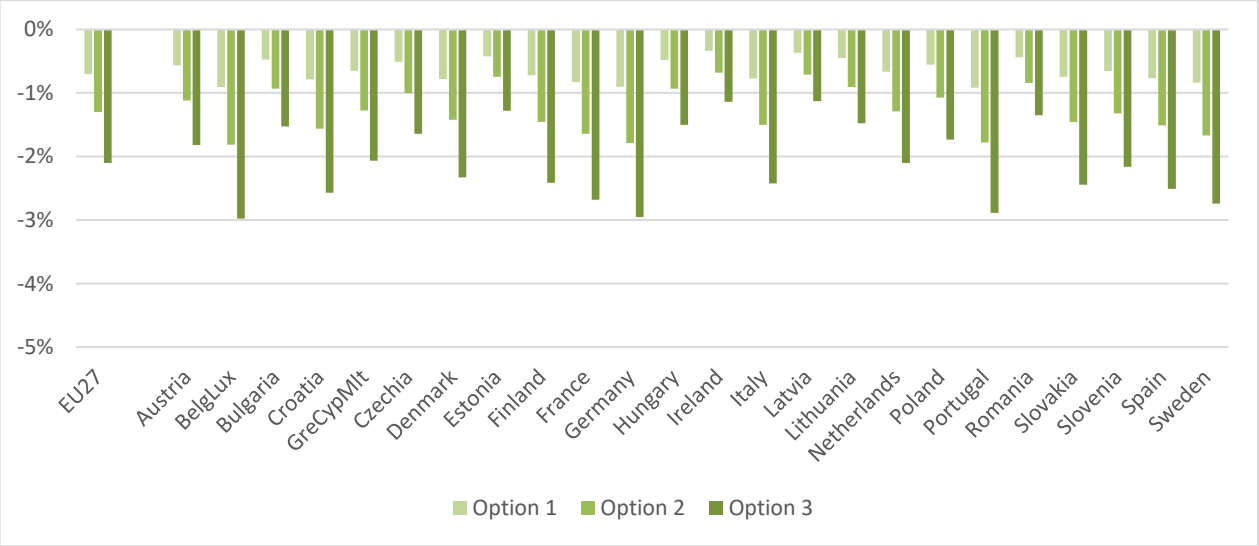
Figure 57: Change in employment in the EU in selected sectors (thousand heads) options vs baseline 2030



Source: MAGNET simulation results

Figure 58 depicts the impact of food waste reduction on agri-food employment for three policy options. Expected reduction varies across Member States – ranging from -0.3% in Option 1 to -3% in Option 3 depending on the country. Largest percentage change decreases are observed for Germany, Portugal, and Belgium and Luxembourg.

Figure 58: Change in agri-food employment in EU MSs, options vs baseline 2030



Source: MAGNET simulation results

The reader is informed that the food service sector (and other service sectors) are not presented in the analysis. While the numbers of the primary and secondary sectors are directly linked to specific activities impacted by food waste reduction, the reaction of the food service sector cannot be represented in a fully satisfactory way. Firstly, the exact composition of the food service sector (i.e., restaurant, delivery services etc.) is not available. Secondly, the possible reaction of consumers to less waste in food services is not straightforward. The expectation to food waste reduction at the food service level is that if consumers behave in a more socially

responsible manner (i.e. waste less), they might be expected to cut back on restaurant visits per time period as they consume out-of-home 'leftovers' at home. It is recognised, however, that the reduction in the number of visits to the restaurant is not proportionate to the reduction in waste as people enjoy the experience of eating out. Indeed, individuals with higher disposable income may cut back food services demand considerably less than those with lower incomes. In addition, food services waste reduction could be achieved (partly) by developing/improving management strategies. Thus, in the absence of any empirical evidence, the modelling approach assumes here that the reduction in household demand for food services is in proportion to the reduction in food services waste, thus likely overstating the effect on food services demand of consumers and the associated impacts on employment. Hence, in this section, results for the food service sector ares not presented. As a conclusion, even without the food service sector, the numbers below should be considered as a worst-case scenario. To the extent known, Member States that have taken steps in reducing food waste have not experienced negative impacts on employment in the food supply chain due to this reduction.

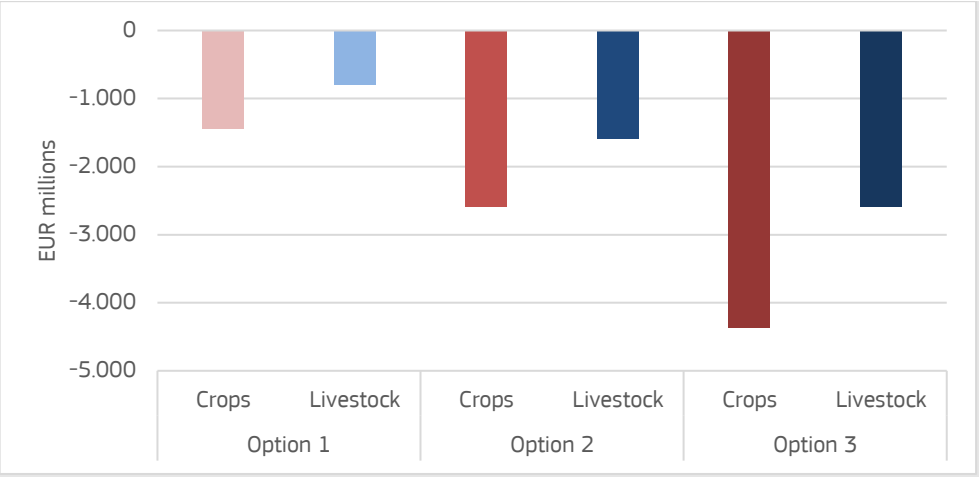
These results do also not take into account the potential job creation from food waste reduction initiatives, as this would entail strong assumptions on new job profiles required. Based on data from surveys to stakeholders, JRC estimates the number of new jobs created respectively for options 1, 2 and 3 at: 6 700 heads 12 500 heads and 22 300 heads. The new jobs created included the roles such as: logistics operators in food banks, coaching supermarkets' staff as part of food redistribution initiatives, and collection/transport of products deriving from the valorisation of surplus food and by-products.

2.4.2. Income distribution

In all three options, the economy in the EU27 is only marginally affected. Calculating a standard measure for macroeconomic impacts, i.e., the value added at basic prices (output minus intermediate consumption), hereafter called "income", the EU27 shows a slight increase in net income of more than 2 billion EUR (0.022%) in option 3. Also, for the options 1 (0.8 billion EUR, 0.008%) and 2 (1.6 billion EUR, 0.016%), the overall economic impact is positive.

Food waste reduction, however, could lead to farm income losses due to less food wasted and hence lower resulting food demand. Figure 59 shows the change in farm income from primary agriculture for EU27 across policy options. In general income losses from the crops sector are higher than in the livestock sector due to the higher share of fruit, vegetables and cereals in total food waste. Option 1 leads to a decrease of around EUR 2.2 billion in farmers' income from crops and livestock farming, whereas in Option 3 this decrease is higher with EUR 7 billion, which corresponds to a decrease of 3.5%. The income in the total agri-food sector (including food processing but not including food services) could experience in the EU a limited decrease of about 3.6% in the most ambitious scenario (about 4.7% including food services).

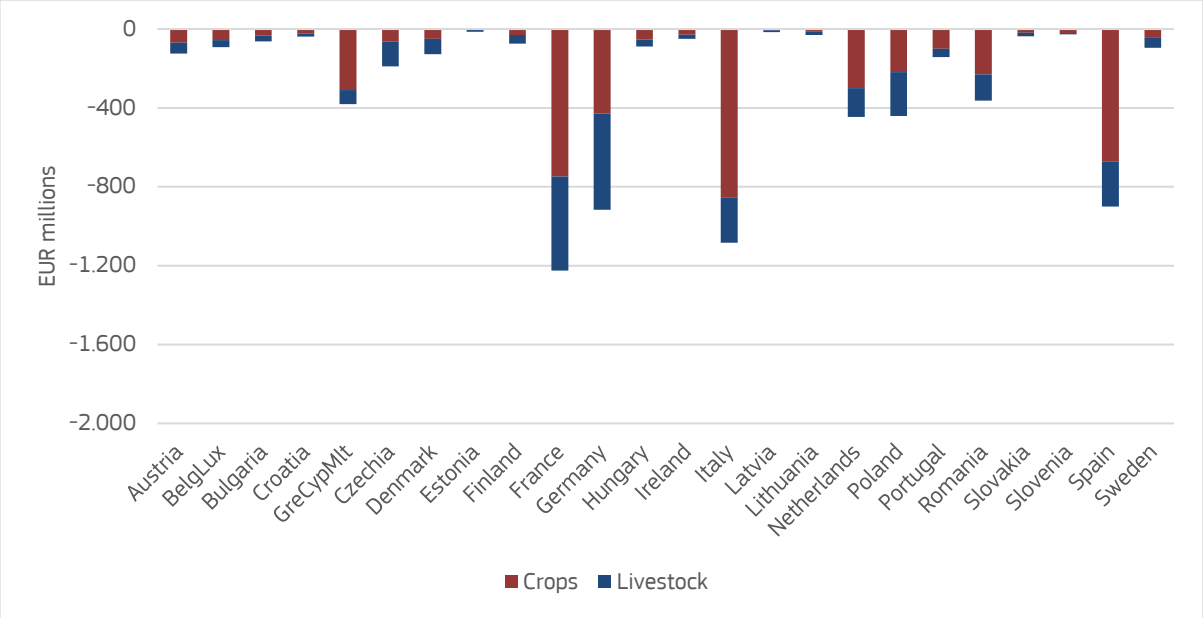
Figure 59: Change deviation in farm income (primary agriculture) EU27, options vs baseline 2030



Source: MAGNET simulation results

Figure 60 depicts the change in the farm income for the maximum target scenario, Option 3, with respect to the baseline at the Member State level. At the Member State level, we see differences where France, Germany and Italy show the highest losses in absolute terms. It should be noted that the losses in the food sector are in general compensated by additional income in non-food sectors.

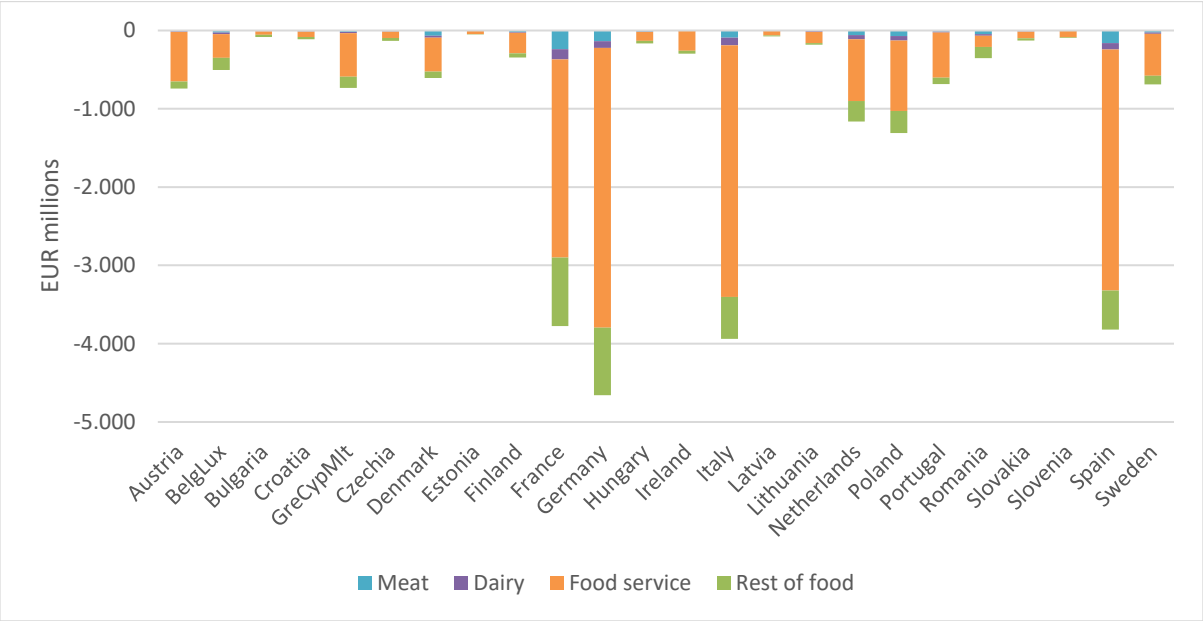
Figure 60: Change deviation in farm income (primary agriculture), Option 3 vs baseline 2030



Source: MAGNET simulation results

Regarding income changes for processed food and the food service sector, the highest income losses due to food waste reduction come from the food service sector (6% reduction at the EU level in Option 3). Figure 61 shows the change deviations per MS. Similarly to primary agriculture, the highest changes are observed in France, Germany, Italy and Spain.

Figure 61: Change deviation in income (food sector), advanced Option 3 vs baseline 2030



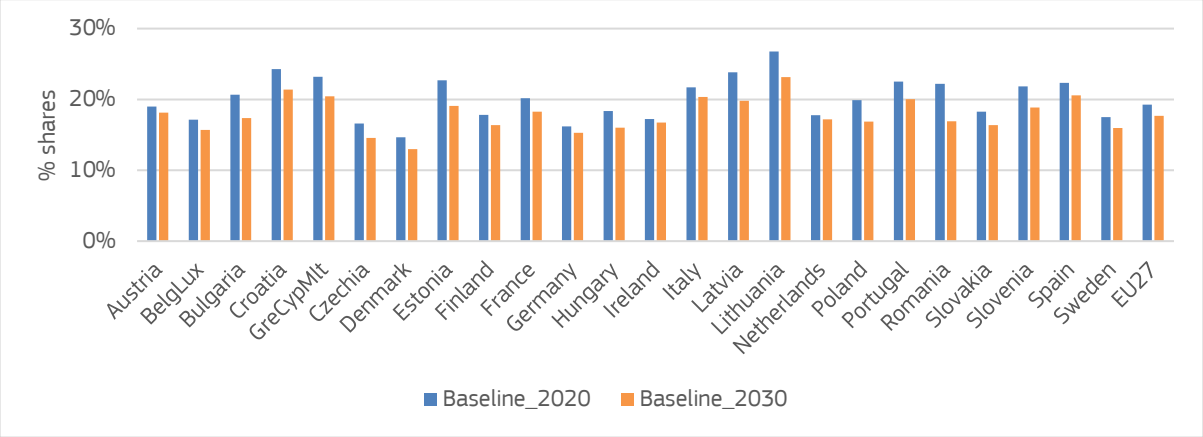
Source: MAGNET simulation results

It should be noted that the model does not take into account possible developments in production systems and consumption habits[171] linked to the transition to sustainable food systems, which could trigger needs for new products and/or services (e.g., shift to organic farming which generates higher income). For this reason, the numbers above should be treated rather as a worst-case scenario.

2.4.3. Food affordability

The average share of food expenditure (agri-food and food services) in total household expenditure in EU27 for 2020 is around 19%, which is projected to decrease by around 1.5 percentage points in 2030 in the baseline as depicted in Figure 62. This result is because as personal disposal incomes grow, non-food demands in developed societies grow faster than food demands (Engel's Law). The extent of this share differs across Member States, where typically those countries with lower per capita disposable incomes exhibit higher food budget shares.

Figure 62: Percentage share of food expenditure in total household expenditure, (Baseline 2020 and 2030)



Source: MAGNET simulation results

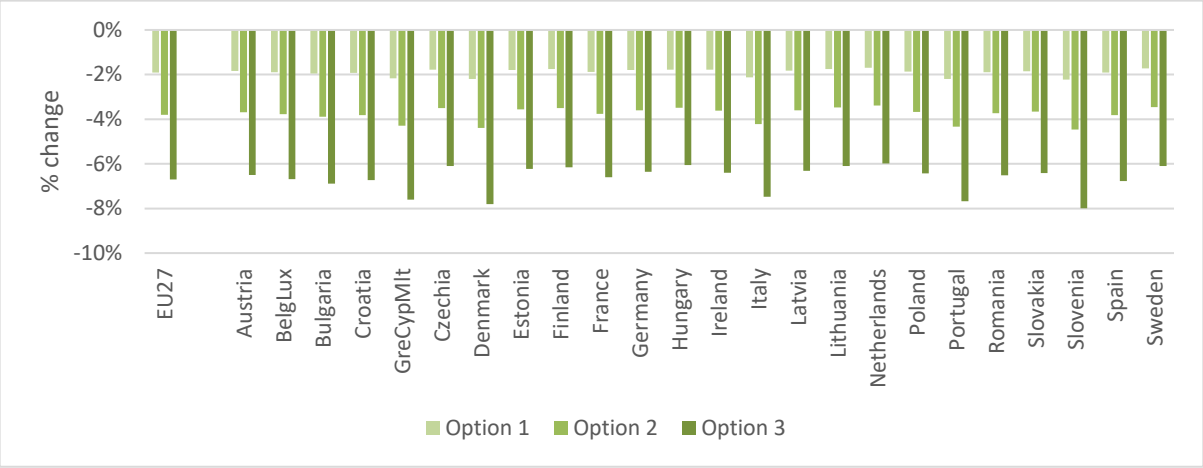
In all policy options examined, the share of food expenditure is expected to fall further, mostly because of decreased demand for food and linked food price reduction to it (Figure 63). Larger amounts of food waste reduction lead to higher decreases in food expenditure shares of households. Due to an expected decrease in food prices linked to food waste reduction, and the reduced amount of food (and food services) purchased, households could save, on average, from 220 to over 720 EUR per year (depending on target levels) and spend these amounts on higher quality food or other goods and services. Such savings are particularly relevant in the current context of rising food prices.

Figure 63: Food expenditure shares and percentage change deviations in food expenditure share, options vs baseline 2030

Source: MAGNET simulation results

Figure 67 shows the Member State-specific data for percentage change deviations in food expenditure. In nearly all EU27 countries, Option 3 results in a decrease of over 6%. Food expenditure shares decrease the most in Slovenia, Denmark and Bulgaria (around 8%).

Figure 64: Percentage change deviations in food expenditure share in total household expenditure, options vs baseline 2030



Source: MAGNET simulation results

2.5. Other impacts

2.5.1. SDGs

The Better Regulation TOOL #19. SUSTAINABLE DEVELOPMENT GOALS indicates: "The indicators and monitoring arrangements underpinning the SDGs can be used to describe the status quo policy objectives, expected impacts of policy options and the observed changes resulting from new policies. As such, the SDG framework is highly relevant for impact assessments and evaluations." It further outlines "the relevant SDGs should be identified and the associated indicators should be used (if available) when preparing the following sections of the impact assessment report" (page 151).

Among the proposed "Tools for the analysis of SDGs" the SDGs modelling tool aims to facilitate the use of models for sustainability assessment in the SDGs framework trough the identification of appropriate model(s) for the assessment of specific policy options. The tool provides the list of all the models run or developed by the Commission and included in the Modelling Inventory and Knowledge Management System (MIDAS) and their contribution to the SDGs (at goal target and indicator level). This tool offers a transparent mapping of how model outputs can be directly or indirectly linked to EU/UN SDGs indicators, therefore screening which models could be suitable to quantitatively evaluate the impacts of policy options on SDGs targets and indicators."

As shown in the related report "Modelling for Sustainable Development Goals (SDGs): Overview of JRC models", the MAGNET model is listed as one of the models with the broadest coverage of SDGs and its related indicators.

Indeed, over the last years, the MAGNET model has been further developed for this purpose and was selected by UN-DESA as one of the 16 outstanding SDG Good Practices across the world. The approach also features in the 2021 OECD/JRC report on "Spillovers and Transboundary Impacts of Public Policies". Several scientific articles witness the methodological developments and applications over a broad range of topics.

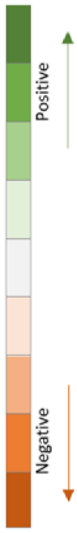
The figures Figure 65 (percentage changes in the three options) and Figure 66 (absolute changes) present a selection of direct or indirect SDG indicators as outcome of the MAGNET model.

The results of the bottom-up analysis can complement the assessment of the implications of the policy options on a number of relevant SDGs, as this analysis provides an assessment of the impact of the different policy options on additional environmental impact categories. The assessment allows to further evaluate four environmental impact categories of the Environmental Footprint (Commission Recommendation C(2021) 9332 final), which are connected to a number of SDGs (Sanye-Mengual and Sala, 2022). The approach also features in the 2021 OECD/JRC report on "Spillovers and Transboundary Impacts of Public Policies".

For the purpose of this exercise, to reduce the complexity of the assessment, the most relevant SDG was identified for each of the four environmental impact categories considered in this analysis. The outcome is presented in Figure 67 (percentage changes in the three options) and Figure 68 (absolute changes).

