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PART 1/4

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} - {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) 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

[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.

	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 luxury fashion, technical textiles[37]. Italy, Germany, France, Spain, Portugal, Poland, Romania, Netherlands, Austria and Belgium represent the most important Member States

[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.

[37] https://single-market-economy.ec.europa.eu/sectors/fashion/textiles-and-clothing-industries/textiles-and-clothing-eu_en

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 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

[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)

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

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]. 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

[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

[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.

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.

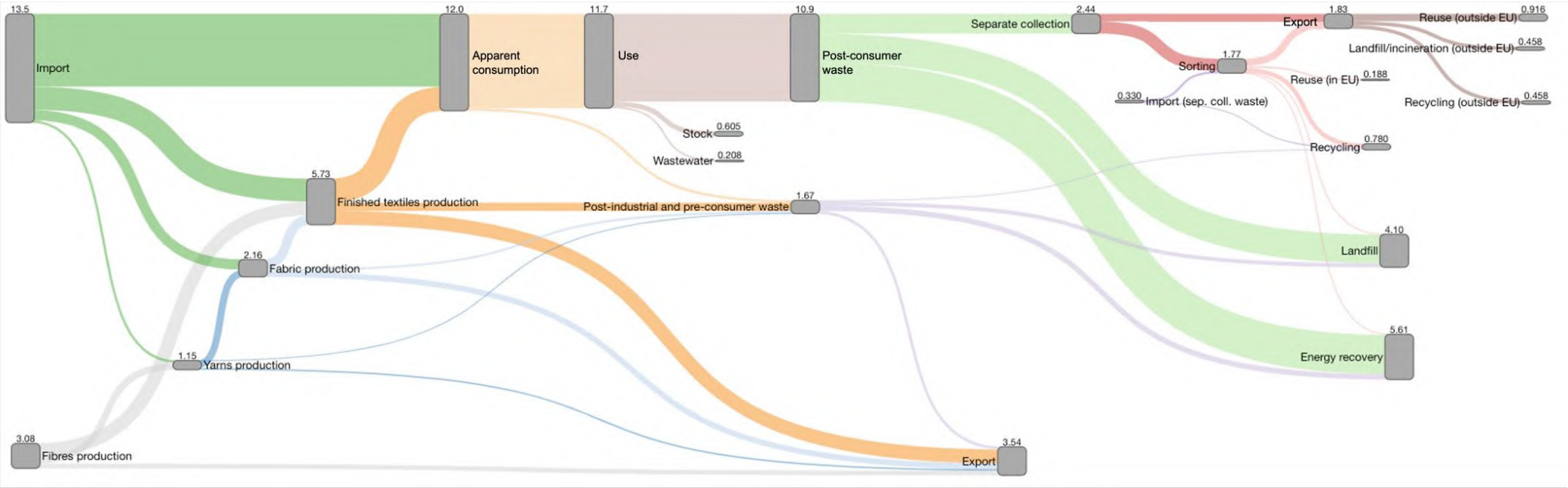
The formal re-use sector, dominated by social enterprises, is currently the most active in separate collection and sorting of textiles, with a business model based on the sale of the best quality textiles. Most sorting presently takes place manually, which is time-consuming and costly, but essential 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 recycled for further applications as apparel is low (2% of sorted material, see Annex 6 for details).

[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.

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

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[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.

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 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.

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

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 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

[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.

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

[66] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0709

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 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

