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# Setting the scene for an EU initiative on food waste reduction targets

*Outcomes of consultation activities and analysis of efforts on food waste reduction*

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## Abstract

This report describes part of the research carried out to support the Impact Assessment of the legislative proposal amending Directive 2008/98/EC, in relation to the part focusing on setting legally binding food waste reduction targets. It illustrates:

- the outcome of the public consultation on the revision of the Waste Framework Directive, for the part concerning food waste, which showed a high level of agreement with setting legally binding food waste reduction targets
- the results of targeted consultation and data collection on food waste prevention initiatives from stakeholders and Member States (MSs), trough the submission of two questionnaires, aimed at collecting quantitative data on costs and results of food waste prevention initiatives
- the results of an analysis of policy initiatives on food waste prevention undertaken by EU MSs, in terms of efforts and results achieved, which showed some discrepancies between formal commitment to SDG target 12.3 and concrete measures implemented.

The high heterogeneity of the food waste prevention initiatives collected is reflected in the high variability of the reported cost of food waste reduction. Few MSs have applied an evidence-based policymaking strategy with medium- or long-term outlooks, while the majority have put in place sporadic initiatives. The evidence gathered suggests that further efforts are needed to monitor food waste quantities and to evaluate the effectiveness of country level food waste prevention initiatives.

## Acknowledgements

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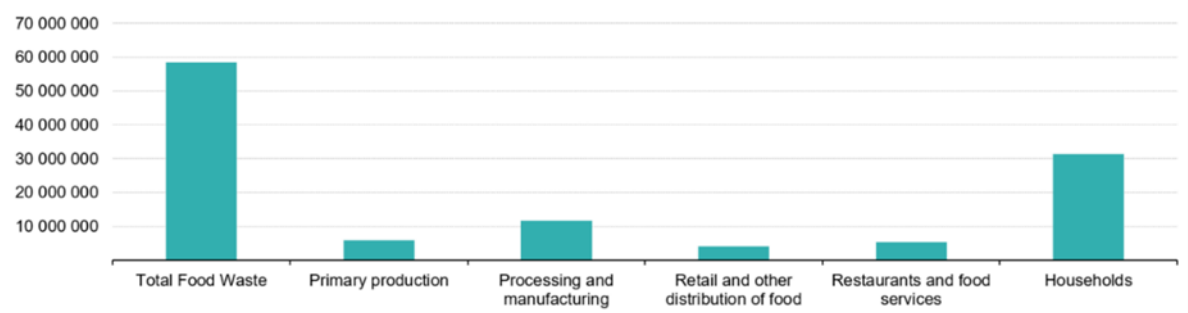
# 1 Introduction

According to EU legislation, food waste is defined as: “all food as defined in Article 2 of Regulation (EC) No 178/2002 of the European Parliament and of the Council (EU, 2002) that has become waste” (EU, 2008). The definition of 'food' laid down in Regulation (EC) No 178/2002 encompasses food as a whole, along the entire food supply chain from production until consumption. Food also includes inedible parts, where those were not separated from the edible parts when the food was produced, such as bones attached to meat destined for human consumption. Hence, food waste includes parts of food intended to be ingested and parts of food not intended to be ingested. ‘Waste’ means any substance or object which the holder discards or intends or is required to discard (EU, 2008). According to Article 2 of Regulation (EC) No 178/2002 of the European Parliament and of the Council, food shall not include feed, live animals unless they are prepared for placing on the market for human consumption and plants prior to harvesting (EU, 2002).

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 report.

In Q1 2023, Eurostat published updated results of the EU-wide monitoring of food waste levels, measured according to a common methodology. In 2020, total food waste reached nearly 59 Mt (131 kg per person per year). Roughly 10% of food made available to EU consumers (at manufacturing, retail, food services and households) is estimated to be wasted. 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 12 Mt). The remaining shares – representing altogether a quarter of the total food waste – originate from the primary production sector (10%; 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 1**).