Figure 65: Percentage changes of selected direct or indirect SDG indicators

SDGs	Target indicators	Unit	Baseline (2030) vs. Baseline (2020), % change	Scenarios (2030) vs. Baseline (2030), % change			
				Option 1	Option 2	Option 3	
1 NO POVERTY	Per capita utility from private expenditure	Index	13.61%	-0.19%	-0.36%	-0.60%	P
	GDP per capita	EUROS (2014 prices)	18.71%	0.01%	0.03%	0.05%	
	Disposable income per capita	EUR 1 000 per capita (2014 prices)	15.89%	-0.10%	-0.19%	-0.30%	P
2 ZERO HUNGER	Domestic food, primary agriculture and fish production	Index	5.92%	-0.64%	-1.26%	-2.04%	I
	Food imports	Index	1.91%	-1.38%	-2.68%	-4.30%	N
	Food exports	Index	5.18%	0.05%	0.12%	0.19%	P
	Calories per capita per day incl fish	kcal/pc/pd	-0.75%	-1.52%	-2.93%	-4.67%	I
	Protein from livestock and fish products	protein qty/pc/pd	0.83%	-1.25%	-2.50%	-4.12%	I
	Food prices	Index	-6.72%	-0.31%	-0.61%	-0.99%	N
	Food consumption by region	Index	10.82%	-1.69%	-3.38%	-5.63%	I
4 QUALITY EDUCATION	Share of skilled labour	share value <=1	-0.35%	0.01%	0.02%	0.04%	P
7 AFFORDABLE AND CLEAN ENERGY	Share of energy from renewables	share value <=1	53.36%	-0.010%	-0.022%	-0.038%	P
	Energy price (fossils)	Index	24.02%	0.004%	0.009%	0.015%	N
	Ratio of value added (val $) to energy usage (val $) in food activities	ratio based on value concepts in data	-11.29%	-0.15%	-0.29%	-0.49%	P
	Final usage of energy commodities per unit of GDP	kilo tonnes of oil equivalent (ktoe) per dollar of GDP	-14.89%	0.04%	0.09%	0.17%	N
8 DECENT WORK AND ECONOMIC GROWTH	Agricultural employment growth ratio	Index	-5.02%	-0.04%	-0.09%	-0.14%	P
	Wages to labour (including output taxes) plus labour taxes divided by GDP	share value <=1	-0.71%	-0.02%	-0.05%	-0.09%	P
	Net trade (X-M)	EUR millions (2014 prices)	20.18%	-0.03%	-0.12%	-0.24%	I
	Share of value added food in total value added	share value <=2	-11.78%	-0.85%	-1.66%	-2.73%	N
	Annual growth in real GDP per worker	% change	386.23%	0.08%	0.17%	0.29%	P
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	CO2 emissions from livestock per unit of value added	tonnes per dollar	-9.88%	0.11%	0.25%	0.39%	N
	Total imports	volume	9.81%	-0.03%	-0.06%	-0.08%	N
	Total exports	volume	12.56%	-0.03%	-0.05%	-0.07%	P
10 REDUCED INEQUALITIES	Ratio of skilled to unskilled agric labour wages	Index	1.12%	0.08%	0.15%	0.24%	I
	PALMAEU Palma ratio (10% richest divided by 40% poorest)	Ratio	-0.22%	0.02%	0.03%	0.05%	N
11 SUSTAINABLE CITIES AND COMMUNITIES	ammonia	Giga grams	-1.46%	-0.46%	-0.91%	-1.50%	N
	nitrogen oxides	Giga grams	-4.58%	0.08%	0.16%	0.28%	N
	total air pollution	Giga grams	-0.46%	0.03%	0.07%	0.13%	N
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	Emissions footprint ave per cap per year food direct and indirect flows	kgCo2e/pc/py	-3.61%	-1.19%	-2.36%	-3.88%	N
	land footprint ave per cap per year food final demands	m2/pc/py	-8.08%	-0.96%	-1.85%	-4.62%	N
	Food waste *(instead of the target, food loss index)*	000 tonnes	0.11%	-12.18%	-23.00%	-41.27%	N
13 CLIMATE ACTION	Tonnes of emissions (CO2e) per unit of GDP	tonnes CO2e per dollar	-14.59%	-0.06%	-0.13%	-0.21%	N
	Emissions virtual flow trade balance food final demands	MtCO2e	-14.82%	-2.21%	-4.36%	-7.10%	N
15 LIFE ON LAND	Agricultural land use	Land area in millions ha	-0.29%	-0.13%	-0.25%	-0.41%	N
	land virtual flow trade balance food final demands	Land area in millions ha	-9.57%	-1.43%	-2.78%	-4.39%	N



Source: MAGNET simulation results

Figure 66: Absolute changes of selected direct or indirect SDG indicators

SDGs	Target indicators	Unit	2020	Baseline 2030, abs. value	Scenarios (2030) vs. Baseline (2030), absolute change Option 1	Option 2	Option 3
1 NO POVERTY	Per capita utility from private expenditure	Index	100	113.61	113.39	113.20	112.93
	GDP per capita	EUROS (2014 prices)	26.40	31.34	31.35	31.35	31.36
	Disposable income per capita	EUR 1 000 per capita (2014 prices)	14 932.40	17 305.73	17 288.77	17 273.06	17 253.58
2 ZERO HUNGER	Domestic food, primary agriculture and fish production	Index	100	105.92	105.24	104.59	103.76
	Food imports	Index	100	101.91	100.51	99.18	97.53
	Food exports	Index	100	105.18	105.24	105.30	105.38
	Calories per capita per day incl fish	kcal/pc/pd	2 609.09	2 589.61	2 550.18	2 513.61	2 468.76
	Protein from livestock and fish products	protein qty/pc/pd	45.86	46.25	45.67	45.09	44.34
	Food prices	Index	100	93.28	93.00	92.71	92.36
	Food consumption by region	Index	100	110.82	108.95	107.08	104.58
4 QUALITY EDUCATION	Share of skilled labour	share value <=1	0.4727	0.4711	0.4711	0.4712	0.4713
7 AFFORDABLE AND CLEAN ENERGY	Share of energy from renewables	share value <=1	0.07	0.11	0.11	0.11	0.11
	Energy price (fossils)	Index	100	124.02	124.03	124.03	124.04
	Ratio of value added (val $) to energy usage (val $) in food activities	ratio based on value concepts in data	15.61	13.84	13.82	13.80	13.78
	Final usage of energy commodities per unit of GDP	Kilo tonnes of oil equivalent (ktoe) per dollar of GDP	0.1816	0.1546	0.1547	0.1547	0.1549
8 DECENT WORK AND ECONOMIC GROWTH	Agricultural employment growth ratio	Index	1 173.22	1 114.36	1 113.87	1 113.39	1 112.81
	Wages to labour (including output taxes) plus labour taxes divided by GDP	share value <=1	0.35761	0.35505	0.35497	0.35488	0.35474
	Net trade (X-M)	EUR millions (2014 prices)	113 002.14	135 807.72	135 763.87	135 644.75	135 482.20
	Share of value added food in total value added	share value <=2	0.02292	0.02022	0.02005	0.01989	0.01967
	Annual growth in real GDP per worker	% change	0.00356	0.01730	0.01731	0.01733	0.01735
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	CO2 emissions from livestock per unit of value added	tonnes per dollar	77.51	69.85	69.93	70.02	70.12
	Total imports	volume	6 399 131.50	7 027 175.50	7 024 966.00	7 023 183.00	7 021 325.00
	Total exports	volume	6 086 354.50	6 850 965.50	6 849 124.50	6 847 631.50	6 846 167.50
10 REDUCED INEQUALITIES	Ratio of skilled to unskilled agric labour wages	Index	100	101.12	101.20	101.27	101.36
	PALMAEU Palma ratio (10% richest divided by 40% poorest)	Ratio	1.1067	1.1043	1.1045	1.1046	1.1048
11 SUSTAINABLE CITIES AND COMMUNITIES	ammonia	Giga grams	5 119.95	5 045.26	5 021.98	4 999.28	4 969.80
	nitrogen oxides	Giga grams	14 248.64	13 595.78	13 606.13	13 617.48	13 633.82
	total air pollution	Giga grams	4 656.28	4 634.68	4 636.27	4 638.11	4 640.81
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	Emissions footprint ave per cap per year food direct and indirect flows	kgCo2e/pc/py	1 517.71	1 462.89	1 445.48	1 428.40	1 406.07
	land footprint ave per cap per year food final demands	m2/pc/py	3 007.91	2 764.77	2 738.35	2 713.71	2 637.07
	Food waste *(instead of the target, food loss index)*	000 tonnes	56 980.80	57 044.63	50 096.89	43 926.14	33 503.97
13 CLIMATE ACTION	Tonnes of emissions (CO2e) per unit of GDP	tonnes CO2e per dollar	249.66	213.24	213.11	212.97	212.80
	Emissions virtual flow trade balance food final demands	MtCO2e	69.20	58.94	57.64	56.37	54.75
15 LIFE ON LAND	Agricultural land use	Land area in millions ha	157.54	157.08	156.88	156.68	156.43
	land virtual flow trade balance food final demands	Land area in millions ha	33.23	30.05	29.62	29.21	28.73

Source: MAGNET simulation results

Figure 67: Percentage changes of selected direct or indirect SDG indicators

SDGs	Target indicators	Unit	Baseline (2030) vs. Baseline (2020), % change	Scenarios (2030) vs. Baseline (2030), % change Option 1	Option 2	Option 3
6	Food waste impacts on water use (EF)	Billion m3 water eq	-0.72%	-14%	-25%	-44%
13 CLIMATE ACTION	Food waste impacts on climate change (EF)	MtCO2eq	-0.69%	-14%	-26%	-44%
14	Food waste impacts on marine eutrophication (EF)	Million kg N eq	-0.94%	-14%	-26%	-45%
15 LIFE ON LAND	Food waste impacts on land use (EF)	Trillion Pt	-0.70%	-13%	-24%	-42%

Source: Bottom-up analysis

Figure 68: Absolute changes of selected direct or indirect SDG indicators

SDGs	Target indicators	Unit	2020	Baseline 2030, abs. value	Scenarios (2030) vs. Baseline (2030), absolute change		
					Option 1	Option 2	Option 3
6	Food waste impacts on water use (EF)	Billion m3 water eq	333.98	331.66	288.80	251.57	190.77
13	Food waste impacts on climate change (EF)	MtCO2eq	245.93	244.17	211.02	182.14	136.34
14	Food waste impacts on marine eutrophication (EF)	Million kg N eq	2,088.17	2,068.52	1,785.36	1,536.51	1,146.61
15	Food waste impacts on land use (EF)	Trillion Pt	8.51	8.45	7.29	6.29	4.69

Source: Bottom-up analysis

2.5.2. Territorial impacts

The MAGNET model does not provide results for subnational geographical units. However, a preliminary assessment of the potential territorial impacts of the food waste reduction targets can be performed considering the differences in the production structure at the regional level. Thus, we can assume that those regions whose production structure includes most affected sectors by the food waste reduction objectives, will be also the most exposed to the overall economic impact.

In this section we analyse the potential impacts of food waste reduction in the advanced target scenario over regional employment. For this exercise, we focused on some selected sectors that would be the most affected by the food waste reduction according to the aforementioned scenario: (1) agriculture (2) food manufacturing and (3) waste collection. We also analysed both the manufacturing and service sectors (the latter only for value added) so as to have a holistic perspective of the economy. For each sector, we retrieved data on both regional employment (number of persons employed by NUTS2 regions) and value added (million euros) from Eurostat data sources (Regional Accounts and Structural Business Statistics).

The year 2019 is selected as the reference given that it is the most recent year not affected by the COVID-19 pandemic for which both datasets have data availability. Regional accounts provide information until the year 2021, while Structural Business Statistics recently published the data for 2020. However, some sectors such as the accommodation and food services activities were strongly affected by lockdowns and other measures to mitigate the pandemic. Consequently, the information on these years may be distorted with regard to both recent and projected trends in MAGNET even though the effects of the COVID-19 shock was already considered in the baseline scenario.

Table 39: Selected indicators and data sources

Indicator	Data sources	Sector	NACE code
Number of persons employed	Regional Economic Accounts (nama_10r_3empers)	Agriculture	A01
		Manufacturing	C (excl. C10)
		Services (including Accommodation and Food services)	F, G-J, K-N, O-U
		Food Manufacturing	C10

	Structural Business Statistics (sbs_r_nuts06_r2)	Waste Collection	E38
Value Added	Regional Economic Accounts (nama_10r_3gva)	Agriculture	A01
		Manufacturing	C (excl. C10)
		Services (excluding Accommodation and Food services)	F, G, H, J, K-N, O-U
	Structural Business Statistics (sbs_r_nuts06_r2)	Food Manufacturing	C10
		Waste Collection	E38
		Accommodation and Food services	I

Source: Authors' own elaboration

After some processing and consistency checks[155], the data from Eurostat were used to calculate the share of both regional employment and value added over the total for each sector per country. Then, these shares were used as a criterion to distribute the foreseen deviations by country among the corresponding NUTS2. The results are described below.

Table 40 and Table 41 show a general overview of the impact of food waste reduction by NUTS2 regions classified according to their level of development. This classification follows the same criteria as the eligibility to receive European Regional Development Funds. Thus, the less developed regions are those whose GDP per capita is below 75% of the EU average, the transition regions show a GDP per capita between 75% and 100% of the EU average, while the most developed regions present a GDP per capita above 100% of the EU average.

Table 40 - Potential impact on total regional employment by group of regions according to their level of development

	Agriculture	Food Manufacturing	Waste Collection	Manufacturing (excl. food-related activities)
Less developed	-0.14%	-0.03%	-0.03%	0.03%
Transition	-0.07%	-0.03%	-0.02%	0.01%
Most Developed	-0.04%	-0.03%	-0.01%	0.02%

Source: Own elaboration from MAGNET results and Eurostat data.

Table 41 - Potential impact on total regional value added by group of regions

	Agriculture	Food Manufacturing	Waste Collection	Manufacturing (excl. Food-related activities)	Services

155 The regional data processing is conducted following the methodology described in Lasarte-López. J. et al., 2022 https://publications.jrc.ec.europa.eu/repository/handle/JRC128984

Less developed regions	-0.18%	-0.09%	-0.03%	0.05%	0.13%
Transition regions	-0.10%	-0.08%	-0.01%	0.01%	0.24%
Most Developed regions	-0.04%	-0.05%	-0.01%	0.02%	0.14%

Source: Own elaboration from MAGNET results and Eurostat data.

In general, we can identify that the impact on agriculture and waste collection sectors could be relatively higher in the less developed regions in terms of both employment and value added. The effect would be lower in the most developed ones. Regarding food manufacturing, there are no significant differences among the three regional groups in terms of employment. As for value added, the most developed regions could register a smaller impact. The rest of the manufacturing activities would partially compensate these negative effects on both employment and value added, especially in the less developed group of regions.

As indicated in previous sections the positive impact in service sectors would partially compensate the negative effects of food waste reduction on value added from food-related activities. According to our estimates, the transition regions would be most benefitting by the positive impact on the services sector. This may be explained by the higher relative weight of tertiary activities over their GDP. By contrast, the positive effect of services would be less significant for the less developed group of regions.

Figure 69 shows the relative decreases of both the agricultural employment and value added over the total regional economy. From the analysis of this figure, we can identify the following insights.

In terms of employment, the most affected regions are concentrated in Eastern Europe (mainly in Poland and in Bulgaria) as well as in Greece. This is explained by the high share of jobs depending on the primary sectors in these regions. Within Western Europe, the most affected areas would be most regions in France and Austria and some regions in Central and Southern Spain, as well as in Southern Italy.

The territorial distribution of the impact on the agricultural value added is quite similar. However, the impact would be more homogenous when comparing both Western and Eastern group of regions. This may suggest higher labour productivity gains in the latter group.

Figure 70 represents the potential impact on the food manufacturing. Contrary to agriculture, the regions with higher job losses in the food manufacturing sector due to the food waste reduction would be mainly located in Western Europe. Specifically, regions in Central Spain, Western France and across Germany would suffer the highest decreases in the number of persons employed in this sector. In addition, Croatian regions would be also highly affected. Other geographical areas with moderate potential impacts would be located in Italy, Greece and in Poland (surroundings of Warsaw). Concerning value added, the effects of reducing food waste on this sector would follow a similar regional distribution but with a more homogeneous impact in Eastern and Western regions.

The potential impacts of food waste reduction targets in the waste collection sector are shown in Figure 71. The main insights from this sector are described below.

Latvia would register the highest impact on the employment generated by this sector. As the entire country is considered as a NUTS2 territorial unit, no regional differentiations can be identified within this country. Other regions moderately affected by a reduction in the number

of persons employed in the waste collection sector are in Portugal, Italy (Southern regions) and Romania (specially the capital region Bucharest).

In terms of value added, the territorial distribution of the impact of food waste reduction would follow a pattern similar to that of employment except for Portugal, which shows a higher relative decrease for this variable.

The territorial distribution of the impacts on the manufacturing sector (excluding food manufacturing) is depicted in Figure 72. The positive effect on manufacturing employment will be reflected in northern Spain (which concentrates the most industrialized regions within the country), some regions in Romania and, to a lesser extent, areas from the rest of Eastern countries, Germany and Italy. As for value added, the distribution of the most affected areas is similar. However, the most positive effects are concentrated in Poland and Romania.

Figure 73 illustrates the potential positive impact of reducing food waste on value added from the service sector. In general, the performance of this sector at the regional level seems to be highly driven by the national-level effect of food waste reduction. In addition, a net positive impact is observed in this sector, which could reach 1.0% of value added for some regions. However, we can still identify some 'hot spots' registering negative impacts, many of which are located in coastal and/or touristic areas. This may be a result of the high importance of accommodation and food service activities in those areas. The most negatively affected regions are concentrated in Greece (mainly in the islands) and Portugal (specifically the most southern region, Algarve could be highly affected). Other areas with moderate potential negative impact are located in Italy and Austria (Tyrolean regions), Spain (island regions) and Poland.

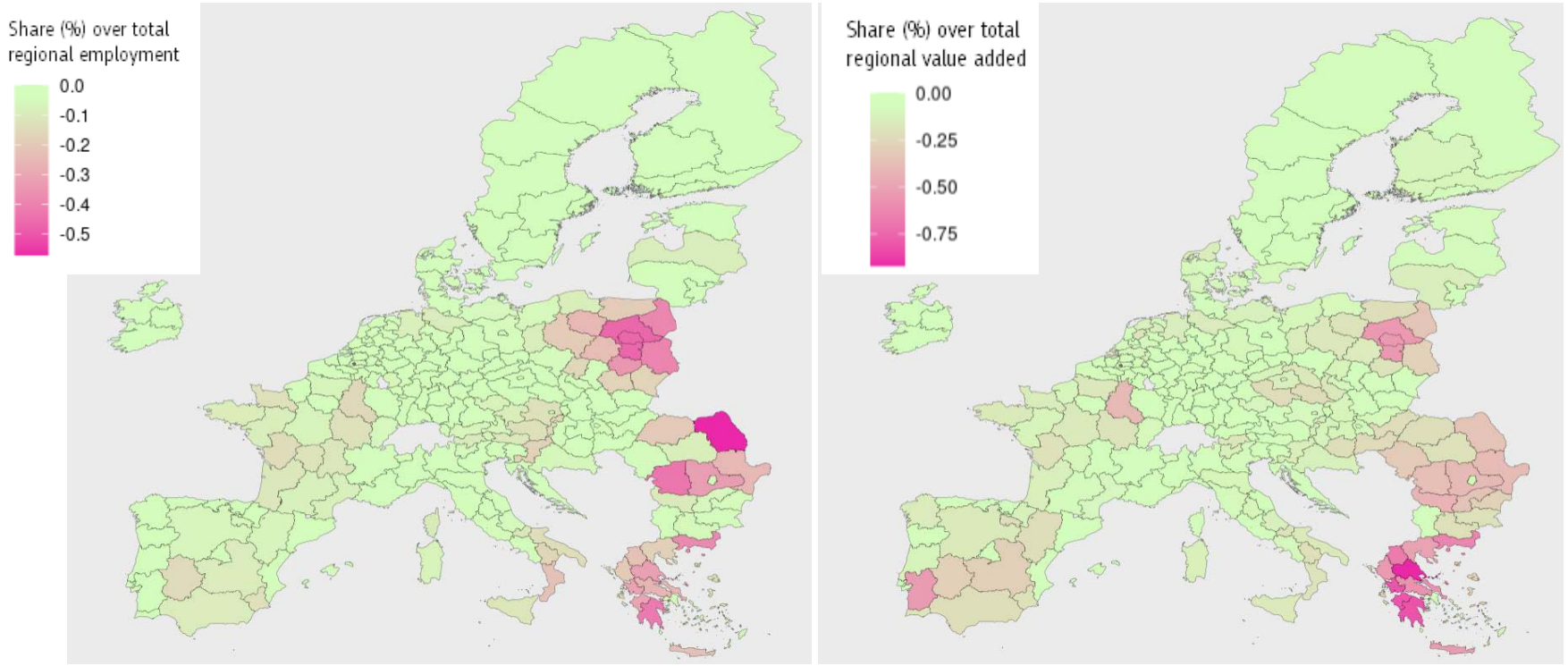
Figure 74 shows the potential losses in value added from the most negatively affected regions (share of GDP), while Figure 75 shows potential value added gains in the most positively affected ones.

In general, the regions with higher potential decreases in value added correspond to Southern and Eastern countries. The losses in the five potentially most affected regions are explained by sharp declines in the services sectors probably driven by the high importance of the accommodation and food service activities (four out of five are coastal touristic areas). In the rest of the displayed regions, the agriculture and the food manufacturing are the main sectors explaining the decline in total value added.

The most positively affected regions belong to France (6 regions), continental Greece (4 regions), and, to a lesser extent, Portugal (2 regions), Spain (2 regions), Belgium (2 regions) and Croatia (1 region). In general, many of these regions show a high importance of the service sectors (five of them are capital regions of the mentioned countries). Therefore, they would be the ones to benefit most from the overall positive effect in this sector.

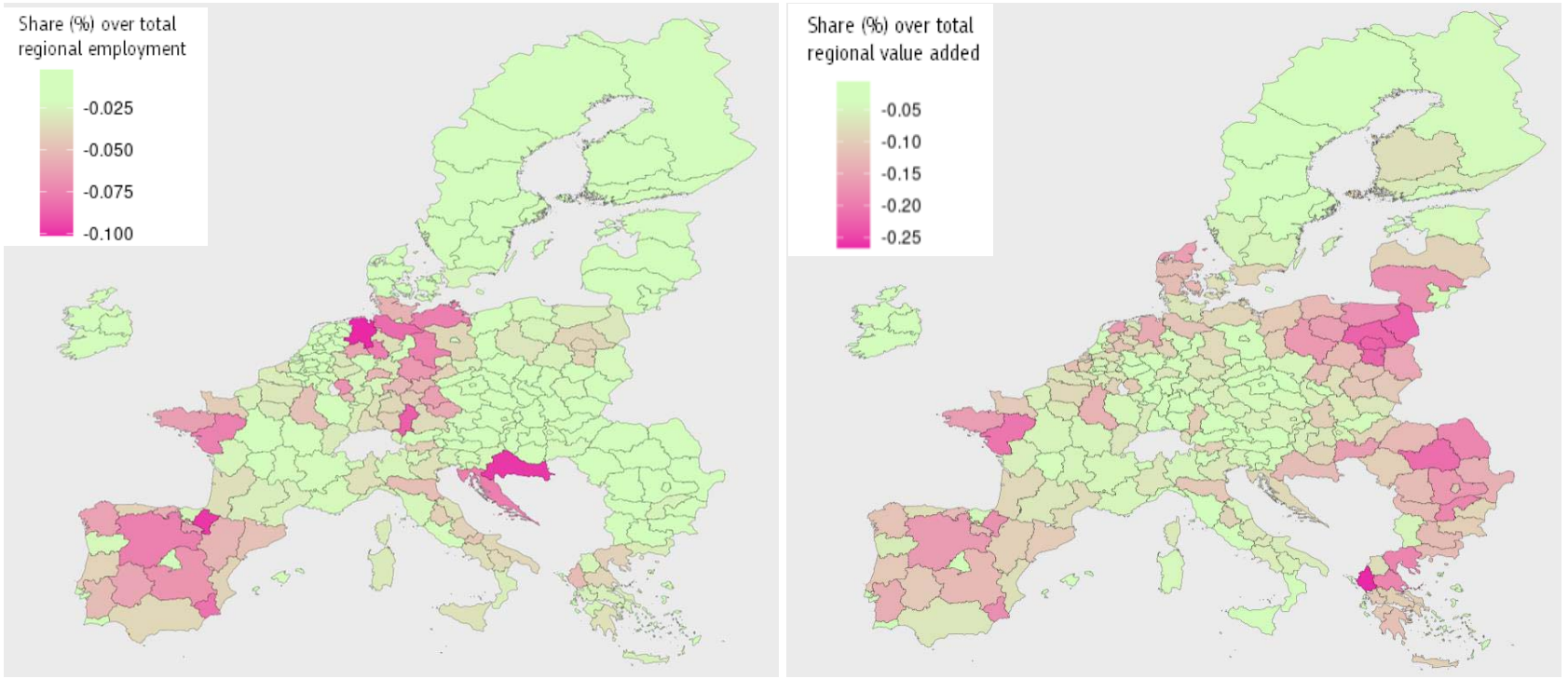
As mentioned, the results reflected in this section assume that the impact of food waste reduction by sectors would suffer an equal shock in all regions within a country. Thus, the regional differences would be explained by the weight of each of the four analysed sectors in the sectoral composition of regional employment. Consequently, the obtained results should not be considered as regional job losses per se but as an indicator reflecting the degree of exposure of regional employment to the fulfilment of the food waste reduction objectives in the advanced target scenario.