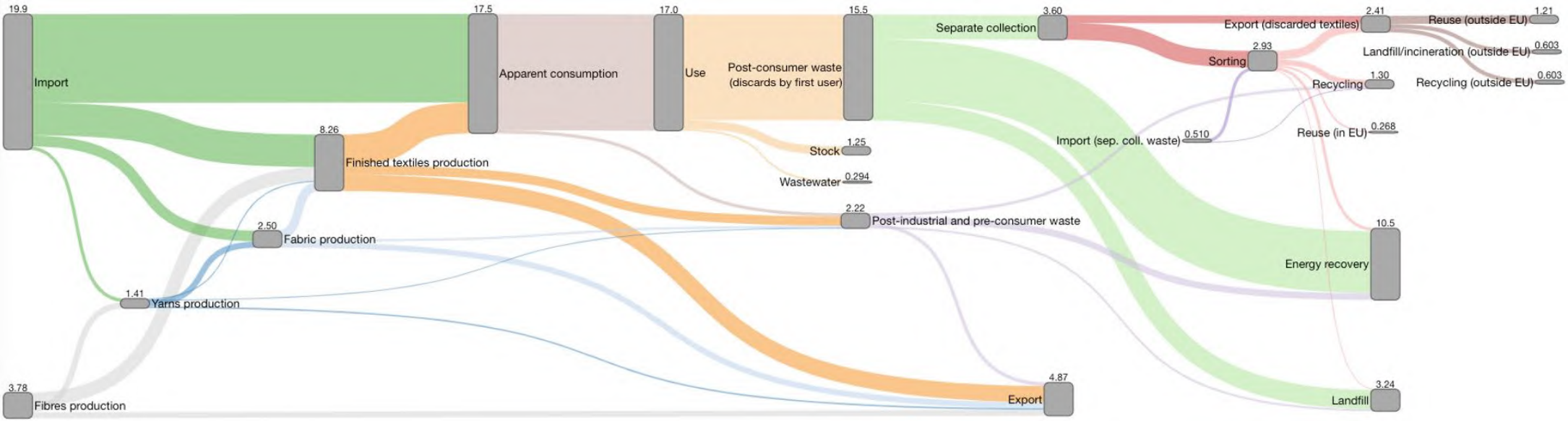
[67] See JRC, 2021. Circular economy perspectives in the EU Textile sector
[68] McKinsey & Company, 2022. Scaling textile recycling in Europe–turning waste into value
[69] European Commission, Joint Research Centre. *Techno-scientific assessment of the management options for used and waste textiles*. 2023 (under development).
[70] Ibidem.

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.

[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 1 - 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 textiles. Addressing transboundary environmental externalities, including GHG emissions and the export of textiles (and waste disguised as

[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

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

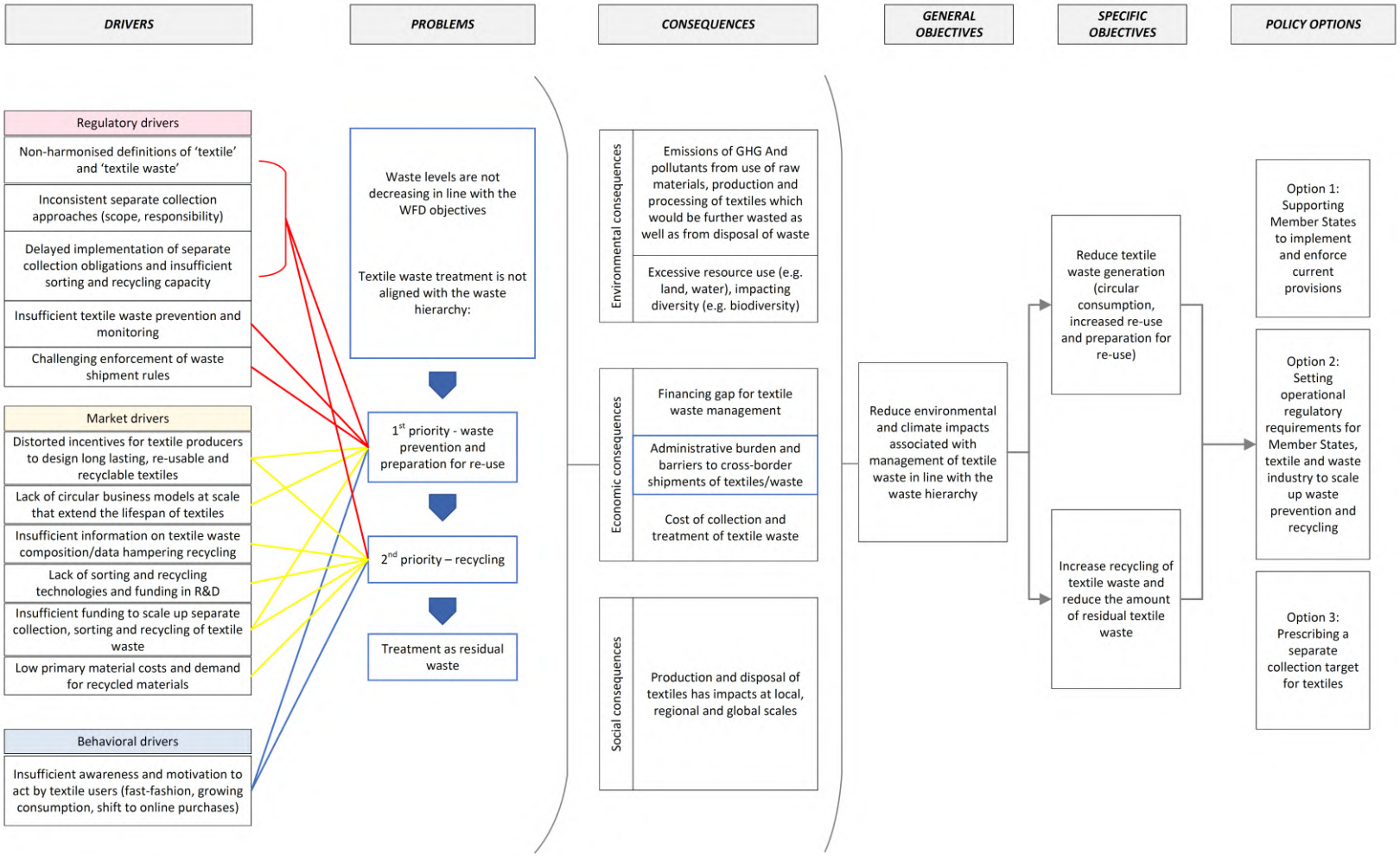
The specific objectives address two distinct problems: **volume of textiles waste is not decreasing in line with the European Green Deal ambitions and textiles waste is not being treated in line with the waste hierarchy**. The first step of the waste hierarchy is about preventing waste generation. Prolonging 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:

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

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

[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

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	**Costs**: €39 million per year (covered by the EPR measure 2.9)

	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	**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 2.14. The latter would also enable further performance targets to be set that is

[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.

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?

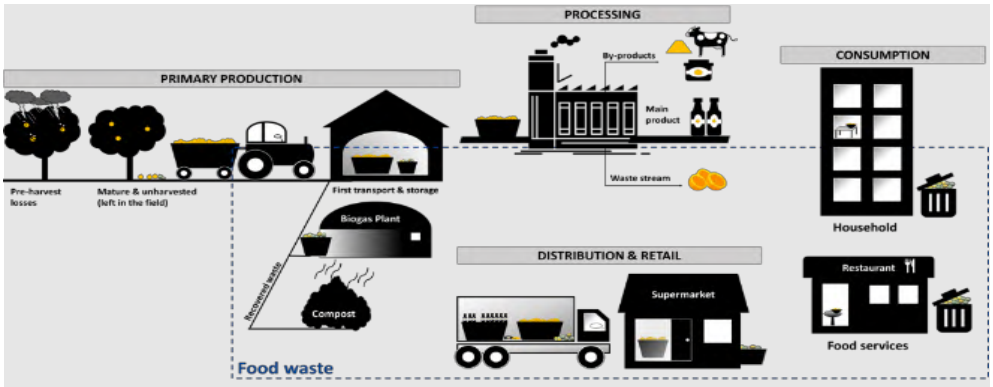
The WFD defines 'food waste' as all food, as defined in the General Food Law[78], that has become waste. This definition, also used in this IA, considers food as a whole and applies across the food supply chain, from production up to and including consumption. Food includes inedible parts, where those 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 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].

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[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*

[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.

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 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

[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
[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

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]