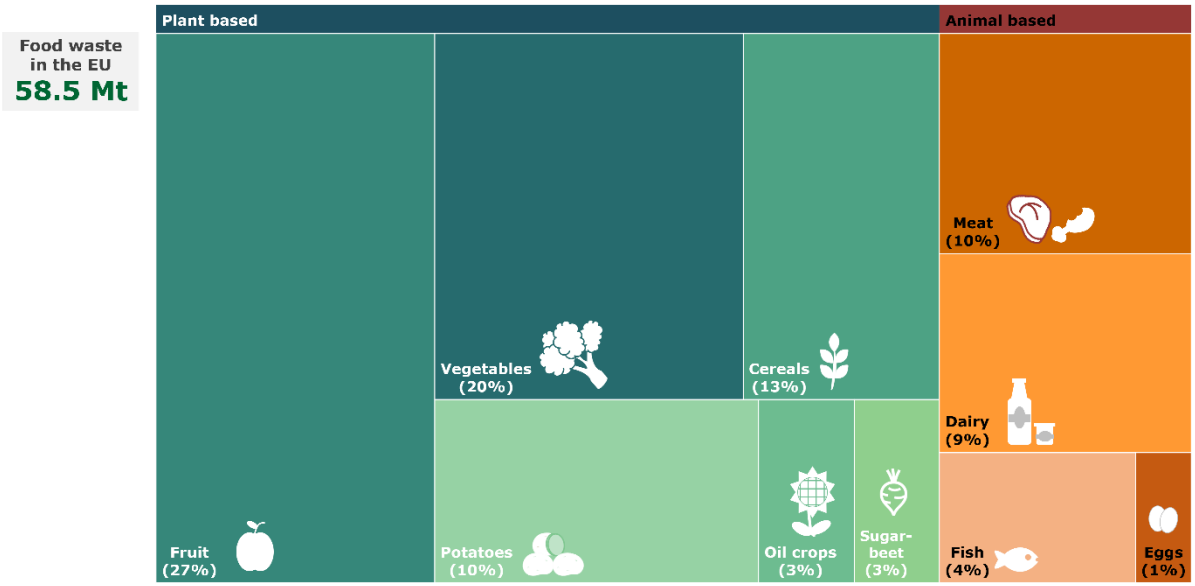
**Figure 1.** Food waste estimations in the EU (2020) (tonnes of fresh mass).




*Source:* Eurostat (2023) (online data code: env_wasfw)

Data collected at MS level reported total food waste, without distinguishing between food types. However, by combining it with the results of the food waste model developed by the JRC (De Laurentiis et al., 2021), it is possible to provide an assessment of the composition of food waste (**Figure 2**). Here, it is possible to see how the largest part is composed of fruit (27%) and vegetables (20%), 13% are cereals while meat and potatoes represent 10% each.

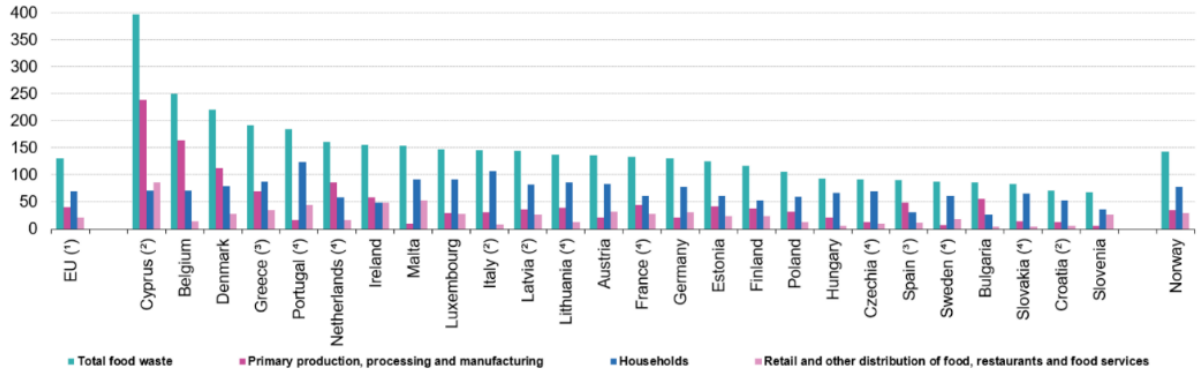
**Figure 2.** Food waste generated in the EU27 by food group. Mt in fresh weight.