Figure 69: Regional impact on agriculture sector. Percentage of deviation over total employment (left) and value added (right) in baseline by NUTS2



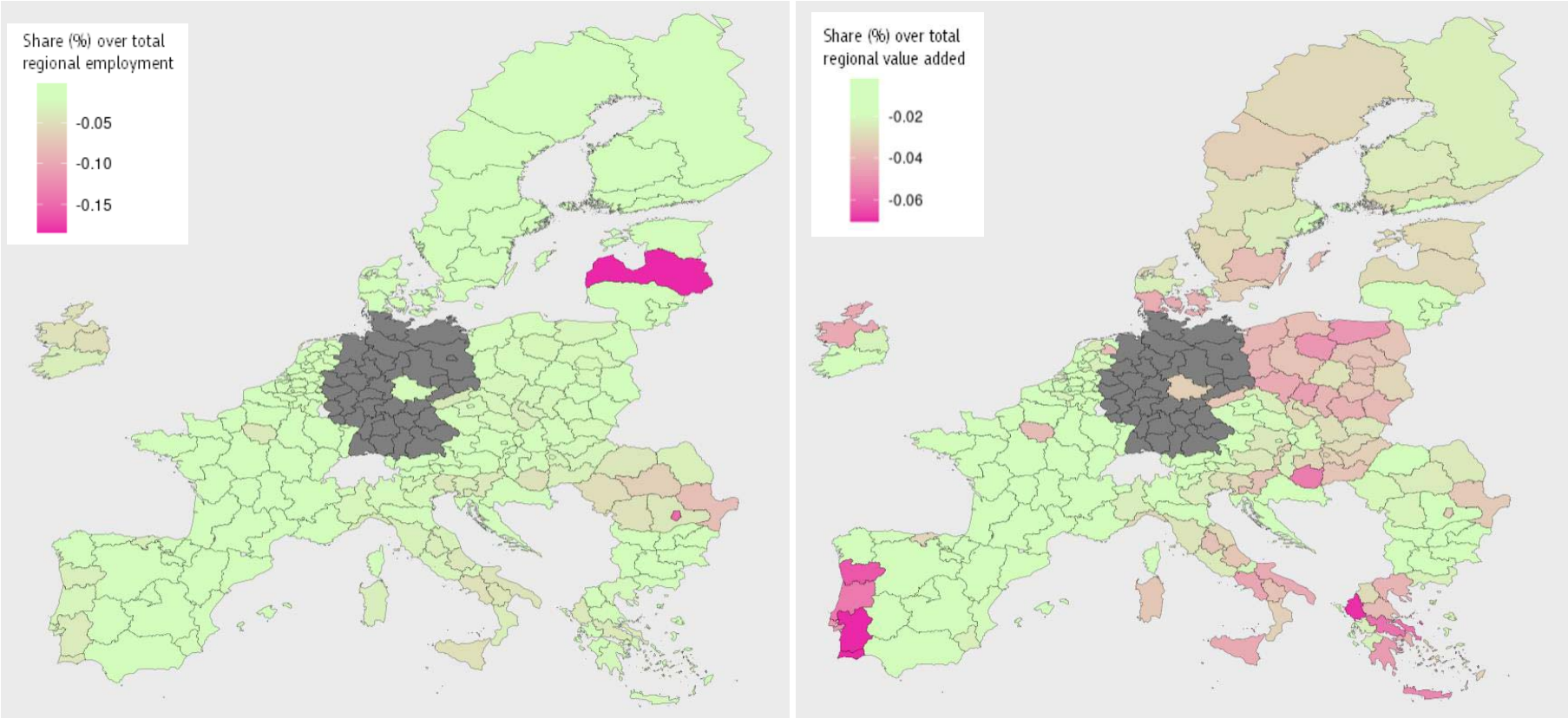
Source: Authors' own elaboration from MAGNET results and Eurostat data

Figure 70: Regional impact on the food manufacturing. Percentage of deviation over total employment (left) and value added (right) in baseline by NUTS2



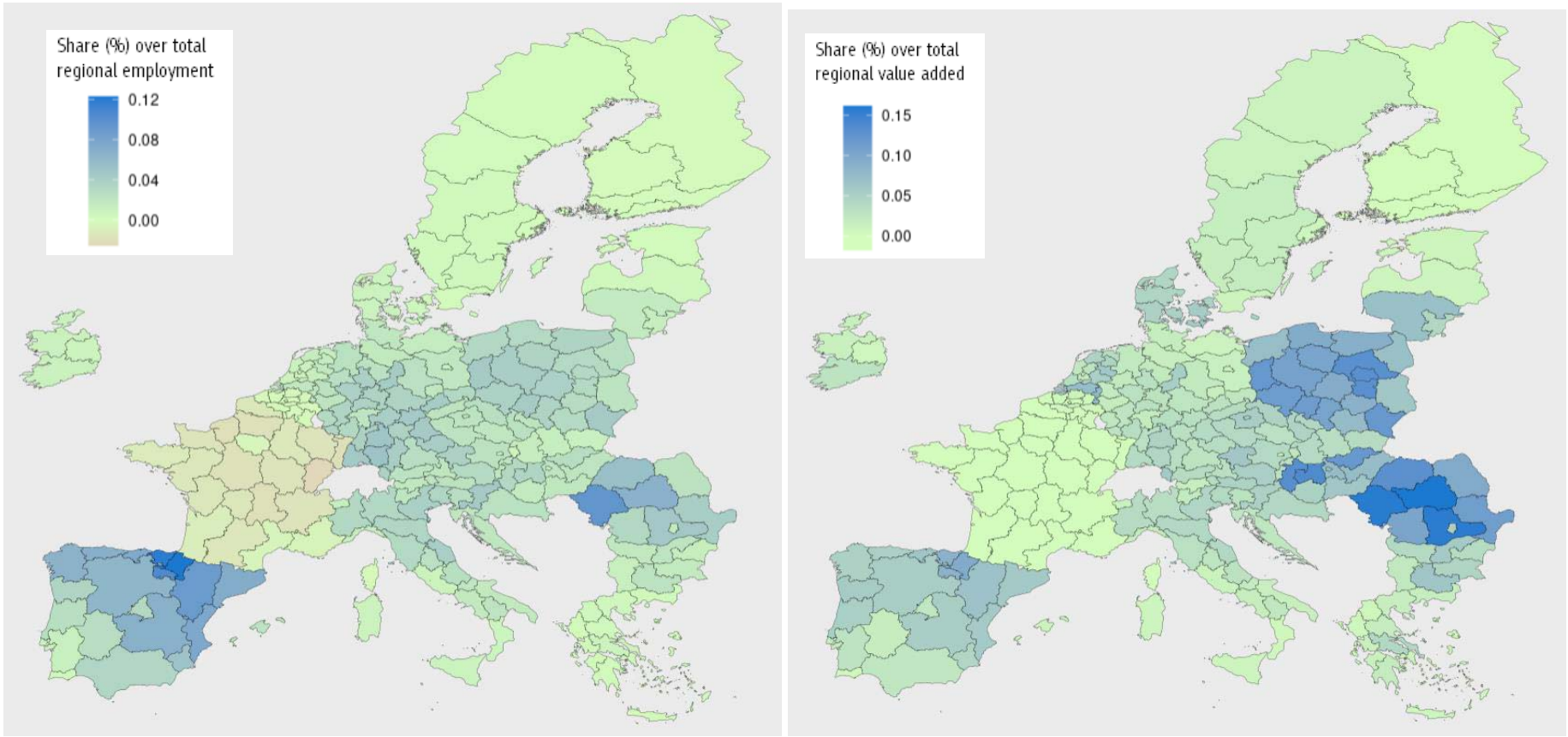
Source: Authors' own elaboration from MAGNET results and Eurostat data

Figure 71: Regional impact on the Waste Collection. Percentage of deviation over total employment (left) and value added (right) in baseline by NUTS2



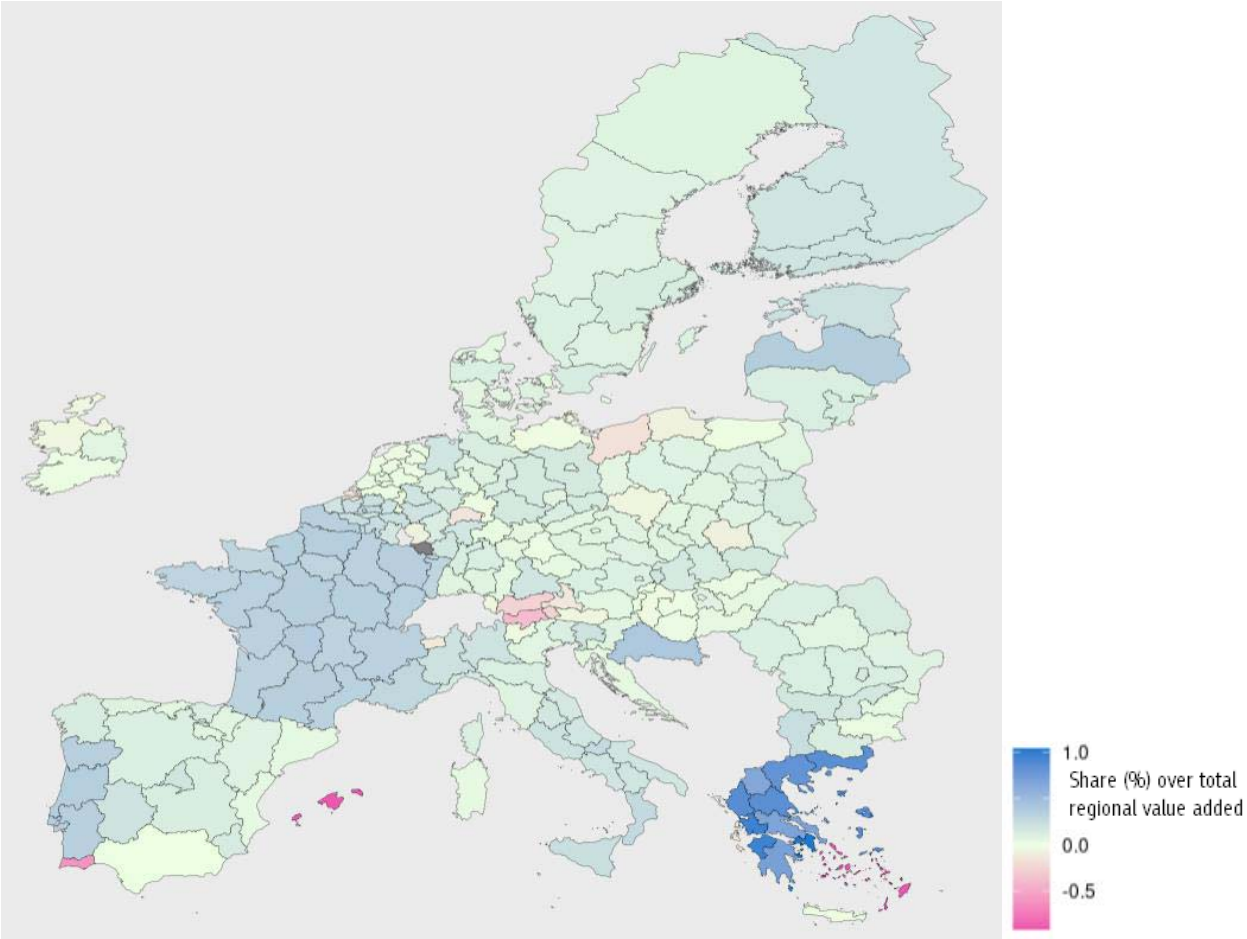
Source: Authors' own elaboration from MAGNET results and Eurostat data

Figure 72: Regional impact on Manufactures (excluding food manufacturing). Percentage of deviation over total employment (left) and value added (right) in baseline by NUTS2



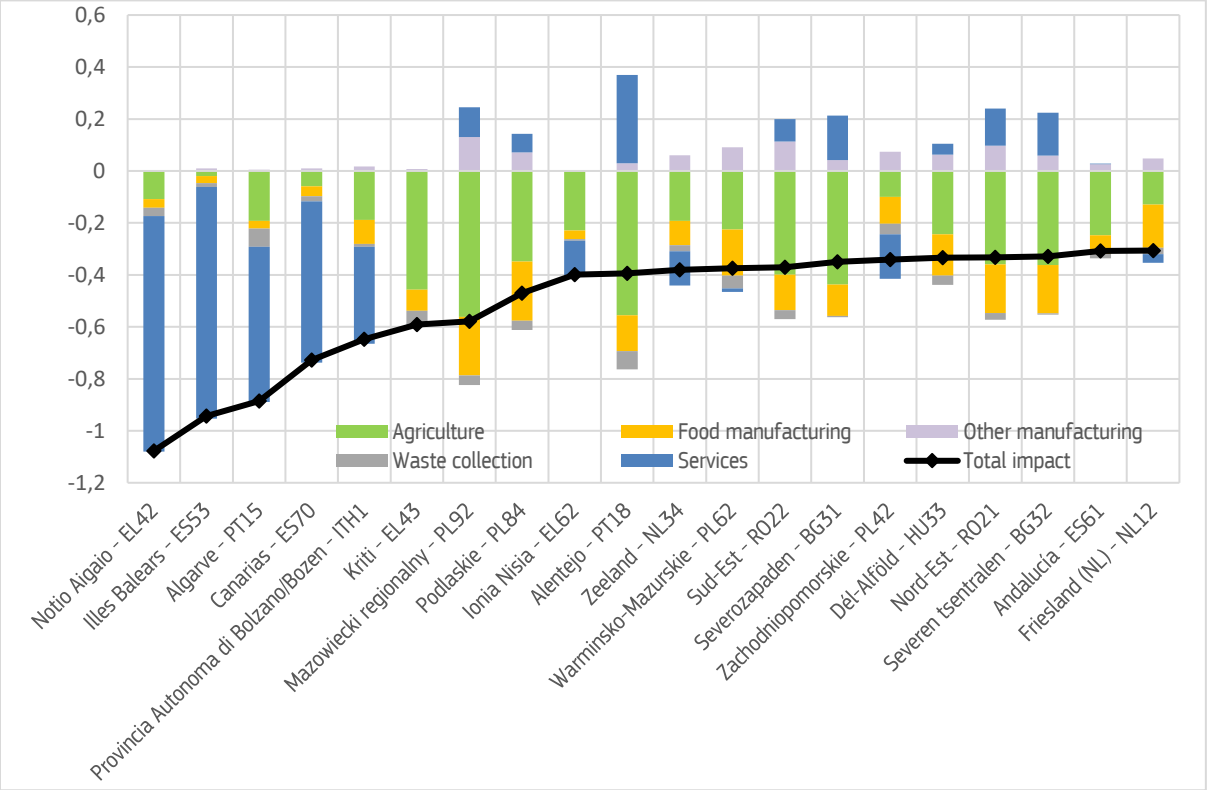
Source: Authors' own elaboration from MAGNET results and Eurostat data

Figure 73: Regional impact on Services (including Accommodation and Food services activities). Percentage of deviation over total value added (right) in baseline by NUTS2



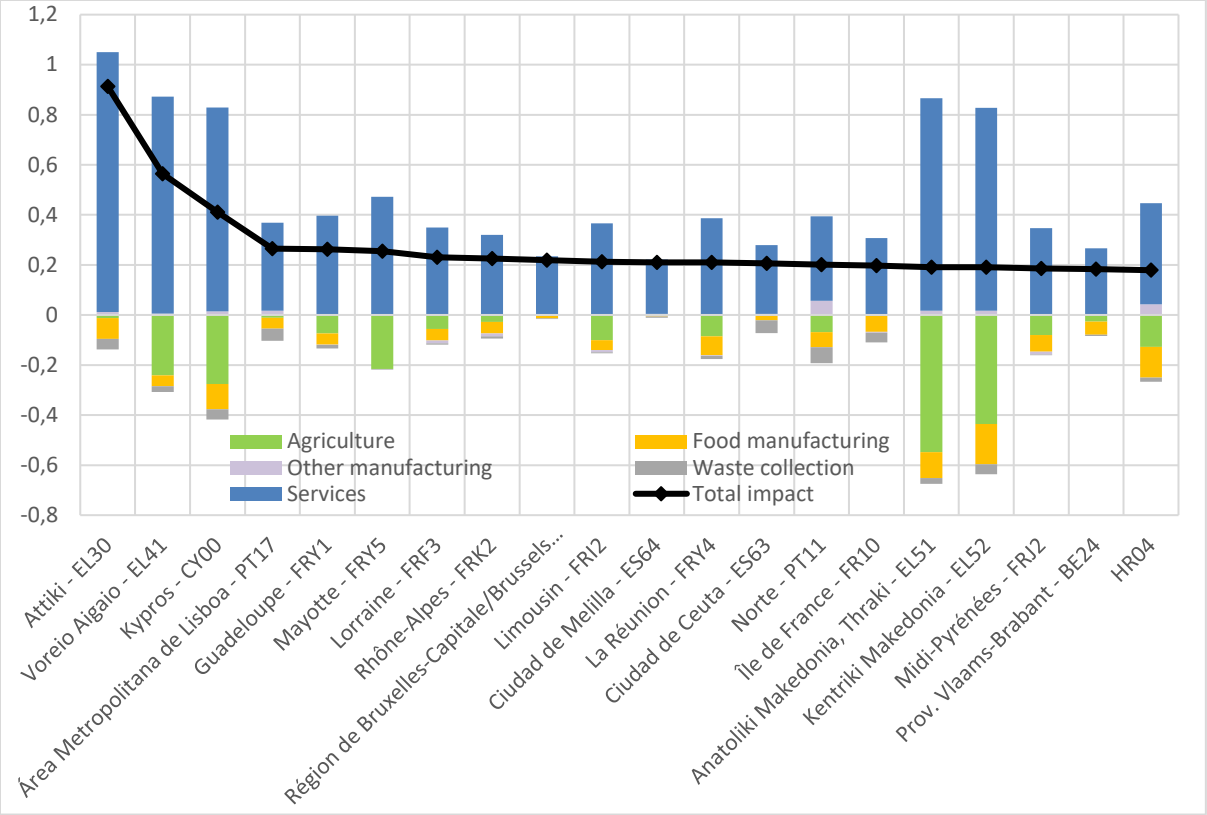
Source: Authors' own elaboration from MAGNET results and Eurostat data

Figure 74: Potential impact on value added for most negatively affected regions (share over total value added)



Source: Authors' own elaboration from MAGNET results and Eurostat data

Figure 75: Potential impact on value added for most positively affected regions (share over total value added)



Source: Authors' own elaboration from MAGNET results and Eurostat data

2.5.3. Impact on SMEs

Recent decades have witnessed an increasing awareness of the importance of small and medium-sized enterprises (SMEs). In fact, although some economists still claim that the role of the SMEs is underestimated (e.g., Ipinnaiye et al 2017), others are arguing that SMEs are already in the vanguard of the industrial policy agenda (e.g., Rigtering et al 2014). According to the World Bank, SMEs constitute over 90% of all businesses and employ over 50% worldwide. The above shares are even higher in the case of the European Union. Following the EUROSTAT data in 2020, the share of SMEs in the overall number of firms included in non-financial business economy stand around 99.8%. Their share in employment was close to 65%, while the value added created by SMEs reached over 52%.

Traditionally, factors related to firm characteristics, internal firm strategy and external financing were considered as main drivers of the SMEs growth (e.g., Barba Navaretti et al 2014; Demirel and Danisman 2019; Mazzucato and Parris 2015). However, recently more interest was placed on the impact of overall macroeconomic conditions. This is due to the fact that SMEs are over-represented in several economic sectors that tend to be particularly exposed during economic crises (OECD 2021). Moreover, financial constraints make SMEs be more vulnerable to the evolution of the macroeconomic environment (e.g., Christopherson 2015; Lai et al 2016).

Existing analyses indicate that macroeconomic factors influence both SMEs' turnover and employment. In particular, Ipinnaiye et al. (2017) show that, in the case of the Irish manufacturing

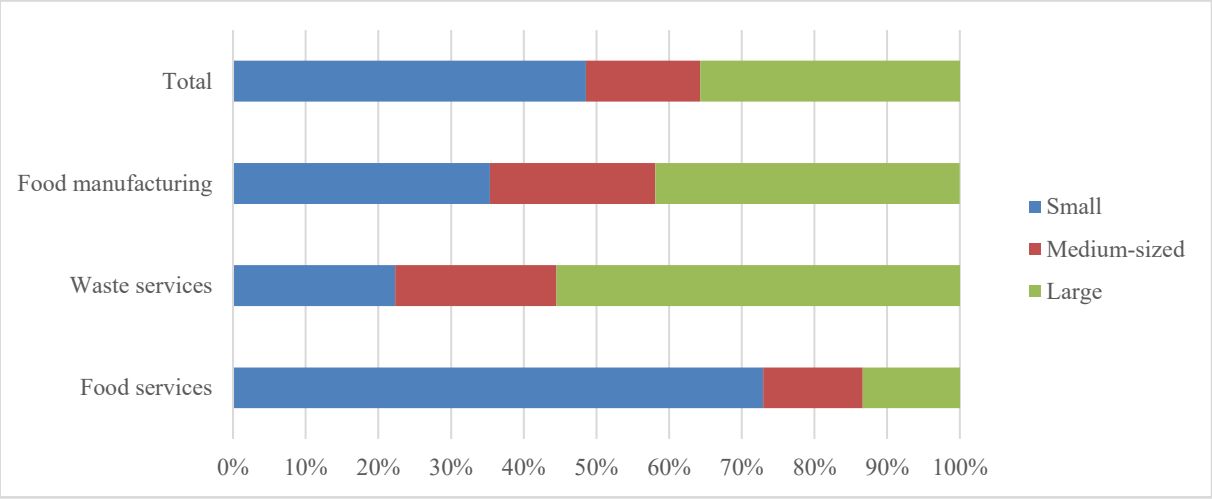
sector, a 1% increase in inflation rate leads to a 2% rise in the turnover growth. Their findings are in line with earlier publications by Beck et al. (2005) or Mateev and Anastasov (2011). At the same time, however, an increase in inflation leads to a decrease in employment. Ipinnaiye et al. (2017) also report a strong positive correlation between the industry growth and both SMEs' turnover and employment growth. In the case of the former, the elasticity is around 22%, while in the case of the latte,r it is around 4%. Still other publications show a much weaker impact of GDP growth and firms' growth. Here the estimated elasticity oscillates between 2% and 4% (e.g., Beck et al 2005; Mateev and Anastasov 2011).

The results of simulations done with the MAGNET model within the Food Waste Impact Assessment project show that the most negatively affected industries would be agriculture, food manufacturing, waste collection and treatment and food services. The abovementioned industries would face the highest decrease both in the value of production and employment. Still, in the case of the former, the highest ambition target reveals that the cumulative growth of the value of production between 2020 and 2030 would be lower by around 2 percentage points in the case of agriculture, over 3 percentage points for food manufacturing, and around 13 percentage points for waste services. In the case of employment, the total decrease for the whole EU is hard to estimate due to the peculiarity of the food service industry and the fact that the SMEs employment in food services is quite high (over 9 million in the EU27). Note that, on average, all the remaining industries would experience a positive impact of food waste reduction. Although the cumulative difference would be very small. For instance, it would be less than 1 percentage point in the case of the production value and less than 0.5 million in the case of employment.

The growth in value of production can be considered as a proxy for the GDP growth in the aforementioned empirical papers. Therefore, taking into account the lower values of elasticities reported in the existing studies, we could expect a moderate decrease in SMEs growth in food manufacturing (at least 7 percentage points), about 15 percentage points for food services and over 25 percentage points for waste services. Also, the change in prices would further negatively impact waste services (additional decrease in turnover growth by 2 percentage points). At the same time however, higher inflation should increase turnover in the food service sector.

The above estimates rely on the average elasticities calculated for the entire economy. Nevertheless, the relative importance of SMEs can be different in particular sectors. EUROSTAT data on non-financial business economy allows comparing the share of SMEs in food manufacturing waste services and food services. Figure 76 below depicts the share of SMEs in the employment of the abovementioned industries in the EU27. It appears that this share is much higher than the average for the entire economy in the case of food services. As a result, we may assume that a decrease in employment caused by food waste reduction would particularly affect the SMEs in this sector. At the same time however, the employment share of SMEs is much lower for the waste services and somewhat lower for food manufacturing. Hence, the expected impact on the SMEs' employment in the above industries would be rather small. In fact, if we assume a constant share of SMEs in overall employment, we may estimate that the food waste reduction would lower SMEs' employment in food manufacturing by 35 000 thousand and in waste services by 21 000.