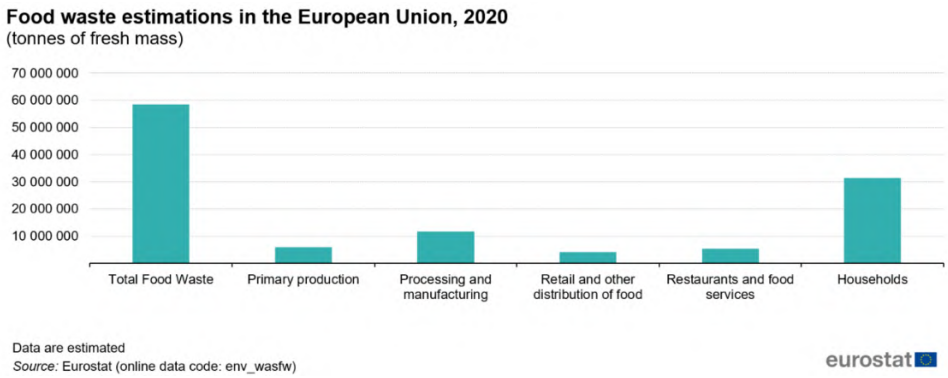
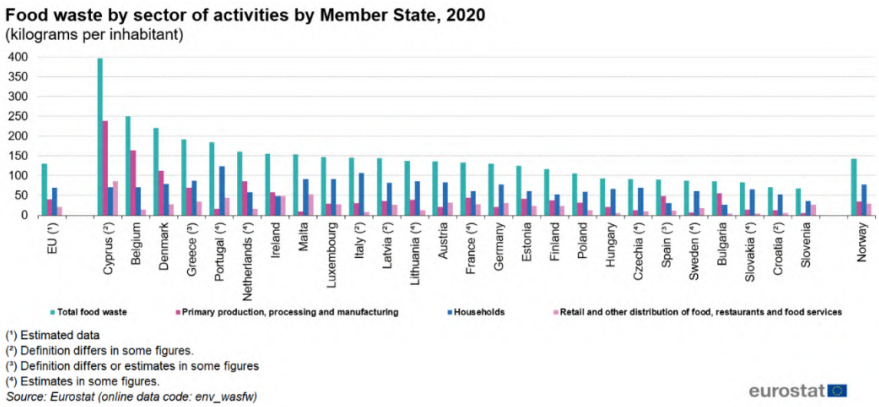


Figure 6 - Food waste by sector of activities by Member State, 2020, Eurostat [98]



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.

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[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.

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 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

[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
[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).

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]

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-

[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.
[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.

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, 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.

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[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)

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

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 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

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[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

[126] REFRESH, *Policies against consumer food waste*, Background report contributing to "REFRESH Policy brief: reducing consumer food waste" (D3.4), 2019.

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 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,

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[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

[132] Market study on date marking and other information provided on food labels and food waste prevention: final report (see note 130)

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 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**

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[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.

[136] *Food Waste Index Report 2021* (see note 118, page 38)

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 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.

[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.

[143] Cyprus, Malta, Poland and Romania.

[144] All Member States excluding Cyprus, Estonia, Lithuania, Malta.

- **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)

- **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:**

[145] Belgium, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Luxembourg, The Netherlands, Sweden

- **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 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).

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

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 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

[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))

[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)

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 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.

[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.

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 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.