*Source:* Adapted from Sanchez Lopez et al. (2020), based on data from Eurostat (2023) and De Laurentiis et al., (2021)

Looking at the food waste levels by Member State (expressed as kg/inhabitant), **Figure 3** provides an overview and shows significant variations in the levels of food waste per capita. Several factors explain the differences in food waste amounts reported by MSs. These include, amongst others: the size of the manufacturing base; whether the country is a net food exporter or importer; the share of disposable income allocated to food; population flux (e.g., due to tourism, migration); cultural differences and food habits. In particular, countries with a small population producing large quantities of food for exporting purposes reported high values of per capita food waste (e.g. Cyprus, Belgium, Denmark). In addition, as 2022 was the first reporting year, some differences may decrease as MS gain experience in food waste monitoring over time.

**Figure 3.** Food waste by sector of activities by Member State, 2020, kilograms per inhabitant.




Legend: [1]: estimated data; [2]: definition differs in some figures; [3]: definition differs or estimates in some figures; [4]: Estimates in some figures. *Source:* Eurostat (2023) (online data code: env_wasfw)

The Farm to Fork Strategy adopted as part of the European Green Deal aims to reduce the environmental and climate footprint of the EU food system and facilitate the shift to healthy and sustainable diets (EC, 2020). With a supply-chain perspective, the Strategy addresses also food waste generation, including a target to halve food waste "The Commission is committed to halving per capita food waste at retail and consumer levels by 2030". Such target is in alignment with the Sustainable Development Goals (SDGs) (UN General

Assembly, 2015) target 12.3 "By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses" ([1]).

Towards achieving this goal, the Commission announced the proposal of EU-level targets for food waste reduction. This initiative also builds on Directive 851/2018/EC amending Directive 2008/98/EC on waste, which obliges the Commission to examine data on food waste provided by MSs with a view to considering the feasibility of establishing a Union-wide food waste reduction target to be met by 2030. Such proposal would be part of the revision of Directive 2008/98/EC on waste.

This technical report describes the preparatory work carried out to support the impact assessment of the policy initiative on EU-level targets for food waste reduction. In particular, it provides an overview of the consultation activities, which include:

- a public consultation (open to everyone, through an EU survey) aimed at getting the views and opinions of citizens, companies, organizations and other stakeholders on the problem of FW and on the related policy proposal
- a targeted consultation for MSs and other stakeholders on the food waste prevention initiatives in place, with a focus on collecting quantitative data on the cost and effectiveness of these initiatives.

Moreover, an analysis of policy initiatives undertaken by MSs to prevent food waste is presented. The aim of the analysis was to delineate the current status of food waste prevention across the different MSs and evaluate the possible resources required to reach the FW reduction targets. This analysis showed that there is a lack of an evidence-based and coordinated approach to food waste prevention in MSs, which was identified as one of the problem drivers leading to food waste generation in the EU.

[1] Tackling food waste is also in line with the priorities of the Bioeconomy Strategy (COM/2018/673) that aims at the deployment of a sustainable European bioeconomy that, inter alia, "can turn bio-waste, residues and discards into valuable resources and can create the innovations and incentives to help retailers and consumers cut food waste by 50% by 2030".

# 2 Public consultation on food waste reduction targets

In the context of the Waste Framework Directive revision, which aims to increase the level of protection of the environment and public health from the impacts of waste management, the European Commission carried out a public consultation. The aim was to seek opinions and insights about the problem, the feasibility and possible impacts of alternative actions; gather examples of best practices and views on the subsidiarity of possible actions. As part of this impact assessment, the Commission also examined policy options related to the setting of EU-level targets for food waste reduction.