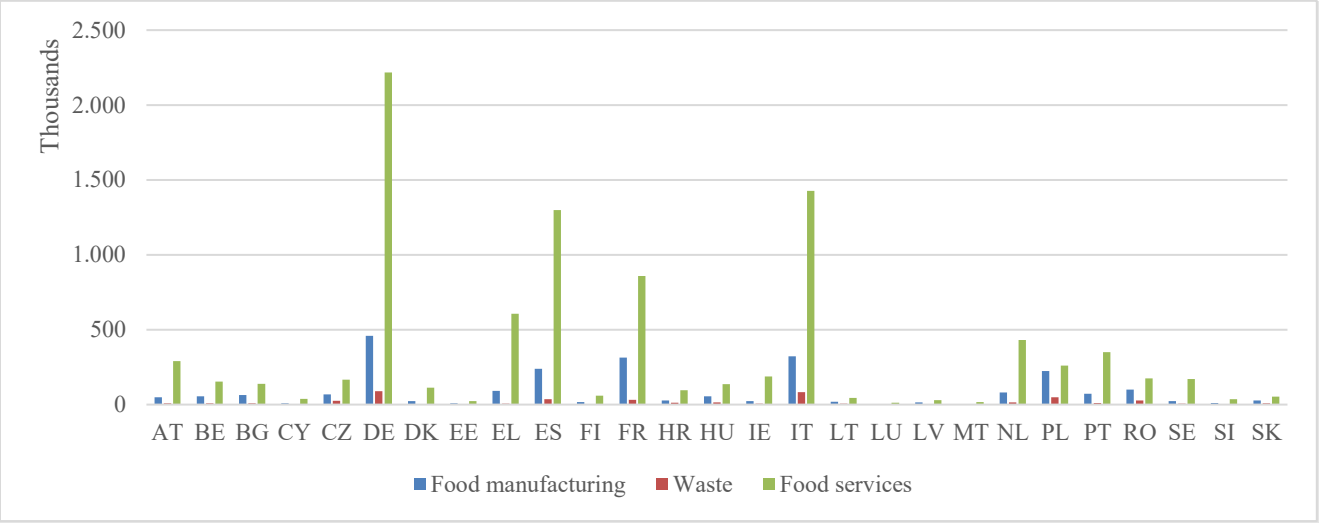
Figure 76: Employment by enterprise size EU27



Source: Authors' own elaboration from MAGNET results and Eurostat data

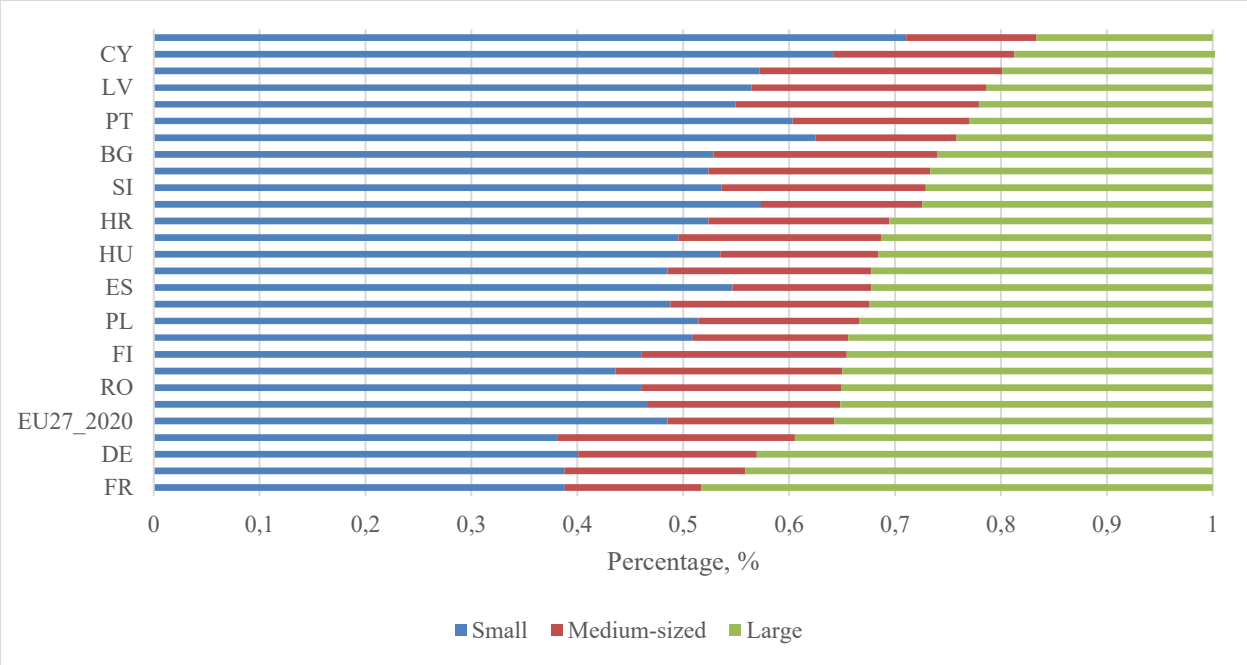
EUROSTAT data show also that there are significant differences in the share of SMEs sector among particular Member States. For instance, employment share of SMEs is much higher in smaller member states (e.g., Cyprus, Estonia, Malta and Latvia) than the bigger ones (e.g., France and Germany). This can be observed in Figure 77 below. On the other hand, these are the biggest member states that lead the SMEs employment in absolute terms (Figure 78). Consequently, we should expect a certain heterogeneity in the impact of food waste reduction on SMEs in particular countries. Following the assumption on a constant share of SMEs in overall employment, we may estimate that the highest reduction in SMEs employment of the analysed industries (without food services) would be expected in Germany (over 13 thousand), followed by Italy (almost 10 thousand) and Spain (over 6 thousand). In absolute numbers the negative impact on SMEs employment would be hardly observed in Denmark, Estonia, Lithuania or Slovenia with reduction far below 1000. Still the relative importance of the fall in employment could be even greater than elsewhere given the high share of SMEs employment in their economies (with the exception of Luxembourg).

Figure 77: SMEs employment in food manufacturing waste and food services by member state in 2020



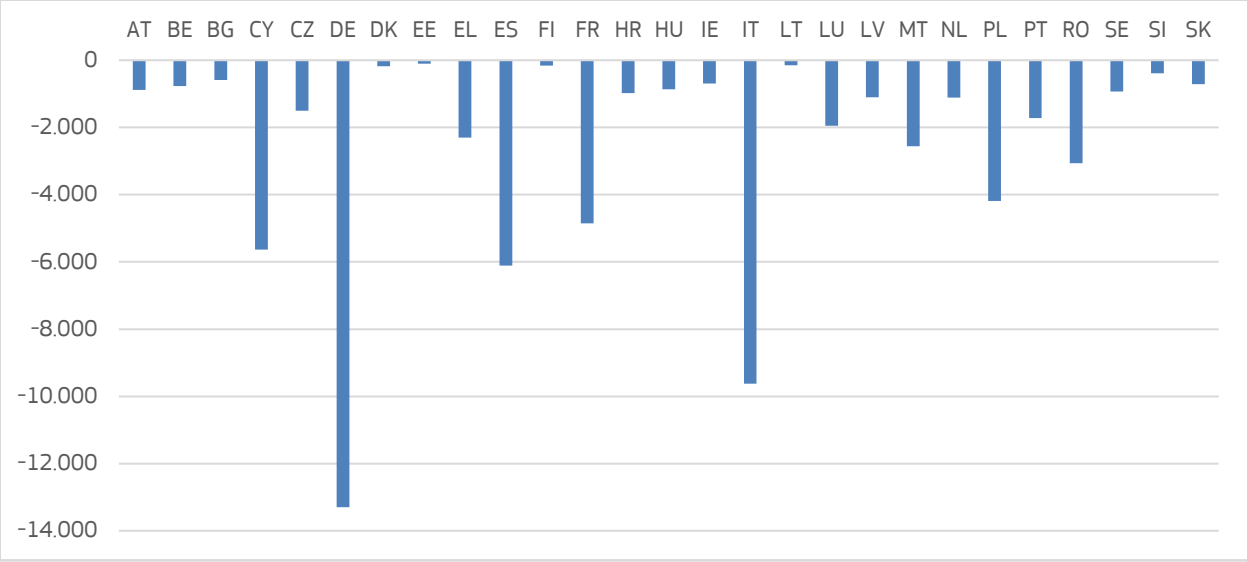
Source: Authors' own elaboration from Eurostat data

Figure 78: Share of SMEs employment in total employment by member state



Source: Authors' own elaboration from Eurostat data

Figure 79: Reduction in SMEs employment in food manufacturing and waste services by member state



Source: Authors' own elaboration from MAGNET results and Eurostat data

2.5.4. Bioeconomy and innovation

The food waste hierarchy defines options to tackle food waste inefficiencies. Prevention and redistribution of surplus food for human consumption are the most preferable options followed by the reuse in animal feed and revalorisation in added-value products keeping the high value of molecule bonds of the material. Low added-value uses such as composting and anaerobic digestion as well as incineration with energy recovery are still better options than disposal. In particular, the non-edible fraction of food that becomes waste can and should be valorised by activities of existing and new bio-based value chains. Already anticipated by the Circular Economy Action Plan and the Bioeconomy Strategy, the latest geopolitical developments and subsequent interruptions of supply chains gave an additional impetus to launch several new initiatives of the European Commission to increase the strategic autonomy for energy (EC, 2022, e.g. REPower EU action plan, where the focus is on sustainably produced biogas and methane, to some extent biofuels), fertilizer (EC, 2022), and other bio-based products.

Although the analysed scenarios in this study mainly look at the implications of food waste prevention and reuse, in principle, an important part of food waste, especially the non-edible fraction of food that is discarded can be valorised. The modelling results of the present assessment give some insights in line with the scenario design.

The reduction of food demand frees up land, which can be used for other purposes. Due to the scenario set-up and assumed cost/benefit relations for the different commodities, the main reaction is an increased export of food products and a small growth of first-generation biofuel production (less than 1% in the advanced scenario) within the existing mandate of the renewable energy directive. Concomitantly, a smaller number of new jobs are created in the related sectors.

As an outcome of the implemented policy options, food waste availability is reduced, so that in this scenario setting neither additional food waste is provided for industrial purposes nor its use promoted through specific policies (such as it is the case for biofuels). For this reason, an additional uptake of second-generation biofuels and the bio-based industry in general is not observed.

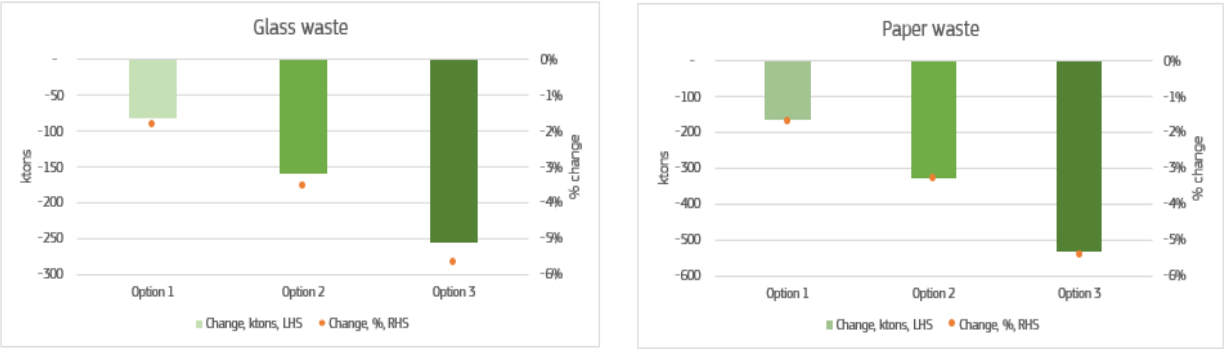
Other studies carried out with the same model (MAGNET) and specific bio-based activities promoting scenarios show the increased use of food waste in the second-generation processing of biomass, creating new growth opportunities for example for bio-based chemicals (Philippidis et al., 2019b, Philippidis et al., 2023).

To summarise, food waste reduction provides, on the one hand, additional land for arable production and non-food uses (if wished by governments and by society), but reduces, on the other hand, in the applied scenario of food waste prevention, to some extent, the availability of food waste for industrial purposes. A holistic assessment of the whole food waste system with different policy support options (also including investments in the food waste collection treatment and processing industries) could give more insights and identify a more efficient policy mix for the circular (bio-)economy.

2.5.5. Food packaging

As discussed in previous sections, food waste reductions lead to less food demand by consumers. This is also reflected in reductions of other waste types such as glass and paper. When less food is purchased, less food packaging waste is created. Figure 80 shows the reductions in household glass and paper waste from food purchases as a total of EU27. In both waste types, we observe a decrease of around 5% in Option 3, which corresponds to a decrease of around 250 ktons for glass waste and over 500 ktons for paper waste. Although not depicted in the chart below as a rebound effect of less food purchases and hence less food packaging, we see a marginal increase in glass and paper waste in other sectors such as services and other manufacturing. However, this increase is approximately limited to 1% in Option 3.

Figure 80: Change in household glass and paper waste (food purchases) for EU27, options vs baseline 2030



Source: MAGNET simulation results

It should be noted that the analysis of potential reductions in food packaging due to food waste reduction is not straightforward. Food packaging plays an important role in the food value chain as it can ensure food safety, enables the product to be transported in good condition and offers convenience to the customers. In addition, packaging can prolong the shelf life of fresh food and prevent the products from spoiling or losing their best shape and taste (Sasaki et al., 2021; White & Lockyer 2020). Hence, in order to reduce food waste, more packaging material could be necessary for smaller portion offerings or emerging packaging technologies could be used to

extend shelf-life of food or to improve food safety. This potential impact of food waste reduction on packaging is not considered in Figure 80.

2.6. Feasibility analysis

This section discusses the feasibility of such targets from the Member States' perspective taking into account:

- the share of edible food waste (which is the fraction that is effectively possible to reduce);
- the efforts made by Member States and other countries in the last decade and the results obtained.

Concerning the effective level of food waste reduction, a maximum theoretical level of food waste reduction achievable can be estimated by considering that at retail and consumption level, the avoidable food waste corresponds to the edible part of food waste generated. This varies significantly across stages of the supply chain and across different products and therefore, the actual food waste reduction potential is diverse among products, for instance, higher in the case of meat and lower in the case of fruits and vegetables. The FUSIONS project estimated an average edible share of food waste at retail level equal to 83%[156]. At household and food services levels, the share of edible food waste was estimated as 70% and 66% of the food waste generated respectively[157]. A weighted average of these three values was calculated based on the levels of food waste generation at retail household and food services level (ESTAT 2022). As a result, the average share of edible food waste over the total food waste at retail and consumption level is equal to 71%. This could therefore be considered the maximum achievable food waste reduction at these stages.

Concerning the feasibility of reaching the food waste reduction targets set in the three alternative policy options, an analysis was conducted on national food waste strategies and policies on food waste reduction, including their implementation, monitoring and reporting. Moreover, a search of quantitative data on food waste reductions reported by Member States and the United Kingdom was performed[158]. The search of data used various sources: information shared in the EU Platform on Food Losses and Food Waste; information gathered by the survey for Member States launched as part of the stakeholder consultation (Annex 2).; national websites; reports from other organizations (WRAP, etc.).

The results of the analysis show that monitoring and evaluation is not a widespread practice and lack quantitative indicators. The few quantitative data on food waste reduction retrieved from this analysis are shown in the table below.

Table 42 - Reported levels of food waste reduction achieved in selected countries

	Retail and distribution	Food services	Household

156 FUSIONS, 2016
157 Derived from the results presented in De Laurentiis et al. 2021
158 UK was considered in the analysis due to the fact that this country is a pioneer in food waste reduction

Country	FW reduction	Reference time	FW reduction	Reference time	FW reduction	Reference time
NL	3.60%(1)	2018-2022			29%(2)	2010-2019
SE			3.00%(3)	2018-2020		2018-2020
UK	8%(4)	2018-2021			21%(5) 17.8%(6)	2007-2012 2007-2018

(5) edible food waste only

Source: (1) (WUR, 2022), (2) (The Netherlands Nutrition Centre Foundation, 2019), (3) (Naturvårdsverket, 2022), (4) (WRAP, 2022), (5) (Champions 12.3, 2017) (6) (WRAP, 2020)

The following considerations can be derived from these results:

1- Values in the table refer to different reference times, which need to be taken into account when considering that Member States will have roughly six years to reach the food waste reduction targets by 2030, in case the legislation comes into force in 2024.

2- No countries reported food waste reduction achieved in primary production and it is therefore not possible to assess the feasibility of reaching food waste reduction targets for this stage of the supply chain based on the results reported by early achievers.

3- At the processing stage the United Kingdom reported an average reduction of edible food waste equal to 1.4% (WRAP, 2022). However, this value was calculated from data reported by manufacturers referring to different baselines (varying between 2015 and 2020) and cannot therefore support any considerations as to the feasibility of reaching food waste reduction targets over six years especially as these refer to total food waste. Moreover, companies, which conducting measurement of food waste reported progress at the level of 10.8% reduction in total food waste per ton of food handled between 2018 and 2021. However, due to increased production and other factors (such as post-Brexit trade disturbances, COVID-19 and post-COVID rebound, improved measurement by companies…), total food waste in processing and manufacturing has increased over this period by around 9%.[159]

4- At retail level the Netherlands reported a food waste reduction equal to 3.6% over 4 years based on which the feasibility of the target proposed in Option 1 seems low. Instead, the United Kingdom reported an 8% reduction over three years, which could

[159] WRAP 2022. The Food Waste Reduction Roadmap Progress Report 2022. https://wrap.org.uk/sites/default/files/2022-12/WRAP_Food_Waste_Reduction_Roadmap_Progress_Report_2022.pdf

suggest that reaching the Option 1 target (15% reduction over 6 years) could be feasible.,

5- At food services level the only available example is Sweden reporting a 3% reduction over two years thereby suggesting low feasibility for all targets.

6- Finally, at household level, roughly similar reductions have been reported by the Netherlands (29% reduction over 9 years) and the United Kingdom (21% reduction of edible food waste over 5 years and almost 18% reduction of total household food waste over 11 years), based on which the Option 1 target can be considered feasible.

When making such considerations on feasibility, it is important to consider that, as presented in Section 3, Member States are at different levels in their implementation of food waste prevention initiatives and therefore assuming that all could replicate results achieved by these two countries would be rather optimistic. Moreover, while the first reductions might be achieved with a lower effort, it might be more difficult and costly to achieve further improvements. Finally, we can observe that results achieved so far are the outcome of voluntary efforts taken by individual countries and that binding food waste reduction targets might be needed in order to achieve more significant results., Experience gained by front-runners, knowledge gained regarding the efficiency of food waste prevention initiatives and continued sharing of best practice through the EU Platform on Food Losses and Food Waste could accelerate such progress.

ANNEX 12: HOW DO THE OPTIONS COMPARE

The measures were assessed individually as detailed in Annex 11. This section sets out the overall assessment of each option and then draws conclusion in terms of how the policy options compare based on the likely impacts of the measures they contained. This comparison is based on how the options contribute to the two main objectives on the balance of economic, environmental and social impacts and on the total costs and benefits where these could be calculated. The 'One-in One-Out' considerations are also explained.

1- Textiles

By way of reminder the objectives for the proposed textiles intervention are to:

- reduce textile waste generation
- to make sure that the textile waste that is generated is treated as high up the waste hierarchy as possible

Option 1 measures would contribute to both intended objectives.

Clarifying definitions (measure 1.1) is necessary to ensure the consistency with which Member States would comply with the separate collection obligation coming into force in 2025 and to facilitate movements of waste to enhance reuse and recycling markets. As described in Annex 11 alternative 3 that takes a definition in keeping with the textile labelling Regulation as a broad family of items that may be considered as textiles but then specifically targets measures at a more defined list of textiles using the coding applicable under the Combined Nomenclature listing is considered the best alternative to define 'textiles' and alternative 1 of defining all separately collected textiles as waste is considered the most appropriate to clarify waste versus non-waste textiles.

For all measures under Option 1 the economic, social and environmental impacts would generally be positive. However, all measures under Option 1 except for clarifying definitions (measure 1.1) are likely to address the objectives to a limited extent. Option 1 is also coherent with existing and planned EU policy initiatives.

The costs of measures under Option 1 are generally limited to administrative costs, including the administrative costs of developing guidance estimated as 135 000 euro per piece as well as staff resourcing from the European Commission. However, Measure 1.1 is likely to result in a reduction of administrative burden for Member States, producers and the waste management sector due to the common terminology for textiles and textile wastes in the context of the WFD across the entire EU. It is difficult to ascertain the full reduction in administrative burden that would take place but an estimation of 250 000 euro per year has been included based on the estimated amount of time currently spent in relation to collection of data and reporting on an unspecified list of textiles at present. Additionally, were waste status for separately collected textiles to only apply after sorting the administrative costs of obtaining and maintaining the relevant waste management authorisations for collectors would be lowered by approximately 200 euro per year per entity based on the average EU permitting costs. Beyond this, benefits arise from increased support to Member States and stakeholders involved in textiles waste management via guidance dialogue and the

sharing of best practice as well as harmonising end-of-waste provisions at the Member State level by adopting an EU-wide set of criteria that can be applied. This should, in turn, provide an incentive to invest in and improve textile waste management infrastructure across the EU and mitigate some of the negative impacts of the way in which textile waste is managed at present.

Option 2 measures would be more effective that Option 1 measures in achieving both intended objectives. Option 2 measures carry higher economic costs than Option 1, while they generate far higher economic, social and environmental benefits. Measure 2.9 specifically ensures coherence with the EU Strategy for Sustainable and Circular Textiles[160] that called for the introduction of harmonised measures for Extended Producer Responsibility for textiles.

Measure 2.5 would lead to additional costs for sorting and subsequent treatment of approximately 913 million euro per year, whilst recovering value via textiles for reuse of 534 million euro per year and recycling of 117 million per year. Mitigating GHG emissions as a result of this measure would also result in a reduction of GHG emission equivalent to 16 million euro per year whilst creating an additional 8 740 jobs. Better sorting would also feed into the better application of end-of-waste criteria foreseen under Option 1 as a result of more textiles being made available for reuse and recycling within the EU than the baseline.

Measure 2.8 would result in small additional costs for Member States (approximately 4 000 euro per Member State) and small additional costs for operators of 78 euro per year per entity. However, the legal certainty for shipments of textiles would be much improved, addressing the problem of textiles exported to third countries as reusable actually comprising wastes that are only suitable for disposal. This would also facilitate the enforcement of waste rules by the competent authorities.

As noted in the list of problem drivers, shortcomings in collection, sorting, reuse and repair and recycling infrastructure of textiles are predominant across much of the EU. Measure 2.9 addresses these by requiring producers to take into account the costs of management of textiles over their entire lifetime, including at the point of discard. The infrastructure shortcomings cause problems not only within the EU but also in third countries to which EU textiles are exported with somewhat questionable reusable status. EPR fees to meet the full management costs of textile wastes within the EU would result in costs in the order of 2.28 billion euro per year by 2035 from the disparate systems currently and likely to be employed by Member States to producers under EPR. These costs may fall 100% on consumers or 100% on producers (or a mix of both) under the EPR approach whereby producers may choose to add the costs of EPR compliance to the costs of goods sold to consumers or not. The maximum price increase that might be expected under this scenario for consumers is 0.6% for the average textile product. The McKinsey & Company report[161] expects that with the correct investment in capital (estimated at between 6 billion and 7 billion for the recycling sector to 2030) annual overall returns for the EU 27[162] would be in the order to 3.5 billion to 4.5 billion euro by 2030. Whilst these estimates appear optimistic given the current levels of recycling, they do signal that costs of an EPR scheme are likely to be outweighed by the benefits. The application of Measure 2.9 would effectively address the costs and benefits foreseen for Measure 2.5, as well as contributing to the objectives of Measure 2.8.

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[160] COM (2022) 141 final
[161] McKinsey & Company, 2022.
[162] This estimate includes CH that amounts to roughly 1.1% of total

Measure 2.14 on reporting would generally see an increase in reporting for approximately 1 400 waste management operators with a total cost of additional reporting of approximately €750 000 for the EU overall. At the same time significant improvements in understanding the volumes of textile wastes generated, collected, sorted and subsequently treated would result as a result of the changes to existing reporting obligations and the small number of additional reporting obligations added.