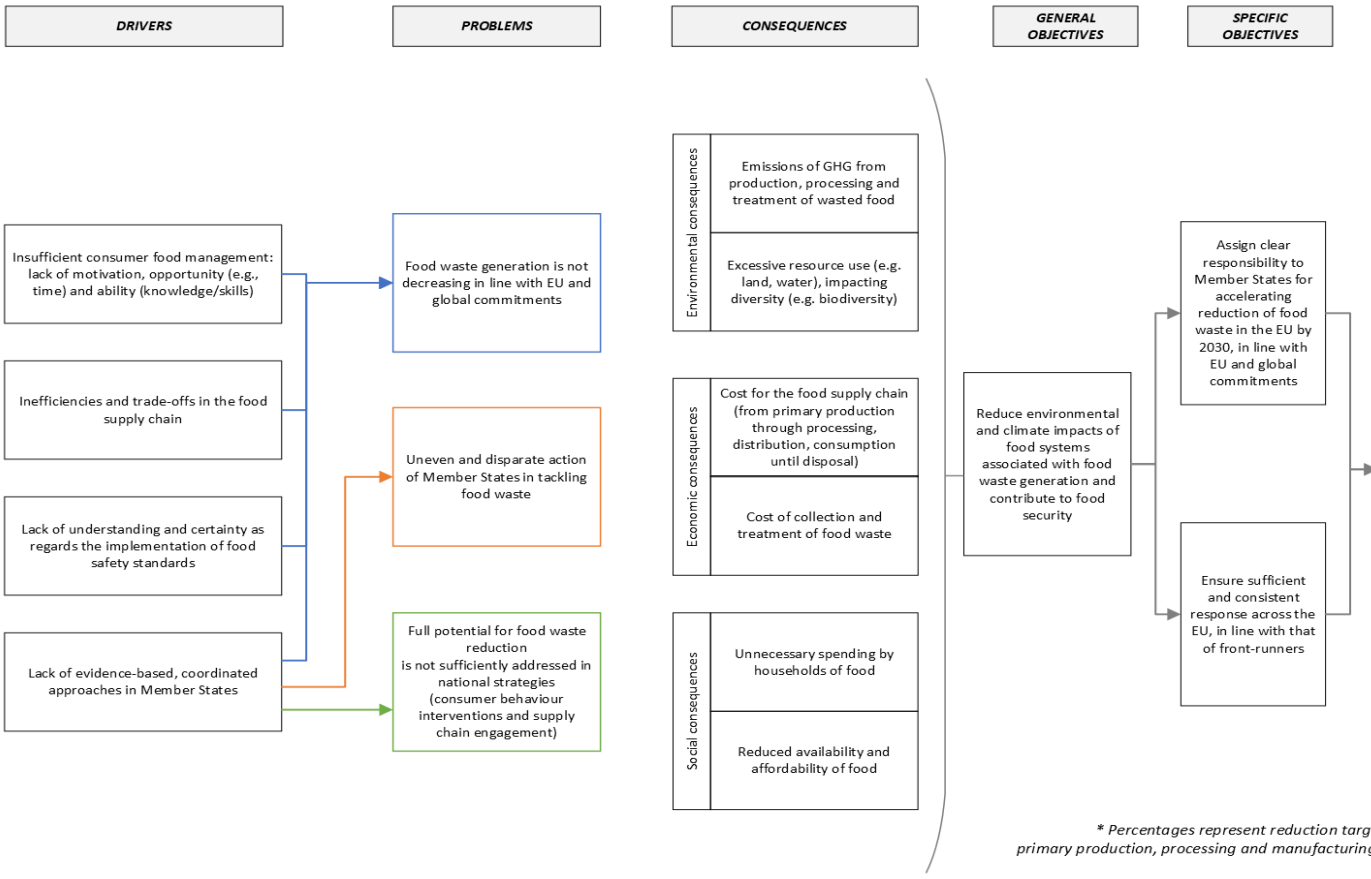
As second specific objective, the initiative also seeks to **ensure sufficient and consistent response by all Member States to reduce food waste**, in line with that of front-runners. This should lead each Member State to take ambitious action – deploying the most effective measures, tailored to its 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.

Problem tree and intervention Logic



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 consumers' own motivation and intentions to reduce food waste, opportunity factors (e.g., available time and financial resources), and consumers' abilities (knowledge

[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.

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).

b) Consumer education

[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.

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.*"

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 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

[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

(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-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

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

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

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%,

[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.

- 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.

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**

[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.
[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.

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 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

[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*.

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 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

[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.

[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.

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.

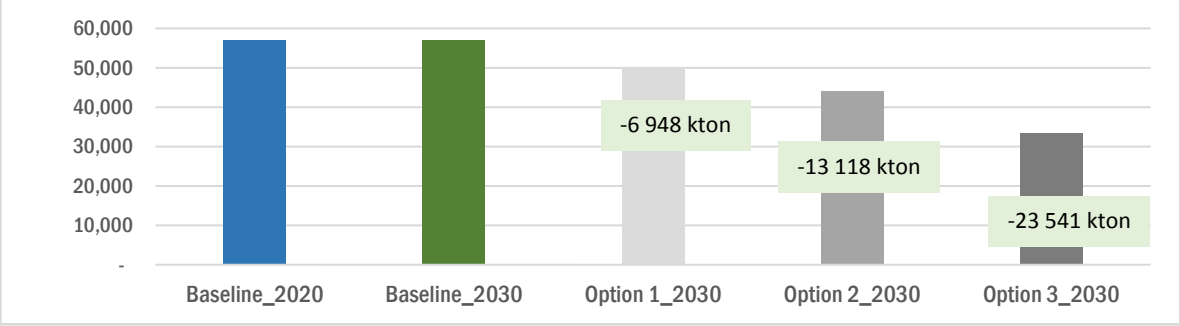
Where impacts could not be quantified (e.g., in part of territorial impacts and the contribution to the 'digital by default principle'), a **qualitative analysis** has been performed.