The questionnaire developed was intended to reach out to interested or concerned stakeholders. Stakeholders could provide feedback by responding to the questionnaire and by uploading a document if they wished. The consultation period started on 24 May 2022 and ran until 24 August 2022. The questionnaire was available on the Have your Say platform in all EU languages. There were 731 responses to the survey during the consultation period and 207 respondents uploaded written contributions. Section 2.1 summarizes the main outcomes of the public consultation for the part related to food waste, while Section 2.2 summarizes the main outcomes of the position papers provided in the consultation by various respondent.

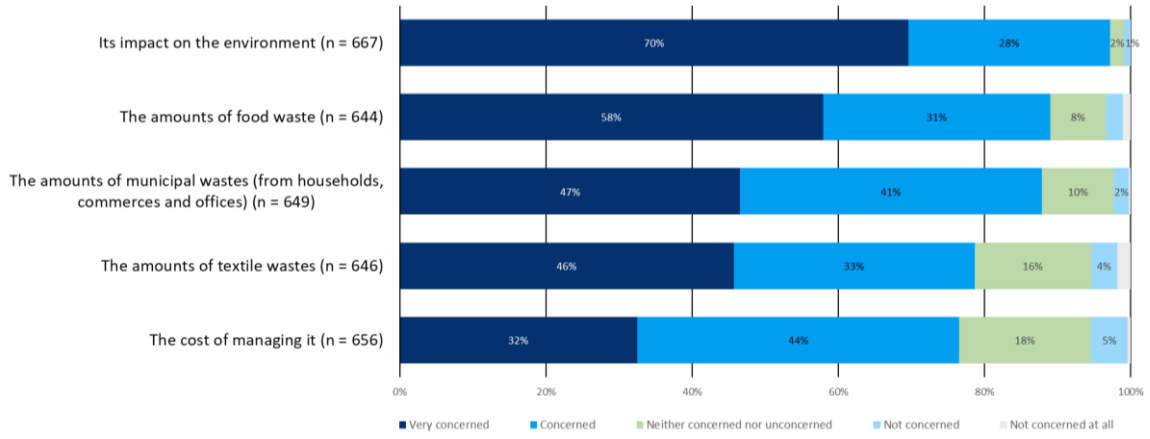
## 2.1 Analysis of the responses

This section illustrates the outcome of the public consultation for each of the questions related to food waste.

### 2.1.1 Concern about food waste

Question: *Regarding the volumes of wastes generated, please indicate to what extent are you concerned about the following.*