Option 2 is coherent with existing and planned EU policy initiatives whilst, as noted above, actively contributing to the EU Strategy for Sustainable and Circular Textiles.

Option 3 measures set EU targets for the management of textiles. This top-down approach offers the greatest flexibility to Member States on how to achieve those targets. However, all the targets that could be applied are dependent upon good quality data to define the starting point for Member States in terms of their current textile waste generation volumes, their sorting capacities, their collection, reuse, preparation for reuse and recycling rates. As outlined in Annex 7, there is a lack of common understanding of textiles in the context of the WFD and there are other data and information gaps. This means that option 3 carries the significant risk of setting targets based on incomplete data. Hence, it is not possible to set targets that are ambitious but achievable except for a separate collection target. The existing obligations under Article 11(1) would render such a target more feasible to achieve. It is considered premature to set the other targets assessed.

The measures under Option 3, could the targets be set, would likely be cost effective as flexibility would be left to Member States to achieve them. However, as noted earlier, except in the case of Measure 3.6 it is considered that the current data is insufficient to set such targets with the risk of inappropriate targets being set. In turn, inappropriate investments could be made with resulting benefits also being limited in impact. Measure 3.6, which is the only target that could possibly be set on the basis of the information currently available – even if the studies show large heterogeneity of their predicted rates – would result in extra costs for a number of Member States with collection, sorting and treatment costs totalling 39.5 million euro per year. At the same time approximately 23 million euro of reusable textiles would be available to be placed on the market and 5 million euro of textiles suitable for recycling would be captured. Additional reductions in GHG emissions and increases in employment would also be expected. Option 3 is coherent with existing and planned EU policy initiatives.

Significant and direct environmental impacts from the policy options – more so for Options 2 and 3 – especially on water, soil and air quality are likely to have substantial and positive indirect effects on human health and public health and social care systems across the EU as well as in third countries when textiles or textiles wastes are exported from the EU. This would result in significant indirect positive social impacts that would also benefit the economy by improving labour productivity and other economic factors. These indirect social and economic impacts have been broadly captured as part of the qualitative assessment of environmental impacts.

Table 43 - Balance of costs and benefits for the three options and measures considered in this assessment

Policy option and measure	Description of impact	Overall balance with best alternative
Option 1 – Supporting MS in implementing and enforcing current provisions	**Measure 1.1** **Economic costs**: Measure 1.1 sub-option 1 alternative 1 adds collection costs 660 million euro per year. These costs would fall on producers or consumers or a mix of the two depending on the approach employed at the Member State level to recover the costs of waste management. **Economic benefits**: Reduced administrative burden 250 000 euro per year for businesses. Sub-option 2, alternative 2 offers an admin cost reduction of 200 euro per year as waste permit is not needed. **Environmental benefits**: Better focussed action on the key textile waste streams is likely to reduce the environmental impacts of those streams **Social benefits**: Potential increases in employment in the reuse and recycling sector for the targeted textiles as a result of the measures foreseen.	**Costs**: 135 000 per guidance + COM staff **Benefits**: 250 000 euro per year **Overall effectiveness, efficiency and coherence**: positive but limited except for measure 1.1
	Measure 1.2 **Economic costs**: No specific economic costs have been identified. **Economic benefits**:	

	Better targeted practices and policy measures in relation to waste prevention in Member States to the advantage of business and EU citizens. **Environmental benefits:** Reductions in waste as a result of greater data on and support for waste prevention, as well as greater reuse and recycling. **Social benefits**: Potential increases in employment in the reuse and recycling sector as a result of better targeted waste prevention measures	
	Measure 1.3 **Economic costs**: 135 000 euro per piece of guidance developed + COM staff. Additional costs of application of the measure are dependent upon the actions put into place by Member States as a result of the sharing of best practice. In this respect the greatest costs of application would fall on Member States that currently have low levels of collection of textile wastes. **Economic benefits**: Positive impacts for textile management stakeholders through the sharing of good practice. **Environmental benefits:** Reductions in waste as a result of greater data on and support for waste prevention, as well as greater reuse and recycling. **Social benefits**:	

	Potential increases in employment in the reuse and recycling sector as a result of better guidance and stakeholder sharing of experience..	
Option 2 - Additional regulatory requirements	**Measure 2.5** **Economic costs**: 913 million euro per year for sorting obligations. These costs would fall on producers or consumers or a mix of the two depending on the approach employed at the Member State level to recover the costs of waste management. Landfill tax loss of 26.5 million euro for Member States due to textiles diverted from landfills but tax gain on the sale of secondary materials **Economic benefits**: 534 million per year of reuse value and 117 million euro per year of recycling value from additional sorting **Env benefits**: 16 million euro from GHG emission reduction as well as reduction in release of pollutants to air, water and land that would otherwise result from poor waste management. Replacement of virgin fibres with recycled fibres of between 118 000 and 295 000 tonnes. **Social benefits**: 8 740 jobs created and social impacts of EU waste in third countries mitigated as well as the social costs of fibre production. **Social costs:** Negative impact on the sorting industry in third countries receiving unsorted / poorly sorted EU textiles at present	**Costs**: 963 million euro costs **Benefits**: Direct benefits of 651 million euros of reusable and recyclable materials as well as support to 3.5-4.5 billion euro annual overall returns from EPR investments. **Env benefits**: 16 million euros in GHG emissions averted alongside the wider air quality, water and soil pollution mitigated via current disposal practices in the EU and third countries. Land use savings in relation to virgin fibre displaced by recycled fibres as well as water savings. **Social benefits**: 8 740 jobs created. Reduced social costs for producers of virgin fibres in third countries. Higher quality reusable textiles received in third countries. **Social costs:** Potential job losses in the sorting sector in third countries as a result of increased sorting in the EU. **Overall effectiveness , efficiency and coherence**: positive
	Measure 2.6	

	Economic costs: 0.5 FTE within the Commission to adopt the necessary implementing act. **Economic benefits**: Minimising divergence of approaches to end-of-waste criteria . Potential savings in the costs of managing textile wastes that reach end-of-waste status for businesses managing such materials. Ensuring sufficiently consistent feedstock from the sorting processes as input to textile recycling. **Env benefits**: Managing textile wastes within the EU in comparison to third countries would result in CO2 eq savings of approximately 81 000 – 225 000 tonnes per year and externality savings of between 13.5 million and 37.7 million euro per year using the 10% waste value and between 54 million euro and 150.8 million euro per year using a 40% waste value. **Social benefits**: Negative impacts of EU waste exported to third countries mitigate including prevention of open dumping and open burning.	
	Measure 2.8 **Economic costs**: 208 euro per competent authority and 78 euro per exporter annualised per inspection **Economic benefits**: Reduced textile waste management costs to the reuse operators within or outside the EU on account of reduced share of potential waste fractions in the bales of sorted textiles for reuse imported from the EU.	

	Env benefits: 16 million euro from GHG emission reduction as well as reduction in release of pollutants to air, water and land that would otherwise result from poor waste management. **Social benefits**: 8 740 jobs created and social impacts of EU waste in third countries mitigated.	
	Measure 2.9 **Economic costs**: Shift of economic costs from the current disparate systems employed by the majority of Member States for the management of textile wastes to producers under extended producer responsibility. These costs that would be applicable under the baseline anyway would fall on producers or consumers or a mix of the two dependent on the approach employed at the Member State level to recover the costs of waste management. Register development costs of 2-12.3 million euro across all Member States and maintenance costs of 11 200 and 69 000 euro per Member State per year. 7.79 euro million per year for producers to report for the purpose of EPR 4.04 euro million costs of operating PRO registers and inspections **Economic benefits**: Support to 1.1 billion euro of reusable textiles would be available to the market as well as 188 million euro of textiles for feeding into closed loop recycling and 49 million of textiles for open loop recycling operators.	

	Support to 3.5-4.5 billion euro annual overall returns on recycling investment (including the costs and benefits indicated for the other measures) and 1.1 billion euro annual recovery of reusable textiles Tackling potential divergence in Member State national EPR schemes and the resulting level playing field challenges that would result. **Env benefits**: Application of the polluter pays principle supporting a reduction in textile waste sent for disposal of 670 000 tonnes per annum and the resulting environmental impacts of that disposal. Support for the displacement of virgin fibres with greater recycled fibres through support to the textile recycling sector and resulting land use and water use savings. **Social benefits**: Support for 5 500 jobs created and social impacts of EU waste in third countries mitigated.	
	Measure 2.14 **Economic costs**: 750 000 euro per year for EU enterprises to comply with EU reporting obligations **Economic benefits**: Better understanding of textile management within the EU in particular for pre-consumer, post-commercial and post-industrial wastes	

	Env benefits: Improved knowledge of the textile waste problem allowing better targeted measures to address the environmental impacts of those wastes **Social benefits**: No specific benefits identified.	
Option 3 – Targets (assessed for separate collection target)	**Economic costs**: 39.2 million euro per year for additional textile collection, sorting and treatment in Member States that are unlikely to meet a 50% collection target by 2035. These costs would fall on producers or consumers or a mix of the two dependent on the approach employed at the Member State level to recover the costs of waste management. Lack of robust data makes target setting for textile waste management premature for most targets **Economic benefits**: 23 million euro per year of reuse value and 5 million euro per year of recycling value for the reuse and recycling sectors. **Env benefits**: Additional GHG emission reduction	**Economic costs** €39 million per year (covered by the EPR measure 2.9) **Economic benefits** 28 million euro per year **Env benefits**: Additional GHG emission reduction **Overall effectiveness, efficiency and coherence**: Effective if the targets are met. Ensures flexibility of implementation in Member States.

2- Food Waste

As comparison of the options result directly from Annex 11 and was summarised in the main text of Staff Working Document, no additional information on the comparison of the options is provided here.

ANNEX 13: PREFERRED OPTION

1- Textiles

The preferred option would be to combine the green-rated policy measures illustrated in the Table below. These measures compose a 'preferred' policy package for the revision of the WFD. The implementation of such measures would likely generate significant and positive impacts that significantly outweigh the costs involved in their application. The preferred policy package would involve the measures listed in the table, aiming to address the two specific objectives:

- reduce textile waste generation, and
- increase the recycling of textile waste and reduce the amount of residual textile waste.

Table 44 – Impacts of textile policy measures in the preferred option

Policy measure	Impact of the measure
Measure 2.5 – Setting sorting obligations for separately collected textiles and textiles waste	As well as ensuring that once collected within the EU that textiles are sorted with the waste hierarchy in mind, better sorting in the EU looks to limit the possibility of textile wastes being mixed with reusable textiles and exported to third countries where they place an economic, environmental and social burden on the countries of destination.
Measure 2.6 – Adopting end of waste criteria	Ensuring a coordinated approach to determining when textile waste is no longer a waste looks to limit distortions in the EU market in relation to reuse and recycling whilst facilitating easier movement of materials when they no longer pose an environmental threat and can be safely used.
Measure 2.8 – Setting requirements for shipments of textiles for reuse	In coordination with Measure 2.5, ensuring that exports of reusable textiles are actually reused at the point of destination and do not contain textile wastes looks to address the economic, environmental and social burdens that are currently related to the export of EU waste textiles to third countries.
Measure 2.9 – Mandating the use of EPR	The effective management of textile wastes is dependent on an informed public, sufficient waste management infrastructure and research and development to support innovation. EPR effectively ensures that the required funding is put in place to finance these actions and producer is incentivised to adapt product design to facilitate waste management in line with the waste hierarchy.
Measure 2.14 – Setting reporting obligations for textiles	Information on the generation of textile wastes, their collection, sorting and treatment is exceedingly limited. This prevents the development of well-informed waste management infrastructure and future policy making. Adjusting present reporting obligations as well as adding additional reporting obligations would address this

	information shortcoming allowing better targeted and informed action in the future.
Measure 3.6 – Setting a separate collection target for textile waste	Setting a separate collection target could additionally be considered. It may addsclarity to the obligation under Article 11(1) of the WFD whilst ensuring that Member States achieve at least a 50% collection rate for textiles thereby increasing the volumes of textiles available for reuse and recycling whilst reducing the volumes of textiles currently discarded in residual waste. At the same time, it imposes administrative burden, setting the exact rate might be challenging given the large heterogeneity of predicted rates across different studies and the existing 2025 separate collection obligation may have a similar effect on the rate.

The implementation of such measures would likely generate significant and positive impacts that significantly outweigh the costs involved in their application. This would include:

- Economically ensuring the that costs of managing textile wastes fall on the producers of those wastes (with a shift in cost under the baseline from the disparate systems likely to be used to producers under EPR of approximately 2.28 billion euro (Measure 2.9)) whilst ensuring better recovery of the values of the wastes generated in terms of textile reuse and recycling of textiles including support to the development of closed loop recycling in the EU (Measures 2.5, 2.6, 2.8, 2.9 and 3.6) to the extent that such recovery of value may recover 75% of the costs concerned (Measure 2.5). Possible economic impacts on third countries are detailed (e.g., for textiles producers in third countries) in the dedicated section/chapter.
- Environmentally reducing the negative impacts of textile waste disposal by greater reuse and recovery within the EU (Measures 2.5, 2.6, 2.9 and 3.6) whilst better addressing the impacts of used textiles and textile wastes exported from the EU in third countries (Measure 2.5, 2.6 and 2.8) including reducing GHG emissions.
- Socially mitigating the social impacts of poor textile waste management both within the EU (Measures 2.5, 2.6, 2.9 and 3.6) and in third countries (Measure 2.5, 2.6 and 2.8) whilst increasing employment in the waste management sector including textile recycling (Measures 2.5, 2.6, 2.9 and 3.6) and providing support to social enterprises and the role they play in managing used textiles (Measure 2.9).
- Administratively giving much greater clarity in relation to the scope of textiles subject to the provisions of the WFD (Measure 2.9) as well as greater information on the flows of those textiles and on the results of efforts by Member States to address used textiles and textile wastes (Measure 2.14). Reducing administrative burdens in relation to unclear reporting (Measures 2.9 and 2.14) and adding reporting obligations only where they are most relevant (Measures 2.9 and 2.14).

- Specifically in relation to SMEs the textiles sector is dominated by SMEs and micro-enterprises comprise over 86% of the sector. The chosen measures have been specifically tailored to minimise the financial and administrative burden that would fall on micro-enterprises most notably by excluding them as producers for the purpose of EPR. At the same time, the support to reuse and recycling will assist SMEs in these fields in comparison to the status quo by ensuring better funding is available and a more stable feedstock of reusable textiles and recyclable textiles are available on the market.

Table 45 – Impacts of textiles preferred option

Preferred option	Description of impact	Overall balance
Option 2 - Additional regulatory requirements + 3.6 target	**Economic costs**: 913 million euro per year for sorting obligations Register development costs of 2-12.3 million euro across all Member States and maintenance costs of 11 200 and 69 000 euro per Member State per year. 7.79 euro million per year for producers to report for the purpose of EPR 4.04 euro million costs of operating PRO registers and inspections 39.2 million euro per year for additional textile collection, sorting and treatment in Member States that are unlikely to meet a 50% collection target by 2035 208 euro per competent authority and 78 euro per exporter annualised per inspection 750 000 euro per year for EU enterprises to comply with EU reporting obligations Landfill tax loss for Member States due to textiles diverted from landfills **Economic benefits of additional sorting**: 534 million per year of reuse	**Costs**: 975 million euros costs. These costs may fall 100% on consumers or 100% on producers (or a mix of both) under the EPR approach whereby producers may choose to add the costs of EPR compliance to the costs of goods sold to consumers or not. **Benefits**: Direct benefits of 656 million euros of reusable and recyclable textiles for the EU reuse and recycling market as well as support to 3.5-4.5 billion euro annual overall returns from EPR investments. Additional GHG emission reduction equal to 16 million euro per year 8 740 jobs created **Overall effectiveness and efficiency**: positive

	value and 94 million euro per year of recycling value **Economic benefits of additional collection**: 28 million euro per year of combined reuse and recycling value **Supported (indirect) Economic benefits of EPR**: 3.5-4.5 billion euro annual overall returns on recycling investment (including the benefits indicated for the other measures) **Env benefits**: 16 million euro from GHG emission reduction as well as reduction in release of pollutants to air, water and land that would otherwise result from poor waste management. **Social benefits**: 8 740 jobs created and social impacts of EU waste in third countries mitigated.	

Impacts on competitiveness

Table 46 – Impacts on competitiveness

Dimensions of competitiveness	**Impact of the initiative (++ / + / 0 / - / -- / n.a.)**	**References to sub-sections of the main report or annexes**
Cost and price competitiveness	+/-	Annex 11
Dynamic competitiveness	++	Annex 11
International competitiveness	+	Annex 11
Strategic competitiveness	+	Annex 11
SME competitiveness	0	Annex 11

Costs and price competitiveness – The initiative will result in the application of fees to certain categories of textiles goods placed on the market, namely clothing and household textiles via extended producer responsibility. The fees are targeted at addressing the costs of managing textiles at their point of discard and will be set by Member States and monitored at the EU level. Micro-enterprises are exempted from these provisions. Compliance costs will be minimised through the use of Producer Responsibility Organisations that will coordinate compliance on behalf of

producers. The provisions would apply to goods placed on the market that are manufactured within the EU as well as those imported and placed on the market from third countries. The fees are expected to account for less than a 3.5% increase in the total costs of textile products whilst at the same time raising 2.3 billion euro to fund collection, sorting, reuse and recycling. The mandatory involvement of all relevant stakeholders in the development and implementation of EPR schemes looks to address potential for anti-competitive behaviour in their operation. Impacts of price competitiveness are generally linked to the level of action taken by Member States to date to address textile wastes, with those Member States generally lagging behind facing the greatest price competitiveness impacts.

Dynamic competitiveness – The initiative generally improves dynamic competitiveness in the EU, in particular through increased research and innovation in the reuse, repair and recycling sectors directly supported by a clear funding mechanism under EPR. The initiative will simplify movements of textiles for reuse and recycling by adopting end-of-waste criteria applicable across the EU. The fees raised through extended producer responsibility will feed into textile waste management including sorting and recycling infrastructure increasing the speed of innovation in this important sector whilst providing information to the public on textile waste prevention at the Member State level.

International competitiveness – No significant impacts on international competitiveness have been identified as the most significant costs apply to both goods manufactured within the EU as well as those imported into the EU. Manufacturers of textiles in the EU would not be subject to the proposed EPR fees for their goods placed on the market outside of the EU.

Strategic competitiveness – The initiative would directly support strategic competitiveness, reducing reliance on imports of textiles and textile products into the EU through increased reuse and recycling, directly replacing virgin fibres with their recycled equivalent.

SME competitiveness – The textiles industry is dominated by SMEs. The most costly aspect of the initiative – the application of EPR – would not include the majority of SMEs as micro-enterprises that comprise approximately 86% of the sector are proposed to be excluded. The greatest knock-on consequences of their exclusion would be an increase in costs in enterprises with greater than 50 employees by approximately 11% in comparison to a situation whereby micro-enterprises would be included. These costs are not expected to impact on competitiveness given their relatively low level.

Impacts on third countries

The Measure on setting sorting obligations (2.5) adopting end of waste criteria (2.6) and setting requirements for shipments of textiles (2.8) are linked. Their aim it to ensure that the impacts arising from illegal shipments, whereby used textiles exported as used contain textile waste fractions (textiles not fit for re-use in the receiving market) are reduced. Measure 2.8 sets minimum requirements for distinguishing shipments of re-usable textiles from shipments of waste textiles. Measure 2.8 does not restrict exports; it aims to ensure that textiles exported for reuse purposes have undergone sorting operations to ensure that they are reusable. With respect to unsorted textiles which are shipped as waste, sorting can take place outside the EU in accordance with the

WSR if the provisions of the WSR are respected. Measure 1.1.2.1 as taken up in measure 2.5. mandate that when used textiles are collected they are to be regarded as waste until they have undergone sorting or other recovery operations leading to an end of waste status. Measure 2.5 and 2.6 sets sorting obligations to separate the fraction for reuse that can then exit the waste status. The sorting obligation will set a number of criteria to ensure that the textiles that are exported are reusable as much as possible. Textiles that would remain unsorted can still be exported but would have to be exported as waste in accordance with the requirements of the Waste Shipment Regulation (which include different requirements for textile waste exported to OECD or non-OECD countries and textile waste exported for recovery or disposal) which ensures that waste is exported to countries that may ensure sound management of waste.

The preferred option ensures that textiles are exported according to their verified status, reusable versus waste without imposing any trade restrictions. The measures is therefore the least trade restrictive necessary to achieve the environmental objectives of the measure. In 2021, the countries importing most of the textiles exported from the EU were Pakistan, the United Arab Emirates, Tunisia, Cameroon, Turkey and Togo. These countries may import these textiles and then dispatch them to other countries in the region, there is no information in that respect. Of these only Turkey is an OECD member country. To export to non-OECD, traders will have to either export the textiles as reusable (and hence having undergone prior sorting according to measure 2.5) or as waste.

In the case of reusable textiles, there may be an impact on importers who may receive less volumes of textiles as they have been better sorted and potentially reuse more in the EU. However, they would also get lower shares of waste in the imported bales, reducing the preparation for reuse and waste management costs and reducing the administrative burden on the enforcement of illegal shipments. In addition, received less waste will have a positive environmental impact by reducing the textiles that end up burned or dumped where there is a lack of appropriate waste management infrastructure. Measure 2.5 on setting sorting requirements also requires sorters to collect information on the fate of the textiles exported for reuse. Local reuse actors and NGOs are the best placed actors to assist the sorting operators in data collection in third countries to provide the required information. This will create new business opportunities for local third country textile reuse actors.

In the case of textile waste, according to the proposal for a WSR, export to non-OECD member countries will only be possible if the third country demonstrates its ability to treat waste in an environmentally sound manner. This will reduce the amount of textile waste exported to where it can be managed in an environmentally sound manner.

There is also an impact on companies importing new textiles in the EU as they will be subject to the EPR rules (measure 2.9) as are the producers in the EU (to the extent that they are not exempt as micro-enterprises). This mainly concerns producers in China which represents over one third of finished textiles and clothing imports to the EU markets (includes fashion and clothing, furnishing and home, and industrial and technical). EU is the second largest producer of textiles consumed in the EU and following that there are a number of other Asian countries.

2- Food Waste

The preferred option for the food waste part would be the option 2 which considers the following combinations of targets per sector of the food chain:

- Target for primary production – 0%,
- Target for processing and manufacturing – 10%,
- Target for retail and consumption stages – 30%

It is expected that this option will be efficient in providing a strong policy impulse for Member States to take action to reduce food waste at national level, while being proportionate and politically feasible.

The main environmental, economic and social impacts from this option are summarized in the tables below:

Table 47 – Main food environmental impacts

Impacts	**Option 2**
Reduction of GHG emissions (MAGNET model)[163] [Million tCO2eq]	3.9 in the EU (and 12.6 out of EU)
Reduction of GHG emissions (Environmental footprint)[164] [Million tCO2eq]	62
Reduced impact on land use [Trillion Pt][165]	2.2
Reduction in marine eutrophication [Million kg N eq.]	532
Reduction in water scarcity [Billion m3 water eq.]	80

Table 48 - Main food economic impacts

Impacts	**Option 2**
Demand for food	-4.2%

[163] Calculated with MAGNET model including rebound effect. Rebound effect refers to increased emissions resulting from increased economic activities in other sectors due to savings from food spending being spent on other types of consumption

[164] Calculated with bottom-up analysis

[165] Pt - Dimensionless (point) unit representing soil quality index (LANCA model) - taking into account erosion resistance, physicochemical filtration, groundwater regeneration, mechanical filtration and biotic production.