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 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

[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.



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.

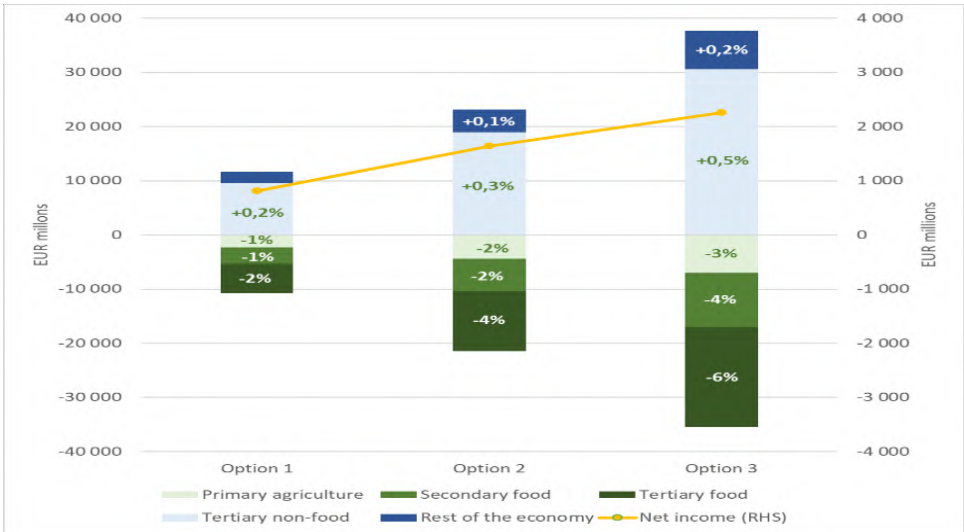
Reduction in **consumer demand** increases from Option 1 to Option 3 as more food waste is avoided and food remains available for human consumption or for other uses. This reduction in demand does not fully translate into a reduction of production and is instead likely to be partly counterbalanced through 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.

[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.

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 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

[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.
[202] SWD(2023) 4 final *Drivers of food security* (section 8.24. Food choices and 8.25. Demographic trends)

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.

*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

[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)

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 of food waste reduction[206] [EUR/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
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

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

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

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).

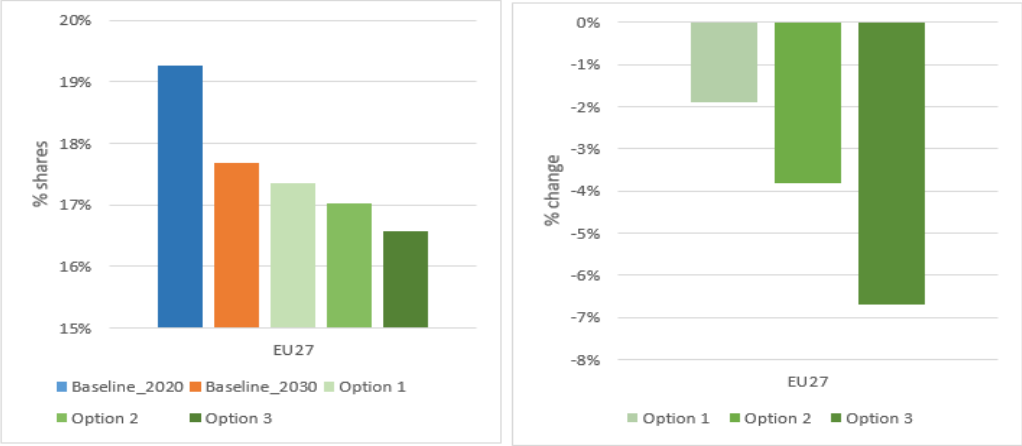
Due to an expected decrease in food prices, and the reduced amount of food (and food services) purchased, households could save, on average, from EUR 220 to over EUR 720 per year (depending on target levels) and spend these amounts on better food or other goods and services. Such savings are particularly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

[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.



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 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.

[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.

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.

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

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

(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:

- 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

[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.

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 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

[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.

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	?	-	-
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.

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

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.

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

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

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 compensated in other

	• 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)	sectors) **Overall effectiveness, efficiency and coherence**: positive