**Figure 4.** Answers provided to the question on the level of concern about waste flows

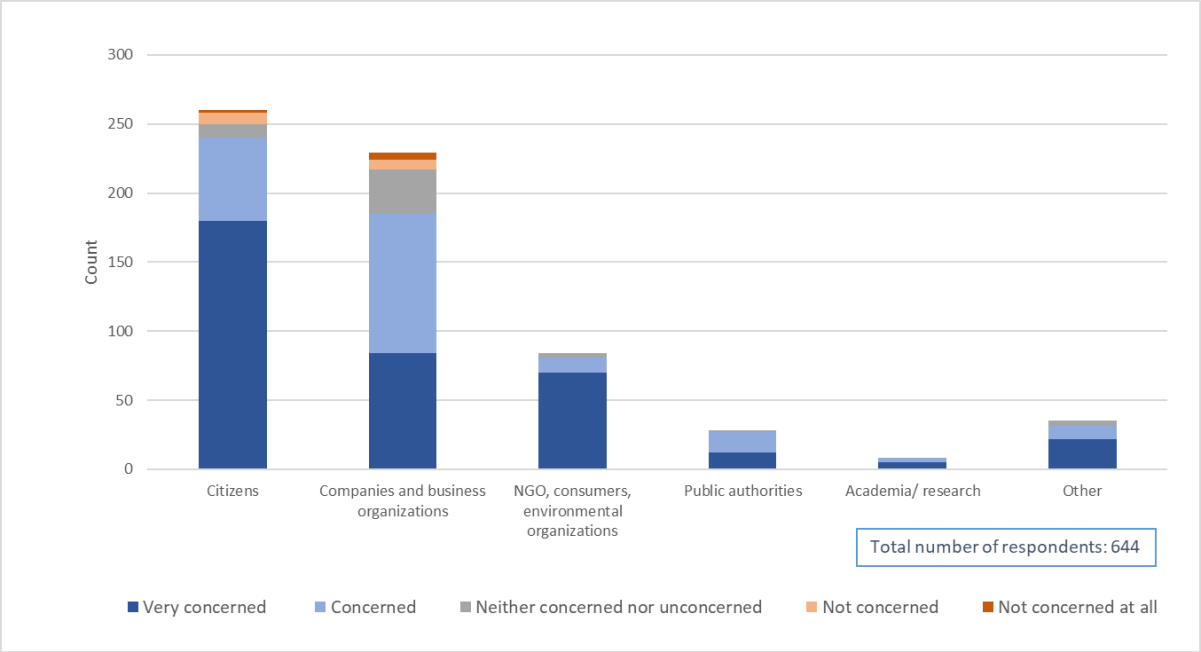



*Source:* Authors' own elaboration

89% of the respondents declared to be concerned or very concerned about the amount of food waste. The option "municipal waste" shows a similar share (88% are concerned or very concerned about its quantities), whereas almost 80% of the respondents declared to be concerned or very concerned about the amounts of textile waste. Finally, almost all the respondents (98%) reported being concerned or very concerned about the "impact on the environment" of waste generated (**Figure 4**).

Considering the stakeholder groups, stakeholders showing no concern for the amount of food waste generated belong only to the categories business association and companies (n=12 out of 131) and EU citizen (n=10 out of 260) (**Figure 5**).

**Figure 5.** Stakeholder analysis of replies to the question on food waste reduction targets



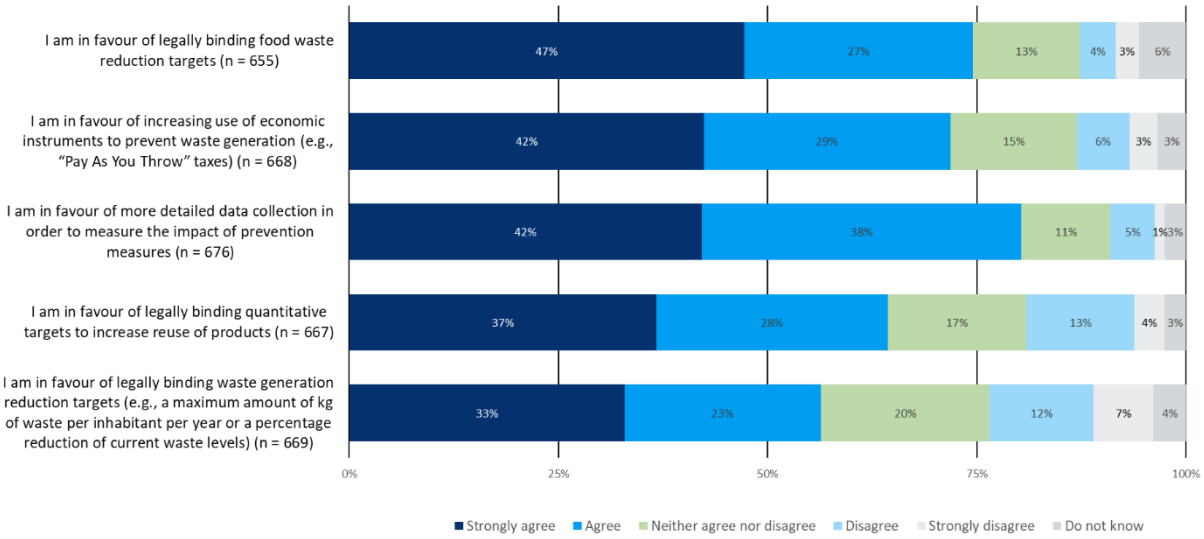

*Source:* Authors' own elaboration

### 2.1.2 Level of agreement on food waste reduction targets

Question: *To what extent do you agree with the following statements on possible EU measures to improve waste prevention?*