Change in the value of agri-food production	-1.8%
Change in market prices	-0.1% to -2.6%
Trade Balance (TB) per sector[166]	AGRI TB: 2 691 mln EUR FOOD TB: 2 217 mln EUR
Farm income	-4.2 bn EUR
Estimated adjustment costs[167]	**Household:** 20 EUR/ton to 158 EUR/ton
	PROC: 13 EUR/ton to 29 EUR/ton **RETAIL**: 25 EUR/ton to 123 EUR/ton

Table 49 - Main food social impacts

Impacts	**Option 2**
Change in jobs in agri-food sectors[168]	- 135 000, -1.3%
Average share of food expenditure (agri-food and food services) [% of total household expenditure]	17.0%
Savings in food expenditure per household (of four persons) [EUR per year]	439

Impacts on competitiveness

Table 50 - Overview of impacts on competitiveness

Dimensions of competitiveness	**Impact of the initiative (++ / + / 0 / - / -- / n.a.)**	**References to sub-sections of the main report or annexes**

[166] AGRI includes all primary agricultural commodities (crops and livestock), FOOD includes all processed food commodities, including food services

[167] PRIM – primary production. PROC – processing and manufacturing. Household includes out-of-home consumption (food services)

[168] i.e. primary production and processing and manufacturing and not including retail and food services

Cost and price competitiveness	+	Annex 11, Annex 15
Capacity to innovate	+	Annex 11
International competitiveness	+	Annex 11
SME competitiveness	0	Annex 11, Annex 15

Costs and competitiveness – The initiative is expected to result with national actions to support food waste prevention. It is expected that food business operators which will optimize their business process will become more competitive. However, this IA is not able to quantify that process. Based on exchanges with stakeholders it expected that the costs for adapting the operation will be quickly offset by savings from reduction due to less waste (lower treatment costs) and savings on raw material purchases.

It is generally regarded that food business operators have an inherent economic incentive to reduce food waste as it impacts directly on their profits. Moreover, numerous business cases shows that more insight on food waste generation in their operations, measurement of food waste and taking action to address hotspots brings significant savings, with some reports indicating average benefits-cost ratio of 7:1 or even more. Similar business cases analysis covered hotels The Business Case for Reducing Food Loss and Waste: Hotels | Champions 12.3 (champions123.org), catering The Business Case for Reducing Food Loss and Waste: Catering | Champions 12.3 (champions123.org) or food business in general The Business Case for Reducing Food Loss and Waste | Champions 12.3 (champions123.org).

Capacity to innovate – The targets of reduction of food waste should create additional incentive in several areas of innovation, such as use/uptake of digital tools (e.g., optimisation of stock and logistics, food sharing applications, food consumption prognosis) or bioeconomy (drive to find high value use for food not destined for human consumption). As sharing of best practices is one of the most often used tools at both at EU (EU Platform on Food Losses and Food Waste) and national levels, it is expected that the uptake of innovation will be spreading fast.

International competitiveness – Food waste reduction targets have no direct impact. However, the model expected that as result of reduction on demand for food the prices on EU market will decrease, making European food relatively cheaper at the international markets. This mechanism and expected values are described in Annex 11 (section on trade impacts).

SME competitiveness – It is expected that there will be no impact on competitiveness of SMEs – i.e., distribution of costs and benefits resulting from the proposed policy option are expected to be similar, regardless of business size. See Annex 15 for more details.

Impacts on third countries

See section on international competitiveness above. No other impact on third countries is expected.

3 - Combined effects of the preferred measures on textiles and food waste

Table 51 – Combined impacts of the preferred measures on textiles and food waste

Preferred combined option	Description of impact	Overall balance
Option 2 - Additional regulatory requirements + target for textiles	**Economic costs for textiles**: • €913 million per year for sorting obligations • Register development costs of €2-12.3 million across Member States and maintenance costs of €11 200 and 69 000 per Member State per year • €7.79 million per year for producers to report for the purpose of EPR • €4.04 million costs of operating PRO registers and inspections • €39.2 million euro per year for additional textile collection, sorting and treatment in Member States that are unlikely to meet a 50% collection target by 2035 • €208 euro per competent authority and €78 per exporter annualised per inspection • €750 000 per year for EU enterprises to comply with EU reporting obligations • €26.5 million landfill tax loss for Member States due to textiles diverted from landfills **Economic costs for food**: Reduction in demand for food of 4.2% and a change in value of agri-food production of -1.8% alongside a fall in market prices of between 0.1 and 2.58%.	**Costs**: €975 million (these costs may fall 100% on consumers or 100% on producers or a mix of both). Combined costs of 84 euro / tonne to 145 euro per tonne of food produced for food. **Benefits**: Direct benefits of €656 million of reusable and recyclable textiles for the EU reuse and recycling market as well as support to €3.5-4.5 billion annual overall returns from EPR investments Reduction in household food costs of 439 euro per year. Additional GHG emission reduction equal to €16 million per year from textiles and additional GHG emission reduction equal to 4.1 million tonnes per annum per year 8 740 jobs created in waste management but 135 000 lost in agri-food sectors. **Overall effectiveness, efficiency and coherence**: positive

	A fall in farm income of euro 4.2 billion euro per annum. Implementation costs of 43 EUR/ton to 70 EUR/ton for household, 7 EUR/ton to 22 EUR/ton for producers and 34 EUR/ton to 53 EUR/ton for retailers. **Economic benefits for textiles:** • EPR: €3.5-4.5 billion annual overall returns on recycling investment (including the benefits indicated for the other measures) • Additional sorting: €534 million per year of reuse value and €94 million per year of recycling value • Additional collection: €28 million per year of combined reuse and recycling value **Economic benefits for food:** Household savings in food expenditure: 439 euro per year **Env benefits**: €16 million from GHG emission reduction from textile waste as well as reduction in release of pollutants to air, water and land that would otherwise result from poor waste management. 4.1 million tonnes GHG emission reduction as well as reduction in release of pollutants to air, water and land that would otherwise result from poor waste management. Reduced impact on land use of 2.2 trillion Pt, reduction in marine eutrophication of 532 million kg of Neq and reduction	

	of water use of 80 billion m3 per annum. **Social benefits**: 8 740 jobs created in relation to textiles and social impacts of EU waste in third countries mitigated. 135 000 jobs lost in agri-food sectors.	

ANNEX 14: MONITORING AND EVALUATION

1- Textiles

The impact of the preferred policy option in the attainment of the objectives of this initiative to reduce textile waste and residual textile waste generation would be monitored through the indicators and targets set forth in measures 2.1 and 2.15 and 3.6. This entails assessment of the Member State annual reports on textiles waste management which are currently reported to the Commission and verified and published by Eurostat (see Annex 10 for details).

More specifically, as from the date of the entry into force and transposition of this Directive and putting in place the necessary secondary legislation, Member States would be required to carry out a more granular monitoring of the waste prevention measures, waste generation and collection and subsequent treatment operations for all textile wastes. This monitoring will take place based on the proposed:

- EU-wide waste prevention indicators for textiles (adopted through an implementing act, possibly collected through Producer Responsibility Organisations (PROs));
- Increased granularity of the data collection and reporting on used textiles and textile waste management (specified in the WFD and in the implementing act setting out the harmonised reporting formats);
- Separate collection target for textiles.

The improved reporting obligations would deliver more reliable data on the textile waste management practices and performance for the purposes of monitoring at national level the adherence to the waste hierarchy and textile waste management policy planning, including for the necessary investment needs by the competent authorities as well as the industry stakeholders. Improved reporting and monitoring can build awareness amongst all players including consumers about the need for prevention.

The main indicator against which this initiative should be evaluated is the reduction in residual textile waste generated, i.e. textile waste that is destined to disposal operations. The proposed measures should lead to simultaneous and steep infrastructure capacity growth across the EU in separate collection, sorting and recycling (capacity should be enough to deal with collected textile waste). Further, the evaluation should see the progress on the objective of creating a profitable textiles recycling sector and achieving investments in R&D and scaling up/maturity of technologies.

2- Food Waste

Monitoring and evaluation of progress towards **food waste** reduction target will be done on the basis of annual reports from Member States on food waste amounts according to the existing harmonised methodology and reporting rules of the WFD. The data are reported to and published by Eurostat (Annex 5 details food waste monitoring). The current monitoring of food waste reduction allows to address the **operational objectives** identified in this IA, namely:

Table 52 – Monitoring by objective

Operational objectives	*Reporting and monitoring of food waste under the WFD:*
Ensure consistent response by all MS to reduce food waste in line with targets	*Amounts of food waste by Member States, by main economic sectors, including at households*
Improve efficiency of national waste prevention programmes	*Following review of national food waste prevention programmes shows that measures are strengthened (e.g., hotspots identified, etc).*

Implementation of the national food waste prevention programmes and textile waste prevention measures as part of the national waste prevention programmes is subject to periodic reviews by the European Environment Agency (as required by Article 30(2) of the WFD). The Agency publishes every two years, a report containing a review of the progress made in the completion and implementation of waste prevention programmes, including an assessment of the evolution as regards the prevention of waste generation for each Member State and for the Union as a whole.

ANNEX 15: SME TEST

1- Textiles

Step 1/4: Identification of affected businesses

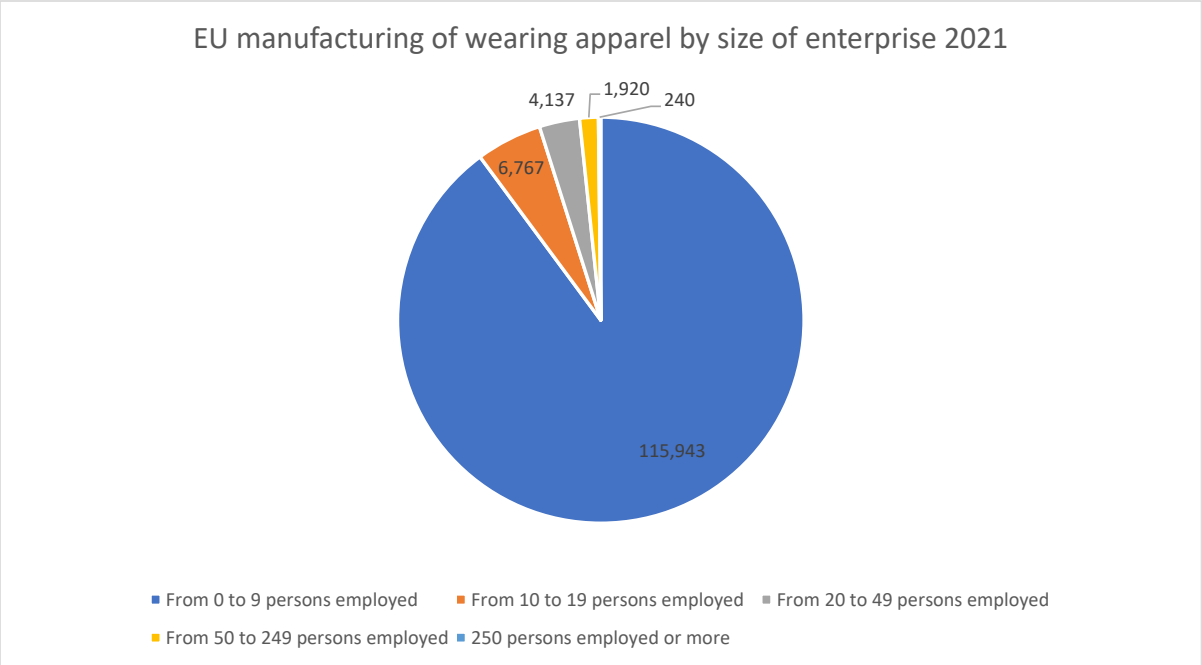
The EU is both a manufacturer of textiles and an importer of textiles from other countries. Producers in the context of these two sources of textiles will vary with some being manufacturers who place goods on the market that have been manufactured within the EU and others more likely to be wholesalers or retailers that import goods from third countries that place goods on the EU market for the first time.

The composition of these two groups in terms of enterprise size is similar and is well reflected in the data found in the 2022 review of the European Apparel and Textile Confederation[169] that notes that 99.8% of total companies in the industry are micro and SMEs.

In relation to EU textiles, wearing apparel and leather manufacturing, data from Eurostat[170] indicates that out of 226 624 total enterprises, 198 443 (87.6%) are micro-enterprises (0-9 employees), 27 485 (12.1%) are SMEs (10-249 employees)[171] and the remaining 696 (0.3%) employ 250 persons or more. The split of turnover by enterprise size indicates a different split with enterprises in the size 20 employees and up accounting for 80% of industry turnover. Inclusion of the 10–19-person size enterprises raises this value to 88% of industry turnover. Effectively this means that 12% of manufacturers generate 88% of industry turnover.

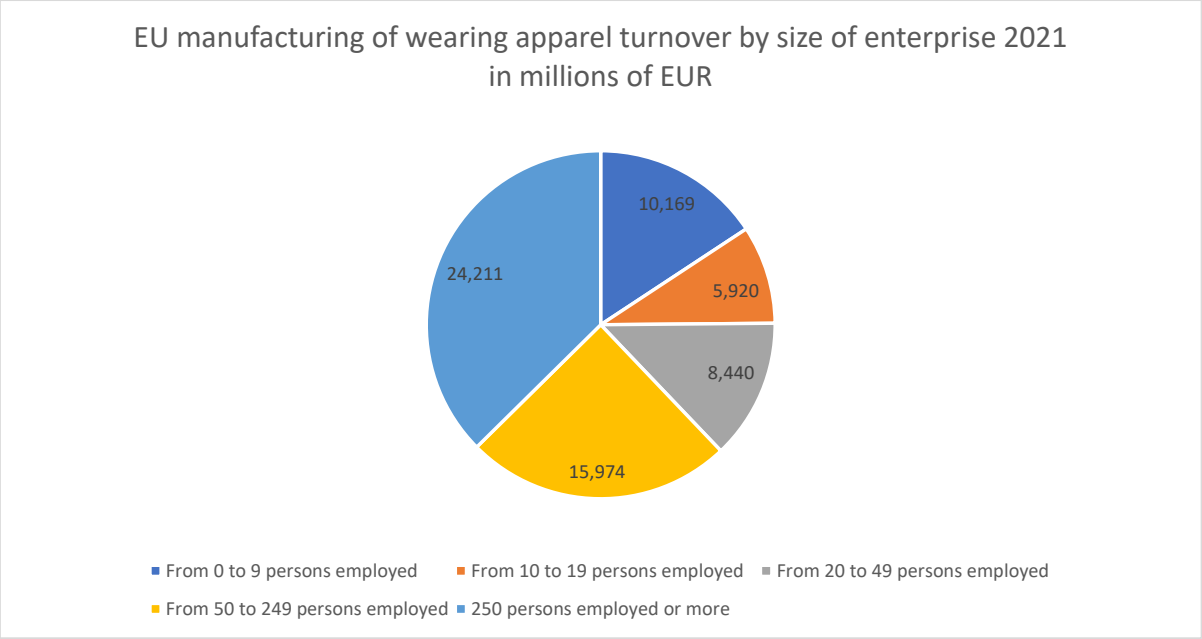
Figure 81 – Textile manufacturers by size of enterprise

[169] EURATEX, 2022. Facts & key figures of the European textile and clothing industry 2022
[170] Annual enterprise statistics by size class for special aggregates of activities (NACE Rev. 2) [SBS_SC_SCA_R2__custom_3996079]
[171] 13 758 employee 10-19 persons, 9 106 employ 20-49 persons and 4 621 employ 50-249 persons.



Source: Eurostat, 2022

Figure 82 – EU textile turnover by size of enterprise



Source: Eurostat 2022

For the textile and leather wholesale and retail sector this kind of data broken down by size of enterprise is not available. However, information on the nature of the enterprises, numbers and average number of employees is available from Eurostat[172] that shows splits by agents involved in

[172] SBS_NA_DT_R2

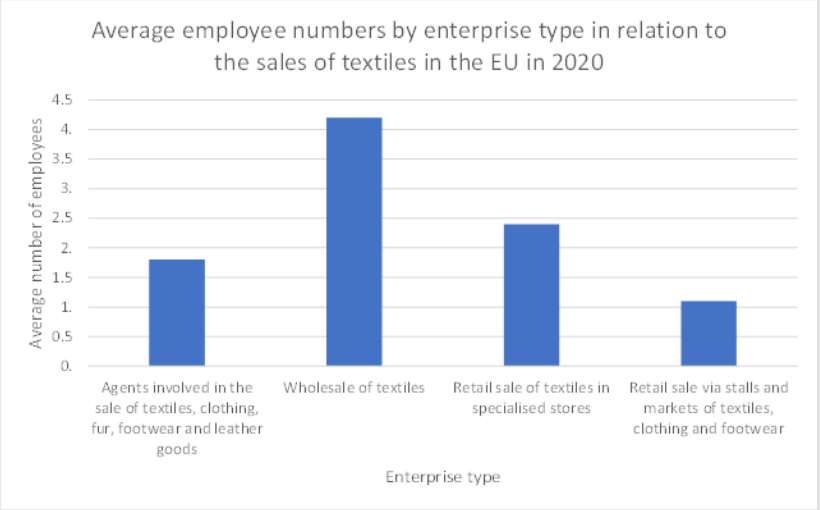
the sale of textiles, clothing, fur, footwear and leather goods, wholesalers, retail sales of textiles in specialised stores and retail sale via stalls and markets. In terms of the number of enterprises involved in retail the values from Eurostat for 2020 are as shown below.

Figure 83 – Enterprises involved in the sale of textiles, clothing, fur, footwear and leather goods

Source: Eurostat 2022

The number of employees per enterprise at the retail level is only provided as an average. However, the values are provided below.

Figure 84 – Average employee numbers by enterprise type in relation to the sales of textiles in the EU in 2020



Source: Eurostat 2022[173]

[173] Enterprise statistics by size class and NACE Rev. 2 [SBS_SC_OVW]

Even without the ability to split enterprises by number of employees it is apparent from the Eurostat Annual detailed enterprise statistics for trade (NACE Rec. 2 G as found in SBS_NA_DT_R2) that the retail sector is dominated by smaller companies with a small number of employees, typically sole trades and stores with 2-3 employees at the store side, with agents similarly small in terms of number of employees and wholesalers generally larger in size.

Given SMEs are the majority of those involved in the placing on the market of textiles as well as, alongside social enterprises, their collection at the point of discard the initiative is considered as relevant for SMEs. The IA includes assessment on the impacts of the initiative on SMEs of all sizes (micro, small, medium) across the EU, which are considered to be the most affected by the initiative.

The scope of the legislative proposal in the area of textile waste is to improve textile waste management in line with the waste hierarchy prioritising reuse and recycling of clothes and household textiles.

Whilst it is generally accepted that textile manufacturers and retailers have an inherent economic incentive to reduce textile waste, the increasing volumes of textiles placed on the market as well as the manner in which post-consumer textiles from these actors is handled at the point of discard is subject to significant shortcomings that this initiative looks to target.

Step 2/4: Consultation of SME stakeholders

Within the context of the public consultation SMEs, among other stakeholders, were invited to both respond to questions in relation to waste in general as well as for textile waste. Furthermore, SMEs were invited to submit additional information including position papers. 211 business associations, company / business organisations and consumer organisations that fell into the SME category responded to the public consultation.

In general, SMEs pointed out in their position papers that currently there is no large-scale planning to process the waste. Most of them agreed that textile production's design and consumption patterns have to be changed, leading to the production of textiles of higher quality that can last longer. They also highlighted the importance of prioritizing waste prevention and reuse and the need to set reuse and preparation for reuse targets, as well as to improve separate collection systems. Regarding EPR, the main points were to ensure that EPR schemes enforce the waste hierarchy by setting quantitative targets for waste prevention and preparation for reuse, ensure a harmonised approach to eco-modulation of EPR fees and the fair competition in recycling markets, granting access to the waste stream to preparing for reuse operators, while also involving social enterprises as key stakeholders in the development, governance and functioning of these schemes. Also, the harmonisation at EU-level of end-of-waste criteria was advocated which was also endorsed by the recycling industry, as well as the insurance of the consistency with other regulatory initiatives, such as the ESPR and WSR. Further, they pointed out that guidance to achieve high levels of separate collection of textile waste is needed, while maturing fibre sorting and pre-processing is critical to scale the recycling of post-consumer waste. Some of them reflected on the need for a harmonised definition of textile waste.

Some of the key SME representatives consulted in the context of textile waste were:

EURATEX – Representing the national associations of AT, BE, BG, CZ, DE, DK, EL, ES, FI, FR, HR, IT, LT, NL, PL, PT, RO and SE the European Apparel and Textile Confederation provided input to the call for evidence and the public consultation. They were also interviewed by

the consultants team. The public information made available from Euratex provides information on the size of the entire sector that is not split into members and non-members. However, with the Member State national associations listed a majority of the 143 000 companies reflecting the composition of the textile industry, involved in the EU textile and clothing industry are represented by Euratex.

EURIC – Representing the recycling federations of 18 Member States and over 5 500 companies including SMEs and with a specific group dedicated to textiles (EURIC TEXTILES), EURIC provided input to the call for evidence as well as the public consultation. Furthermore, additional evidence was submitted directly to the European Commission, most notably the LCA-based assessment of the management of European used textiles issued in January 2023 that was used specifically in the assessment of environmental benefits of specific measures.

The Policy Hub represents more than 700 brands, retailers and manufacturers and other textile stakeholders including NGOs representing more than 50% of the apparel and footwear sector. The Policy Hub provided input to the call for evidence and the open public consultation. Additionally, the Policy Hub was interviewed by the support study team.

RREUSE represents social enterprises active in reuse, repair and recycling in the EU. With association members in AT, BE, CZ, DE, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, NL, PL, RO, and SI as well as individual social enterprise networks in SE and LV RREUSE provided input to the call for evidence and the public consultation. RREUSE was also interviewed by the support study team.

Municipal Waste Europe, representing national public waste associations and similar national or regional associations in AT, BE, CY, DE, DK, EL, FI, HR, IT, LT, MT, NL, PL, PT, SE, and SI provided input to the call for evidence as well as the open public consultation. They were also interviewed in the context of the support study.

FEAD, representing the private resource and waste management industry covers 17 Member States and 3 000 companies involved in waste management. The membership of FEAD covers 60% of the household waste market and 75% of industrial and commercial waste management in Europe including 2 400 sorting and recycling centres, 1 100 composting sites, 260 waste-to-energy plants and 900 controlled landfills. FEAD provided input to the call for evidence and public consultation.

Step 3/4: Assessment of the impact on SMEs

In addition to the collection of stakeholder evidence on the potential impacts on SMEs additional assessment using data from Eurostat on the composition, turnover and spread of SMEs was performed in order to identify those impacts that would significantly impact on such enterprises.

The consultants study considered the specific impacts on SMEs for each measure. In this respect measures under Option 1 are likely to place no significant administrative burden on SMEs, while at the same time the measures should simplify obligations placed on SMEs aligning the scope of textiles. The guidance and support platform foreseen under this option would have the largest impacts on SMEs overall.

Measures under Option 2 and 3 are expected to have minor additional costs on SMEs. The most burdensome measure that considers the application of extended producer EPR schemes (measure 2.9) would address SMEs given the majority of producers are SMEs. However, in order to avoid the application of unnecessary administrative and compliance burdens, the impact assessment proposes to exclude micro-enterprises and the re-use sector from the scope. Reuse actors that place

both new and used products on the market, would be requested to only account for and report the new ones The knock-on consequence of such exclusions would be a minor increase in the costs applicable to enterprises with over 10 employees, with those over 250 employees facing the largest additional burdens. Additionally, reporting obligations have been targeted to revise existing obligations in the first place to make them more fit for purpose and improve the knowledge base for the textile sector overall.

Step 4/4: Minimising negative impacts on SMEs

Following the assessment of the composition of the textile sector, the process for designing the measures as part of all the policy options involved a systematic consideration of the ways how to reduce the impact on SMEs while not compromising on their contribution to the attainment of the policy objectives.

The textiles industry is dominated by SMEs. The most-costly proposed measure – the application of EPR – excludes micro-enterprises that comprise approximately 88% of the sector are proposed to be excluded. The greatest knock-on consequences of their exclusion would be an increase in costs in enterprises with greater than 250 employees by approximately 7 percentage points in comparison to a situation whereby micro-enterprises would be included. These costs are not expected to impact on competitiveness given their relatively low level.