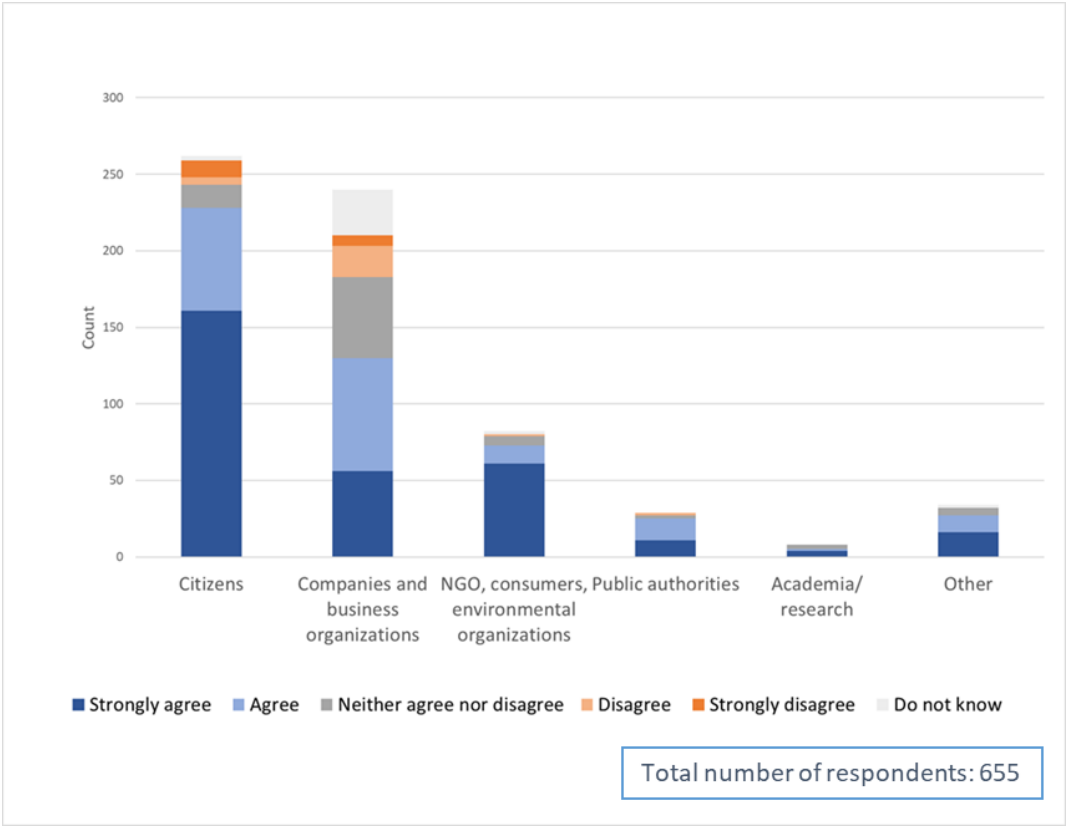
The level of agreement concerning the setting of legally binding food waste reduction targets is generally high, with 74% of replies expressing agreement or strong agreement with the proposal (**Figure 6**). As shown in **Figure 7**, NGO, consumer and environmental organizations expressed the highest support (relative to the group size) as 73 respondents out of 82 (i.e. 89%) either agree or strongly agree with the proposal, followed by EU citizens (228 out of 262, i.e. 87% of them agree or strongly agree on the proposal). The consensus is lower in the case of business associations and companies (130 out of 240, i.e. 54% expressed agreements or strong agreement). When delving into the opinion of companies (**Figure 8**), the level of agreement is similar among different company size groups. In all groups more than half of the respondents reported to either agree or strongly agree with the proposal, while a small share (between 4% and 15%) reported to either disagree or strongly disagree with the proposal. The largest share of disagreement was reported by small companies (where, however, only two respondents reported to disagree or strongly disagree with setting food waste reduction targets). Across different types of "public authority" (n=29), **Figure 9** shows that the level of consensus on setting food waste reduction targets is generally high. All types were in favour of such measure with consensus above 70% (considering the sum of the options "agree" and "strongly agree"). Disagreement was only reported by two stakeholders belonging to local authorities.