2- Food Waste

Step 1/4: Identification of affected businesses

Processing and manufacturing:
The EU food and drink industry is comprised of 290,000 SMEs – making up 99% of the entire industry. SMEs employ 2.8 million people out of 4.5 million for all businesses and generate over 40% turnover of the sector.

Food services sector

Eurostat Structural Business Statistics does not single out food services but provide data for sector on accommodation and food services jointly. Therefore, these data should be treated as illustrative.

Table 53 Services by employment size class

Size of enterprise	Number of enterprises	Persons employed
2-9	790 000	3 067 000
10-19	652 226	1 570 046
20-49	32 286	930 000
50-249	7 000	642 000
250 +	939	938 800

Source: Eurostat Structural Business Statistics and Eurostat Statistics Explained.

The enterprise size structure of the EU's accommodation and food services sector would appear to be dominated by SMEs (small and medium enterprises) employing less than 250 persons. These enterprises together employed 85.7 % of the EU's accommodation and food services employment in 2019 and generated 77.1 % of its value. The importance of large enterprises (employing 250 or

more persons) was relatively small, with only 14.3 % of the EU's total employment and 22.9 % of its value added in the accommodation and food sector.

The share of micro enterprises was particularly high for the EU's food and beverage services subsector, generating 35.4 % of the value added and contributing to 43.6 % of the total employment in this subsector in 2019.

To what extent is the initiative relevant for SMEs?

This initiative is considered as potentially **relevant** for SMEs.

The scope of the legislative proposal in the area of food waste is limited to setting food waste reduction targets on the Member States. Therefore, the proposal will not impact businesses directly.

The proposal does not include any new obligations for action by Member States other than those already established by Waste Framework Directive (reducing food waste at each stage of the food supply chain, preparing food waste prevention programmes, implementing related actions, monitoring and reporting on progress achieved). Moreover, Member States have already committed to take action to reduce food waste in order to contribute to SDG Target 12.3.

It can be expected that more active implementation of prevention policies by Member States will have indirect impact on SMEs in the food sector by modifying their business environment, especially in the longer term. In implementing national food waste prevention programmes, Member State authorities will likely engage with all actors in the food supply chain in order to ensure progress towards the national targets. It is also possible that Member States can take measures directly aimed at SMEs, although this is very unlikely.

See Annex 7 and Annex 10 (Section 2.4) to see examples of actions taken by Member States which have already started implement food waste prevention policies. The majority relies on voluntary measures, encouraging food business operators to better cooperation and providing them with tools and information for that purpose. The only exception was France which introduced legislation requiring an obligatory agreement on food donations, however addressed only to larger companies, not considered as SMEs.

It is generally regarded that food business operators have an inherent economic incentive to reduce food waste as it impacts directly on their profits. Moreover, numerous business cases shows that more insight on food waste generation in their operations, measurement of food waste and taking action to address hotspots brings significant savings, with some reports indicating average benefits-cost ratio of 7:1 or even more. Similar business cases analysis covered hotels The Business Case for Reducing Food Loss and Waste: Hotels | Champions 12.3 (champions123.org), catering The Business Case for Reducing Food Loss and Waste: Catering | Champions 12.3 (champions123.org), The Business Case for Reducing Food Loss and Waste: Restaurants | Champions 12.3 (champions123.org) or food business in general The Business Case for Reducing Food Loss and Waste | Champions 12.3 (champions123.org).

Therefore, the focus on actions observed so far in Member States and neighbouring countries (United Kingdom, Norway) which have undertaken coordinated action to reduce food waste, focused on actions encouraging food waste prevention (voluntary agreements, exchange platforms etc.) supported by financed by government financing.

Examples:

United Kingdom: Guardian of Grub
The Netherlands: https://nowastenetwork.nl/?lang=en

So far, the only country that has introduced obligations in national legislation to support food waste prevention are focussed on requirements related to food donation as well as diagnosis and monitoring in sectors of restaurants is France.

On food donation, French legislation[174] bans the destruction of edible food and obliges businesses to sign a food donation agreement with authorised charitable organisations. This requirement applies to retailers (for larger shops, if >400m²), food and drink industry and wholesale (if >50M€ turnover) and collective catering (if >3000 meals/day) sectors. On diagnosis and monitoring, government requests diagnosis and action plans for the entire collective catering sector. The government provide guidance and tools to enable companies make their own diagnosis and implement results of their diagnosis as feasible for business operator. There is no minimum threshold for companies (so SMEs are included), but there are no consequences for late or no delivery. The Impact Assessment related to the French legislation[175] does not expect any additional costs for enterprises but rather improvement of their competitiveness and public image.

Step 2/4: Consultation of SME Stakeholders

Full description of consultation activities is in the Annex 2.

The stakeholders were consulted through public and targeted consultations to gather views and feedback in view of further developing and fine-tuning the different initiatives.

A set of targeted consultation activities with stakeholders focused on surveys on costs and benefits on food waste prevention actions.

Consultations with food business organisations represented in the EU Platform on Food Losses and Food Waste: There is no dedicated organisation representing SMEs directly. Instead, SMEs are represented by sector-specific organisations. The Platform covers the whole food supply chain from primary production, through processing and manufacturing, retail and distribution, restaurants and food service, until households. SMEs are well represented by the organisations representing specific sectors of the food chain, notably: EuroCommerce, Independent Retail Europe, HOTREC (food services, 90% of micro enterprises) and FoodDrinkEurope.

Public consultations included questions regarding options and measures for prevention of food waste. No specific impacts or challenges related specifically to SMEs have been identified. Analysis of replies and position papers, showed no significant differences between different size-classes of food business operators, including SMEs (i.e., micro, small, medium). As the current legislative proposal does not include any measures directly relevant to food business operators but will instead put obligations on Member States, there was no specific feedback received from SMEs on the problems and the proposal, but a general call to support SMEs in their actions to reduce food waste.

The **main challenges perceived by small businesses** are lack of information as well as staff and resources to integrate food waste prevention practices and introduce measurement tools. SMEs also highlight the need for financial support (e.g., tax incentives on donation, reduction of waste

[174] Ordonnance n° 2019-1069 du 21 octobre 2019 relative à la lutte contre le gaspillage alimentaire
[175] https://www.legifrance.gouv.fr/contenu/Media/Files/autour-de-la-loi/legislatif-et-reglementaire/fiches-d-impact/fiches-d-impact-ordonnances/2019/fi_agrg1920827r_25_09_2019.pdf

management fees) as well as for targeted information campaigns and guidelines on how to avoid food waste, including how to deal with food surpluses and especially with food donation. (As indicated in EU guidelines on food donation, that the recovery and redistribution of surplus food from the hospitality and food services sectors is more limited due to food safety restrictions, and some Member States provide specific guidance in this regard). Such information campaigns and guidelines should be prepared at national level, to take into account specific national legal, institutional and business environment.

Step 3/4: Assessment of the impact on SMEs

The impact assessment included activities to collect information about the costs and benefits of food waste prevention actions (see step 2).

The distribution of costs and benefits for each policy option are expected to be similar regardless of business size. Analysing Member States policies so far, it may be expected that the breadth of Member States' policy response will widen (involving a wider spectrum of food business operators) with increasing food waste prevention target levels. However, it is likely that any regulatory obligations / voluntary agreements will be imposed first on large operators, responsible for generating a high share of food waste and able to implement food waste prevention in cooperation with both their suppliers and customers. Similarly, measures taken by food business operators to support consumer behavioural change (notably at retail) are often led by the large players.

The analysis of impacts is done by modelling food and connected sectors. It is generally assumed that food waste reduction will lead to decreased demand on food which should lead to lower prices and higher availability of food. This in turn can reduce jobs on food production across the economy, which may also be offset by jobs created through the need for new service providers related to food waste prevention (e.g., repurposing and/or valorisation of food surplus).

The results of simulations done with the MAGNET model show that the most negatively affected industries[135] would be food manufacturing, waste collection and treatment and food services. Still, the expected impact on SMEs' employment in the above-mentioned industries would be rather small. On the other hand, on average, the remaining industries would experience a small positive impact related to food waste reduction. The cumulative difference would be very small. For instance, even for the highest reduction targets, the cumulative difference in the value of production between the baseline and the policy scenario would be less than 1 percentage point during the 2020-2030 period. It should be noted that SMEs may be impacted by other related legislation currently in force, which is expected to have an indirect effect on food waste generation. For example, taxes on landfilling may lead to a rise in waste collection costs, which may be perceived as additional cost for SMEs, but such measures are not part of the current proposal.

Step 4/4: Minimising negative impacts on SMEs

The experience from leading countries as well as studies conducted demonstrate that the success of food waste prevention initiatives depend on the engagement of key players involved. Both management and staff usually want to help reduce waste but require clear guidance. Therefore, measures implemented by countries so far have focused on the voluntary involvement of SMEs. Bearing that in mind, no dedicated mitigating measures are envisaged in the legislative proposal.

Financial assistance (in form of grants) is currently offered at EU level, in order to support development and dissemination of best practices in the food chain. The grants implemented thus

far by the Commission, under the Single Market Programme, have targeted SMEs in order to address their specific needs.

The further exchange of knowledge, best practices, tools, guidelines and experience will continue via the EU Platform (including its sub-groups) and the dedicated website (EU Food Loss and Waste Prevention Hub). The support would cover in particular the areas of measurement (e.g., how to make it cost-effective), food services (meeting consumer needs), prevention of food waste at consumption (and its implication for SMEs), case-studies (including cost-benefits). These could also lead to specific recommendations from the Platform towards Member States on how potential impact of food waste reduction targets on SMEs could be mitigated.

ANNEX 16: RELATED STAKEHOLDER AND CITIZENS' ENGAGEMENT

The **Conference on the Future of Europe** took place in April and May 2022. It enabled people to share their ideas on what they expect from the European Union and led to a final report consisting of 49 proposals. As regards food waste, proposal no.1 related to agriculture, food production, biodiversity and ecosystems, pollution includes following a measure to 'apply: Apply circular economy principles in agriculture and promote measures against food waste'.

Topic "climate change, environment", proposal no. 5 concerns sustainable consumption, packaging and production. The main objective of this proposal is to build a circular economy by promoting sustainable EU products and production and more circular, autonomous and less dependent materials within the EU. For this reason, the said proposal includes, among others, the following measures:

- Stricter and harmonised production standards within the EU and a transparent labelling system for all products sold on the EU market regarding their sustainability/environmental footprint, as well as longevity, using a QR-code and eco-score, or the Digital Product Passport.
- Further avoid waste by setting prevention and reuse targets and setting quality standards for waste sorting systems.
- Launch an EU knowledge platform on how to ensure long-term and sustainable use and how to "repair" products, including the available information from consumer associations.
- Introduce measures to tackle early, or premature (including planned) obsolescence, ensure longer warranties, promote a right to repair, and ensure availability and accessibility of compatible spare parts.
- Establish a secondary raw materials market, also by considering requirements for percentages of recycled content and encouraging less use of primary materials.
- Rapid implementation of an ambitious sustainable textile strategy and setting up a mechanism ensuring consumers can be aware the product meets sustainable criteria.
- Take EU actions that enable and incentivize consumers to use products longer.
- Stricter manufacturing standards and fair working conditions throughout the production and entire value chain.

As a follow-up to the Conference on the future of Europe, the Commission announced **a "new generation" of citizens' panels** to consult randomly selected citizens before certain key proposals at the European level. Food waste was selected amongst the three first topics (along with virtual worlds and learning mobility) to be addressed by citizens, with the panel convened for three sessions held from December 2022 to February 2023. Although the Citizens' panel was not part of the consultation activities organised for the purpose of this Impact Assessment, citizens' recommendations[176] will support the Commission's work related to food waste prevention and have been considered in the preparation of the legislative proposal setting EU-wide food waste reduction targets. Importantly, citizens' recommendations will serve as a guide to help Member States in achieving the EU food waste reduction targets.

[176] European Commission, European Citizens' Panel on Food Waste Final recommendations February 2023, flw_eu-actions_fwrt_20230210_recom-cit_0.pdf (europa.eu).

1- Citizens' Report from the European Commission's citizens' panel on food waste

Following up on the final recommendations of the Conference on the Future of Europe, in its Communication "Putting Vision into Concrete Action" (of 17 June 2022), the Commission committed to enabling citizens' panels to deliberate and make recommendations ahead of certain key proposals.

The first of this **new generation of citizens' panels** was organised by the Directorate-General for Health and Food Safety and the Directorate-General for Communication between 16 December 2022 and 12 February 2023 on **reducing food waste**. The panel was convened against the background of preparatory work for the proposed *revision of the Waste Framework Directive (WFD)*[177] for which the Commission considered the feasibility of setting legally binding food waste reduction targets to be met by Member States by 2030.

I. The Panel

The panel was **composed** of 147 randomly selected citizens reflecting the EU's diversity in terms of age, gender, socio-economic background, education and geography (nationality and urban/rural residency). Citizens met for three weekends to formulate recommendations on how to step up action to reduce food waste in the EU.

They were **aided** by professional moderators and facilitators, Commission experts and a Knowledge Committee including external experts.

The panel's deliberations focussed on the overall aim of the proposal – to accelerate food waste reduction in the EU – and the future implementation of such EU legislation. The citizens' panel aimed to sound the views of citizens on actions to be taken by Member States, actors in the food supply chain, citizens and other private and public stakeholders, in order to step up efforts to reduce food waste and achieve future targets.

II. The Recommendations

In their work to develop the recommendations, citizens showed a **high level of commitment and engagement.** During the first panel meeting, citizens raised over 80 questions – many going beyond the topic of food waste and focussing on the functioning of food systems more generally – which were addressed by experts. Citizens wanted to **strengthen their voice and participation in EU food policy** and also called for the establishment of local and national citizen engagement fora. They were interested in the next steps and ways to continue their work on the topic of food waste, with some suggesting citizens' closer involvement in EU research on food waste or to be represented when the legislative proposal is discussed in the European Parliament. They also expressed their wish to give **further visibility and coverage to the citizens' panel** and embraced their own role as **ambassadors of food waste prevention** and agents of change within their respective networks.

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[177] The proposed revision of the Waste Framework Directive covers both food and textiles waste.

The 23 recommendations of this panel – as listed in the annex - take **a broad food systems approach**, seeking to engage all actors and strengthen collaboration across the food supply chain. This **comprehensive approach** is also reflected in the three topics addressed by the citizens' recommendations: 1) Cooperation in the food value chain: from farm to fork; 2) Food business initiatives and 3) Supporting consumer behavioural change.

Citizens' recommendations associate food waste reduction with a **fair, equitable food supply chain that ensures solidarity** (e.g., supporting local producers and addressing unfair trading practices that can lead to food waste such as last-minute order cancellations). In the light of growing challenges to food security, they recommend mechanisms to facilitate the redistribution of surplus food to those in need (e.g., networks and digital solutions connecting food business donors with food banks and charities) and call for broadening the definition of food waste to include food left unharvested and encourage gleaning.

The recommendations reaffirm the need for an **evidence-based approach** to guide effective food waste prevention by all players, highlighting the importance of monitoring. They also recognise the need for the EU to set **an overarching goal** to reduce food waste, with Member States taking steps to ensure that the goal is met. The **role of education** on food and, in particular, food waste is prominent, receiving the highest level of endorsement from citizens. Citizens call for the integration of food education in school curricula to help build understanding and appreciation of the value of food from an early age.

III. Next steps

Some recommendations reflect the European Commission's **ongoing work** with Member States and stakeholders to fight food waste across the EU, confirming and supporting the need for EU-level action in this area. For example, citizens recommend **sharing data and best practices** in food waste prevention among relevant stakeholders – which is a core part of the mandate of the EU Platform on Food Losses and Food Waste, established in 2016. The EU's Code of Conduct on Responsible Food Business and Marketing Practices, adopted by stakeholders in 2021, encourages **concrete commitments from food businesses**. EU guidelines to facilitate food donation[178] can support the implementation of harmonised approaches by Member States, as suggested by EU citizens.

Citizens also request action to help consumers prevent food waste including both national and EU-wide campaigns to inform about the related economic and environmental benefits and involving food business operators. As consumers, citizens want support in making their own informed decisions about how to consume and use food in relation to 'use by' and 'best before' dates. Addressing consumer food waste is an important part of the Commission's work and – in line with citizens' expectations – will continue to be a key area of action. A key example of this is the European Consumer Food Waste Forum[179], which is working to find solutions and develop tools to help reduce consumer food waste.

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[178] OJ C 361, 25.10.2017, p. 1–29

[179] European Commission, EU Project: *European Consumer Food Waste Forum*, October 2021 - July 2023.

Citizens' recommendations also indicate **points for further consideration**, such as, taking measures to forbid the destruction of safe, surplus food. Although already reflected in the waste hierarchy (enshrined in European waste legislation[180]), this principle could be further considered in the Commission's work to establish sustainable food systems to ensure that more food produced is utilised for human consumption. Another area of further work, highlighted in the recommendations, is that of research on innovative and sustainable packaging. Furthermore, the recommendations also **reveal some areas for possible future action** by the Commission, Member States and other players, such as the need to improve outreach and engagement with citizens across the EU. Many citizens were not aware of the extent of food waste and related negative impacts before their involvement in the panels nor of ongoing work to reduce and prevent food waste carried out in their respective Member States, for instance, in the context of the International Day of Awareness of Food Loss and Waste. The Commission will continue working with Member States and stakeholders to further build awareness and support behavioural change as regards food waste.

With regard to the European Commission's policymaking, the **outcome of the citizens panel will support the overarching work of the Commission on food waste** and **serve as a guide to help Member States in achieving the future targets**. The recommendations complement the impact assessment and the public consultation carried out by the Commission to support the setting of legally binding food waste reduction targets and they have been considered in the preparation of this initiative. Moreover, citizens' recommendations will be shared and discussed with the EU Platform on Food Losses and Food Waste, bringing together Member States and stakeholders, so that they may consider these in their food waste prevention programmes. Citizens will be kept informed of key EU developments in food waste prevention, such as the adoption of the legislative proposal.

"It was amazing to cooperate with people from all over the EU and see the vast majority is interested and is trying to find the right way to improve the situation with food waste."

Lucie, 40, Czech Republic

[180] OJ L 150, 14.6.2018, p. 109-140

FINAL RECOMMENDATIONS OF THE EUROPEAN CITIZENS' PANEL ON FOOD WASTE

No.	Title of the recommendation	In favour	Against	Abstained
1	The closer the farmer, the happier the consumer: Less waste, more sustainability	120	15	5
2	Tastes of home: Public and private support for local farming to reduce food waste	119	9	12
3	Share don't waste!	93	31	16
4	Sharing of data and best practices across Europe	97	27	16
5	Gathering data across the food supply chain	101	28	11
6	Citizens' voices matter: Citizen participation in European food policy	91	37	12
7	Just picked: The value of seasonal food	103	26	11
8	EU-wide food exchange network	84	41	14
9	Planned purchases and redistribution	85	38	16
10	Restaurants stand for "enjoy without wasting"	113	17	9
11	All waste has a weight	73	48	18
12	A mandatory reporting system for transparency coupled with penalties and rewards	68	56	15
13	EU-wide legislation on the destruction of unsold food products - a peer learning approach across Member States	109	20	10
14	Transparency on food waste for visibility and action	102	22	15
15	Innovation in packaging and use of packaging when needed	116	18	5
16	Broadening the definition of food waste in order to save unharvested food	110	19	10
17	Encouraging adults to take action on food waste as a priority	113	20	6
18	Nutritional awareness and sustainable food in primary and secondary schools	123	9	7
19	Promote and support food sharing applications and platforms connecting consumers with each other	97	25	17
20	Save food, save money: A European campaign against food waste in cooperation with food retailers on four weekends a year	98	31	10
21	"Stop food waste": A week of food waste awareness at school	116	16	7
22	To provide consumers keys to be aware and independent on their impact on food waste and to understand how to process, preserve and reuse a product before and after the date has passed. ("use by" date is a safety date after which a product should not be consumed; "best before" indicates the date until which a product keeps its optimal quality)	108	26	5
23	The implementation of standardized practices at the retail level when promoting to consumers products close to the expiration date.	109	18	12

Recommendations (full text) as formulated by participants of the European Commission's citizens' panel on food waste

TOPIC BLOCK I – COOPERATION IN THE FOOD VALUE CHAIN: FROM FARM TO FORK

RECOMMENDATION 1 **The closer the farmer, the happier the consumer: Less waste, more sustainability**
We recommend that the EU continues its work with policies and initiatives to support small-scale producers in their trade with retailers and supermarkets. Large retailers/processors have a clear power advantage in this relationship, and often steer the trade in their favour, sometimes resulting in food waste. Three aspects need specific attention: 1) The EU and its Member States should encourage retailers and supermarkets to always source from the closest producer possible. Furthermore, they should investigate and develop incentives that motivate retailers to follow these recommendations. 2) The EU needs to monitor and track the ban on last minute cancellations from 2019 and be ready to intervene if it is not followed. 3) The EU needs to continue working with policies on ugly/misshaped food and investigate further the consequences in relation to food waste when such products are rejected.
Rationale/justification Supporting small-scale producers and their sales in close proximity have high potential to reduce food waste in several ways, both along the value chain and in households: - When transportation of food is long and supermarkets try to be cost efficient by increasing volumes, food waste is likely. - Local producers can be more adaptable and respond faster to changes in demand, which can reduce waste. - Food from nearby producers is often of higher quality and longer lasting, which can result in less waste in households. - Food currently disposed of due to its wrong shape can be avoided. - Food waste due to last minute cancellations can be avoided if more comprehensive regulations and frameworks supporting small producers are in place.

Additional notes
Positive influence on food security and health.

Emphasizing the importance of combining this recommendation with other initiatives focusing on consumer behaviour, public awareness, and education to strengthen the cooperation between stakeholders and improve the general understanding of food waste and its relation to local food production.

Challenges:

- Trade-off with EU principle on free trade and free market, therefore it can be opposed by large corporations/retailers and lobbyist groups.
- It is important to consider and discuss what is "local" and what is a "short supply chain" when working further with this recommendation, since there is no common definition for this at EU level.
- Seasonality of products and demand of consumers can challenge a potentially limited supply due to focus on food from short food chain.

RECOMMENDATION 2

Tastes of home: Public and private support for local farming to reduce food waste

We recommend local & regional authorities to support local farmers with practical solutions and initiatives aimed at reducing food waste. The goal is to encourage stakeholders to cooperate more closely to drive these initiatives and thereby create a sustainable food system that benefits both farmers and consumers.

Several initiatives are suggested for local authorities to initiate:

1) Tax reliefs and subsidies for small scale farmers.

2) Support local farmers in finding new markets where they can be protected from unfair power relations with retailers, for example by allocating public spaces for sales.

3) Encourage inclusive processes and initiatives with value chain stakeholders for the work with food waste, for example by promoting the use of "food waste apps" in a city.

4) Support associations and other actors that are supporting local farmers in food waste issues, such as food banks.

Rationale/justification

Supporting small-scale producers and their sales in short proximity have high potential to reduce food waste in several ways, both along the value chain and in households:

- When transportation of food is long and supermarkets try to be cost efficient by increasing volumes, food waste is likely.
- Local producers can respond faster to changes in demand, and be more adaptable to changes, which can reduce waste.
- Food from local producers is often of a higher quality and lasts longer, which means that shortening the value chain would reduce waste both at the transport and household level.

Additional notes

- Emphasizing the importance of combining this recommendation with other initiatives focusing on consumer behaviour, public awareness, and education to strengthen the cooperation between stakeholders and improve the general understanding of food waste and its relation to local food production.

Main challenges

- Large scope and complexity of the recommendation. It will take time to analyse and implement many of the suggested initiatives, and it requires solid monitoring systems.
- Trade-off with EU principle on free trade and free market which can challenge the initiative and its acceptance by different stakeholders.

RECOMMENDATION 3

Share don't waste!

We recommend that food banks, and redistributors in general, should be financially supported at a basic level by governments through a structural scheme common across Europe, instead of primarily working by private donations (but not 100% funded, so it does not turn into a business). We also recommend a platform that connects the various existing apps that connect retailers to food banks. The platform should be user-friendly, efficient, and managed centrally. We also recommend that the food redistributed (donated or sold at a lower price) from retailers to food banks is given away in good time and good condition, preferably 3-5 days before it goes bad (rather than the current 48-hour guideline). The incentive to do this could be a tax deduction for retailers, that decreases the closer the redistribution is to the items' expiration date. They must donate a minimum amount of food to be eligible for this deduction.

Rationale/justification

Since food waste cannot be completely avoided in the current system, we should at least work to save the food that is wasted. In this context, we should utilise all the tools already available (food banks, applications, relevant associations, initiatives, etc.)

Additional notes
A challenge is how to strengthen the capacity of the food banks without making them into a business industry (as we rather want to handle food waste upstream).

RECOMMENDATION 4

Sharing of data and best practices across Europe

We recommend that governments in each country share their data and best practices on actions to target all steps of the food waste chain, from producers to consumers, to the European Commission's platform for food waste (EU Platform on Food Losses and Food Waste). This information will then be managed and analysed by a special committee of EU researchers that work to promote the good practices and make them easily accessible. The data on good practices should be categorized by types of production and types of consumption. In addition, we want to promote a network of cities/regions which access the data and utilize the practices that work best for them, based on similar consumption and production patterns. The network is set up for these localities to learn from each other based on these similarities. The concept of "twin cities" could be applied for this purpose: cities with similar food waste issues work together to solve them.

Rationale/justification
Best practices could be shared more efficiently and consistently. Also, this would utilise both the EU Platform on Food Losses and Food Waste, the Eurocities and “twin cities” concept. We want to empower the collaboration of cities and regions across Europe.

Additional notes

RECOMMENDATION 5

Gathering data across the food supply chain

We recommend that data on how, where, who, why, and when food waste occurs across the food supply chain gets collected by an EU body or other agencies or research institutions. This could be through:

1) Individual consumer behaviour through app measurement.

2) Face-to-face collection of data, through the Eurobarometer survey.

3) Surveys sent to schools and other educational organizations. Could be before/after a school intervention targeting food waste.

4) The use of citizen panel citizens as a representative cohort for research purposes.

5) Journalling study of consumer behaviour could be an intervention study. Inspiration from consumer scan panels of BE/NE.

6) The use of scientifically validated measures from universities.

7) Observational studies – specifically studying actual waste amounts by drawing on existing waste management processes of towns and municipalities.

8) Collecting and comparing invoices from supermarket/farmer interactions.

9) Standardizing forms for reporting waste.

Rationale/justification

We recommend this because if we know where, when, and why we are wasting food, we can launch more targeted awareness raising campaigns, and provide a detailed insight on where we could have the biggest impact on the reduction of food waste. Our group believes that by collecting more accurate data about where exactly in the food chain food is wasted, then we will be able to address our solutions to food waste more effectively. The current common methodology for collecting EU data on food waste (as defined by the Commission Delegated Decision (EU) 2019/1597) focuses on measuring the amount of waste, whereas the aim of our proposal is to gather more detailed data on the who, when, and where of food waste. These additional data-gathering projects/initiatives could be used to supplement the quantitative data gathered in the new yearly reporting by Member States. They would provide more specific data on the "what, how, who, when and where" of food waste.

Additional notes

Notes on data we want collected: We should collect data on the "what, how, who, when, and where" of food waste. **What/When:** What food are we wasting and in what circumstances? What exactly are people throwing away - how many grams are left on the plate? Data on how much we buy vs. how much we throw away. **How:** How is it wasted - is it thrown away? Is it cooked too late/spoiled/out of date? Did we buy too much? Cultural differences could also be

considered. **Who:** Who in the supply chain wastes food - distributors, consumers, etc? At consumer level, is there a breakdown of which consumers are wasting the most food - this could be linked to age or country? (Note: will people want to provide this data?).
Relating to point 5): The name of the company we're drawing inspiration from is Growth for Knowledge/GFK.
The group believes that respecting the privacy and personal data of European citizens is very important. Any studies conducted based in our recommendation should respect this.

RECOMMENDATION 6

Citizens' voices matter: Citizen participation in European food policy

Building on the Conference on the Future of Europe and the current EU Citizens' Panel on Food Waste, we recommend the establishment of local and national citizen engagement fora. These fora would be tasked with following, monitoring and offering advice on national strategies to implement EU directives on reducing food waste from the perspective of citizens. We further recommend that the EU Platform on Food Waste should include citizens' representation and engagement that coordinates exchanges between the engagement fora. At both national and EU levels, the fora should offer a platform for information sharing and mutual learning between citizens/ consumers, stakeholders, and policy makers.

Rationale/justification

We offer this recommendation because it is important to give voice to citizens, ensure a fair and transparent process, and to allow citizens and decision makers to coordinate and learn from each other. Citizens are experts on their own lives, and their perspectives must be considered at local, national, and EU level.

Additional notes

RECOMMENDATION 7

Just picked: The value of seasonal food

We recommend a change in consumer habits by informing consumers of the value of seasonal food. This should be done through clear signs in stores that allows consumers to clearly identify seasonal produce. Information about seasonality should also be communicated to a wide audience through public information campaigns. Informing consumers through signs on shelves and campaigns may incentivize producers to grow seasonal produce. We further recommend the production of better data on the most effective methods for incentivizing production of seasonal produce and limiting the import of non-seasonal low-quality foods.

Rationale/justification

We offer this recommendation because non-seasonal food is often imported and/or of worse quality than seasonal foods. Higher quality produce can impact consumer behaviour, as we tend to value higher quality food more, thus wasting less.

Additional notes

TOPIC BLOCK II - FOOD BUSINESS INITIATIVES

RECOMMENDATION 8

EU-wide food exchange network

We recommend major distributors to be directly connected through a register on an EU-wide website that allows the exchange of about-to-expire or surplus food. The webpage would prevent food waste by enabling communication within the levels (see below) and the next sectoral unit in the supply chain. Businesses can sign up and offer or buy surplus food at a lower price. There would be three levels:

1. Level one would consist of producers, farmers, and distributors.
2. Level two would incorporate supermarkets, food banks, and community kitchens.
3. Level three encompasses consumers and households.

Rationale/justification

Citizens did not provide a rationale.

Additional notes

RECOMMENDATION 9

Planned purchases and redistribution

We recommend developing a legal framework to harmonise Member States' legislation on practices for the entire supply chain regarding the redistribution of surplus and about-to-expire food, considering safety regulations and data forecasting. Purchases should be adjusted to what will be sold. Supermarkets and suppliers could be incentivised with benefits (for example, through tax breaks) for selling at a lower price or donating.

Rationale/justification

Citizens did not provide a rationale.

Additional notes

RECOMMENDATION 10

Restaurants stand for "enjoy without wasting"

We recommend to the European institutions the following plan to reduce food waste in restaurants. Once certain quality criteria (like the ones outlined below and some others) are met, all types of restaurants should be allowed to show a logo (which is harmonised across the EU). The logo would advertise the possibility to take leftovers home and waiters should provide packages for food to take leftovers home. Those restaurants that implement the logo plan would write on their menus an additional text stating “you can take your leftovers home”. If there are still leftovers of prepared food, they should be offered to employees. If there are leftovers of raw food from the kitchen, they should be offered to Food Banks/other charity institutions.

If food is inedible, it should be used to produce renewable energy. To encourage restaurants to meet these quality criteria (or further quality criteria), financial support should be given to restaurants to carry out this plan. A tax relief could serve as a financial incentive and additional aid could be granted. As leftovers from kitchens can be weighed or measured, they could be monitored and taken into consideration for the tax relief.

Rationale/justification

We recommend this because it would reduce food waste coming from restaurants and significantly reduce the shaming effect which might occur when asking for leftovers. If restaurants act as role models, private households will be encouraged to reduce food waste as well.

Additional notes

RECOMMENDATION 11

All waste has a weight

We recommend that organisations in charge of waste management be obliged to weigh, scale or measure organic waste. In the short term, the plan should focus on public institutions (e.g., schools and hospitals), entire neighbourhoods or districts, and in the long-term, it should also include private households. Representatives of these institutions/districts and, at a later stage, private households should regularly receive reports and comparisons to previous periods and comparisons to other entities. This leads to more awareness and is an incentive to reduce food waste. It does not have to be measured in the same way in all countries, it is sufficient if it is comparable in a respective country.

Rationale/justification

We recommend it because it would broaden awareness among consumers. It would also serve as an incentive to improve and reduce food waste. The results of the recommendation can be measured in the short and long term, providing some motivation to reduce food waste.

Additional notes

RECOMMENDATION 12

A mandatory reporting system for transparency coupled with penalties and rewards

We recommend establishing a reporting system (especially similar to ISO certification) to set specific standards across the whole value chain including producers, manufacturers, retailers, supermarkets, restaurants, and hotels. It should distinguish between large and small/medium size enterprises (SMEs) based on existing categories to classify company sizes. There should be penalties if standards are violated and rewards if companies overperform. There should be a relative fine system proportional to the gravity of the offense and the size of the company. Rewards should primarily be based on a label system, for example, ABC grades, or potentially financial incentives, especially for SMEs. Independent and external auditors must be tasked with reporting, not the companies. Public authorities at the member-state level (e.g., ministries or regulatory bodies) are in charge to ensure implementation and monitoring. The data

should be publicly accessible and enable peer learning. The Commission should have an oversight and coordination function.

Rationale/justification
It is important for transparency purposes to have the data of the labels available and accessible for people who wish for more information than just a label.

Additional notes

RECOMMENDATION 13

EU-wide legislation on the destruction of unsold food products - a peer learning approach across Member States

It must be ensured that food products are used in different phases before being thrown away. The priority is on avoiding food waste, but if not possible, the following cycle applies: human consumption, animal consumption, biofuel, and composting. The Member States are responsible for the required infrastructure to be in place to enable implementation. The EU sets an overarching goal to reduce food waste by a certain percentage. Member States set national standards so that the EU goal is collectively achieved. Member States can implement either voluntary or mandatory measures for companies to comply with. The reduction needs to be quantifiable. After a pilot phase that focuses on supermarkets, and adjustments based on peer learning, the best practice should be a guideline for all Member States.

Rationale/justification
The French example does not work, so we need a better solution, for example a platform like in Finland, where companies can upload food that would go to waste. A law forbidding food waste needs to be kept general to account for diverging cultures of Member States.

Additional notes

RECOMMENDATION 14

Transparency on food waste for visibility and action

We recommend that all participants in the food supply chain, except individual households, should have an obligation to measure and report transparently on dealing with food waste and its handling. Further emphasis should also be on the need for new options for data collection as well as including the food loss in the agricultural sector.

Furthermore, differentiated incentives to promote voluntary agreements should follow to support institutions in playing a pioneering role. Also, corrective measures contribute to the importance, geared towards including all participants in the food supply chain (except individual households).

The EU should do a best-practice evaluation of the different Member States about their existing reporting structures and incentives as well as corrective measures. This helps to establish a further embedded framework for the EU to make data more comparable.

Rationale/justification

We recommend this because the awareness of existing food waste is the basis to apply further approaches, such as incentives, innovative voluntary agreements, and corrective mechanisms to avoid food waste.

Additional notes

As an example of incentives, an EU-wide labelling technique could be used to benefit from marketing strategies. Another example could be appropriate financial compensation for reducing food waste.

RECOMMENDATION 15

Innovation in packaging and use of packaging when needed

We recommend investing further in scientific research on innovative and alternative sustainable ways of packaging. This helps to increase the life span, improve the package size to reduce food waste, and ensure better food safety for its transportation. The EU should support this financially and politically through appropriate programs, such as the funding of start-ups and smaller innovating forces. Furthermore, we recommend supporting retailers to sell food without packaging, where it is possible, without compromising food safety.

Rationale/justification
We recommend this because we still rely heavily on the packaging, particularly concerning transportation and food safety. Therefore, we believe that supporting innovations (research/ start-ups) in environmentally sound packaging can contribute towards this. On the one hand, adjusting the sizes of packaging of perishable food would reduce food waste, whilst considering the risk of increased packaging waste (whereby research mentioned above, should aim at preventing this). On the other hand, the individual portions should be offered, where one can bring his/her own container (also to reduce food waste, as well as waste of other kinds). If we develop a structure of environmentally friendly packaging and its infrastructure is adapted, ultimately, consumer acceptance can be achieved.

Additional notes

TOPIC BLOCK III - SUPPORTING CONSUMER BEHAVIORAL CHANGE

RECOMMENDATION 16

Broadening the definition of food waste in order to save unharvested food

We recommend that unharvested food should be integrated in the European definition of food waste. We also want farmers to have the possibility to commercialize less-than-perfect but still edible products. To avoid food loss, farmers should get signs which announce that unharvested food may be harvested by private households and NGO's.

This idea must be communicated to two groups:

- to citizens via the campaign that is developed in recommendation 20
- to farmers via the Member States' ministries for agriculture. The latter should implement this recommendation in coordination with local municipalities and producer unions.

Rationale/justification
We recommend this because it is unreasonable to waste edible food. Direct harvesting helps recognize the work that farmers do and value the food they produce.

Additional notes
A challenge is that we don't want to blame farmers.

RECOMMENDATION 17

Encouraging adults to take action on food waste as a priority

We recommend that each Member State should implement a program for adults to raise awareness and knowledge about the cost of food waste and the benefits of preventing it at national, regional, and local level.

This should be based on best available data (recommendation 5) to underline the urgency of the problem. It should include apps (recommendation 18), campaigns (recommendation 4 and 20), further education and training for people working in the food industry, in-house training programmes for professionals as well as documentaries and television programs on the topic. Some possibilities could be short ads showing the benefit of reusing food, promote Sunday as leftover day, and create game shows with cooking competitions for young adults to involve the broadcasters.

Informing people, through simple messaging or nudges, about the economic and environmental benefits of not wasting food is important.

A key contributor to the dissemination of information could be the media, especially public service radio stations and television, print media, social media, public institutions, museums, and retailers. Existing EU institutions could develop resources to support Member States (for example, the House of European History).

Rationale/justification

We recommend this because other recommendations deal with children's education, but we also need actions that have an immediate short-term effect on the current buying and cooking generation.

Additional notes

A benefit is that anti-food waste nudges used in supermarkets will balance the marketing that persuades people to buy too much.

RECOMMENDATION 18

Nutritional awareness and sustainable food in primary and secondary schools

We recommend the inclusion of the topics of sustainable food and nutrition in primary and secondary schools' curricula, either through the creation of new mandatory standalone courses, as they already exist in some countries, and/or their inclusion in existing mandatory subjects. This recommendation aims to increase pupils' awareness of food waste through discussions on socio-economic values, sustainable production and consumption, shopping behaviours, household economics, and practical experiences bringing schools and farms closer together. To make this recommendation happen, there are two preconditions which we expect the EU to enact. Firstly, we need a multi-stakeholder awareness raising campaign to create and increase momentum around the topic (recommendation 20). Secondly, we need to support teachers through trainings, and pedagogical exchanges and materials, capitalising on existing networks and proven best practices. While we acknowledge that these changes can take time to be implemented, it is important to already organise action days or weeks on the topic of food waste in schools, with the mobilisation of different societal actors (recommendation 21).

Rationale/justification

Food waste is the symptom of broader systemic issues which relate to how we produce, buy, and consume food today in Europe, hence why any pedagogical action needs to go beyond food waste, but consider values and desirable futures for production and consumption in Europe. Education remains a national competence and each Members State has different curricula. We acknowledge these differences, while encouraging the EU to promote ambitious actions, with new and/or existing schools subjects such as geography or economics.

Additional notes

RECOMMENDATION 19

Promote and support food sharing applications and platforms connecting consumers with each other

We recommend that the EU promotes and supports existing applications and platforms, such as Olio or FoodSharing.de. The tools to be promoted must meet some basic criteria and be assessed accordingly: user-friendliness, richness of the database, independence, adaptability to local contexts, and the real impact on curbing food waste. The EU, national and regional authorities need to be proactive in their promotion of most-promising existing tools and support, notably, but not only financially, their development and maintenance through their different research, action, and funding programmes. Public funding should encourage qualitative and neutral information, free of advertisements.

Rationale/justification

There are many applications that connect different actors, from businesses to consumers, or consumers to consumers. Some of these tools might have proven successful to connect consumers with each other, helping them to save food. However, they seem to have a limited geographical coverage or are not known enough by Europeans. We believe it is important for the EU and Member States to actively support technological innovations with high impact, leaving the door open to new ideas and innovations to emerge and to become sustainable in the long term.

Additional notes

RECOMMENDATION 20

Save food, save money: A European campaign against food waste in cooperation with food retailers on four weekends a year

We recommend that the EU coordinates a campaign focusing on shops selling food (food retailers, supermarkets, hypermarkets, smaller shops) to be deployed in the Member States. This campaign would take place over four weekends each year, and focus on the topic "save food, save money". It would be up to the different Member States to decide which weekends to pick. The choice of date should be based on the objective to raise awareness on food buying habits (for example around national or cultural celebrations) and seasonality (for example around harvest time). The campaign would be an initiative from the European Union, which would develop a uniform visual design (same logo, colour code, etc.) for all Member States. The campaign would then be implemented at the national level and adapted based on the specificities of each country, their annual calendar, food habits, etc.

Rationale/justification

We recommend this because it is important to raise awareness among citizens on food waste. There is only the International Day of Awareness on Food Loss and Waste Reduction, which is unknown among citizens and lost among the large amount of other international days. The new event would be extended to four weekends per year. This would develop the visibility of the issue among European citizens, and the form of repeated weekends through the year would be more useful than a single day. That would also be a way to differentiate the European event from standard international days.

Additional notes

- One benefit of our recommendation is that it would raise awareness among European citizens on food buying, consumption, and seasonality as ways to avoid food waste. Having a campaign organized around four weekends a year would bring regularity in the messages passed on to citizens. Another benefit would be encouraging cooperation with food retailers as part of this campaign and including food retailers in the fight against food waste.
- Among the challenges, there is the issue of how to get food retailers/food outlets involved in the event. Because the objectives of food retailers are to sell as much as possible, some may be reluctant to encourage people to consume less food or adopt different consumption habits. On the other hand, the objective of any shops, including those selling food, is to generate profits, so they might consider the event as a strategy to develop a good image as actors in the fight against food waste. Another challenge concerns the specific characteristics and annual calendar in national Member States in the EU: some countries don't celebrate Christmas, or celebrate it on different dates, and holidays can be different from one country to another.
- Other details on how the recommendation would be implemented:
  * Use diversified sources for the campaign against food waste in cooperation with food retailers: traditional media (television, newspapers), social media, use of local influencers, advertising. Take the opportunity of the four weekends to spread a strong Zero Food waste campaign.
  * On these weekends, the EU should communicate about the food retailers who already have organized and developed initiatives against food waste. The EU should support these already existing initiatives and communicate on good practices, sharing a positive narrative. We should not highlight shocking messages and focus on positive experiences.
  * Organize a follow-up and an evaluation of the 4 weekends to improve it and reach more and more people every year.

RECOMMENDATION 21

"Stop food waste": A week of food waste awareness at school

We recommend organizing a theme week in schools on food waste to raise awareness on the topic among young children and teenagers. The week would adopt a form and content depending on the age of the pupils. In primary schools and for younger children, the week should focus on raising awareness through games. The European Commission would create and distribute a toolkit for schools and teachers in all the EU languages on how to raise awareness on food waste at schools and how to discuss and organize activities on this topic in relation with their own teaching subjects. The toolkit would include guidelines with proposed activities to not overburden teachers and should be easily accessible online. Younger pupils would be rewarded by receiving a certificate (with the EU logo). National states would implement the week depending on the functioning of their respective education systems and of their academic calendars. Schools would be free to decide what activities they want to organize during the week, with the help of the toolkit made available for teachers.

Rationale/justification

Children should learn how to value food, how food is produced, and how much time it takes to produce food. It is important to gain this awareness early on. This kind of event can also reach parents through children and teenagers, because pupils tell their parents about their experiences at school when they come home.

Additional notes

- A benefit is that children should learn how to value food, how food is produced, and how many times it takes to produce food. It is important to start early with awareness learning. Another benefit is that this kind of event enable to reach parents through children and teenagers, because scholars tell their parents about their experiences at school when they come home.
- One of the challenges is to not overburden teachers to come up with all the activities and ideas on their own. For this reason, a framework or guidelines with proposed activities is very important to make it possible for all pupils in all schools to benefit from this initiative.

RECOMMENDATION 22

To provide consumers keys to be aware and independent on their impact on food waste and to understand how to process, preserve and reuse a product before and after the date has passed.

("use by" date is a safety date after which a product should not be consumed; "best before" indicates the date until which a product keeps its optimal quality)

We recommend the deployment of information tools to enlighten and (re)equip consumers in their ability to judge whether a product is truly expired. To make consumers aware of the use of their food products, we are in favour of better identification of the labelling of the best-before date: same place for each product and larger font size. Furthermore, we want to affix a QR code directly on the product label (the possibility of also using the barcode). What is the purpose of this? To transmit information on the best ways to preserve it, to recognize (by the taste and the smell) if it is still consumable, and to transmit culinary tips to transform the product (example of adapted recipes). The producers are, for us, the best placed to formalize the information available via the QR code. Concerning unlabelled products such as fruits and vegetables, the QR code should be put where the products are sold to avoid unnecessary packaging. For this source of information to be accessible to everyone, we are not betting essentially on digital technology. We also wish that paper communication tools (guides in supermarkets, for example) be made available.

Rationale/justification

We recommend this because, for us, this is a challenge to make consumers responsible in their food management. Completing the information available on a product is a way for consumers to understand the issues around the expiration date. It is also an opportunity to overcome the "misconceptions" or "fear of getting sick" after the expired date. Indeed, we know that producers are cautious with best-before date to protect themselves. In reality, the product can be consumed afterwards. We do not question the importance of indicating a use-by date. Indeed, it remains a key indicator of freshness.

Additional notes

A benefit is that we focus on labelling to inform consumers in the best way possible about the advantages for their wallet as well as for the environment. Our catchphrase summarizes our idea perfectly: "buy reasonably and eat cheaper". To make known and promote this new source of information to consumers, we propose to deploy a large communication campaign to explain the objective of this new tool.

RECOMMENDATION 23

The implementation of standardized practices at the retail level when promoting to consumers products close to the expiration date.

We recommend that the purchase of products close to their expiration date be revalued by asking businesses to adopt a strategy for managing and valuing these products for the consumers. Indeed, it is a question of improving the perception by households of these products so that they are not intended for only one part of the population. This strategy is divided into several parts:

- a regulatory implementation part at the European level by creating a section dedicated to these products making them easily accessible and identifiable upon entering the store to promote better consumption practices by all users, regardless of income
- the development of a communication policy highlighting "common sense" and the attractiveness of the products as well as the responsible purchasing approach (promotional overconsumption aspects should not be on the front communication line)
- encouraging retailers to adapt their policy of putting new products close to their expiration date on the shelves at peak times (adapted to the practices of consumers in different European countries).

Rationale/justification

We recommend this because it reinforces an existing policy in many stores and standardizes "good practices" on a European scale. The group is paying particular attention to the beneficial effect of the generalization of these measures, which would change the image around low-priced products (not only available for households but to the whole population).

Additional notes

This recommendation is a way to promote companies' engagement in sustainable practices. Indeed, it can build consumers' loyalty. However, there are some challenges in putting this recommendation into practice:

- On the household side: to be more flexible and adapt the weekly menu with the products available
- On the side of professionals: to train the staff and introduce this new policy into practice
- On the side of the general population: to overcome the misconceptions and to change the perceptions of the recipients of these products, certainly at low cost, but which first fights against the unsold goods.

ANNEX 17: BIBLIOGRAPHY AND LIST OF FIGURES

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