**Figure 6.** Answers provided to the question on the level of agreement with policy measures



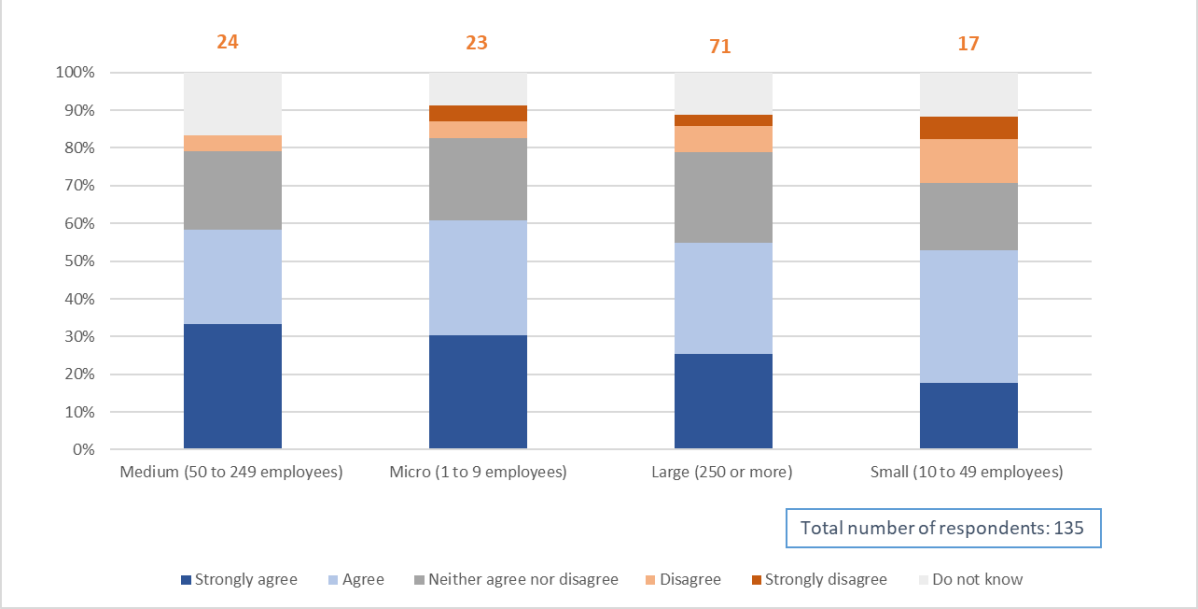

*Source:* Authors' own elaboration

**Figure 7.** Stakeholder analysis of question on the level of agreement with food waste reduction targets



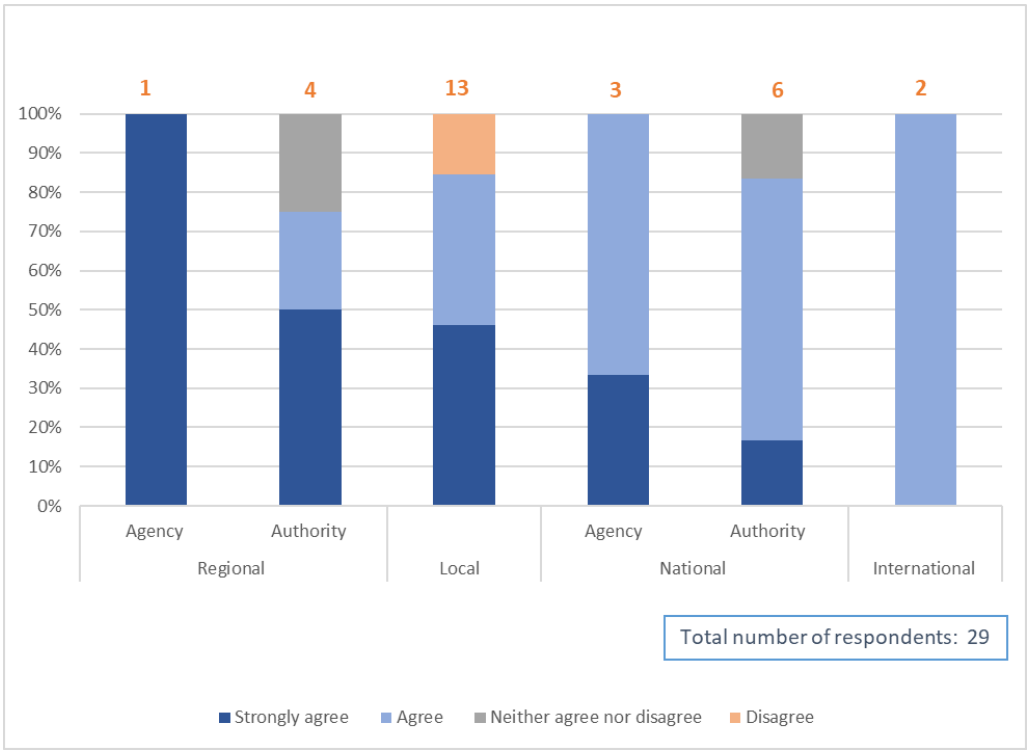

*Source:* Authors' own elaboration

**Figure 8.** Analysis of responses provided by the companies, by company size. Numbers above the bars indicates the total number of replies for each category




*Source:* Authors' own elaboration

**Figure 9.** Analysis of responses provided by the "public authority" group, by type and level of the entity. Numbers above the bars indicates the total number of replies for each category

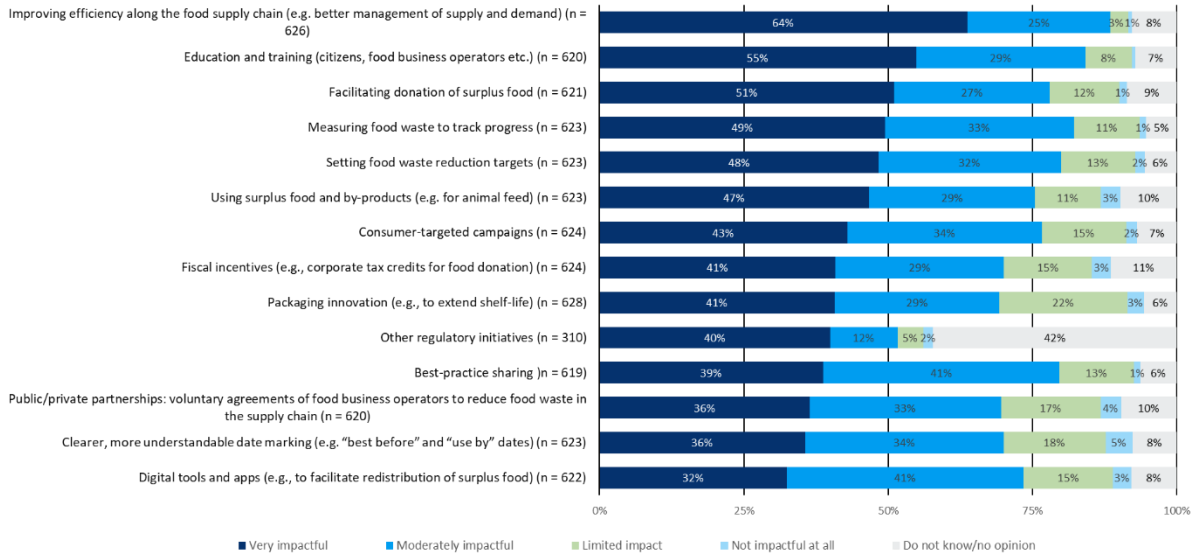



*Source:* Authors' own elaboration

### 2.1.3 Measures to reduce food waste

Question: *Which measures do you consider to be the most effective in reducing food waste? Please indicate for each measure below, its possible level of impact.*

**Figure 10.** Answers provided to the question on the most effective measures to reduce food waste




*Source:* Authors' own elaboration

**Figure 10** shows that the options "improving efficiency along the food supply chain", "education and training" and "facilitating donation of surplus food" are considered the most effective ones to reduce food waste (respectively 64%, 55% and 51% of the respondents consider them very impactful). A high level of support is also shown for the options "measuring food waste to track progress" and "setting food waste reduction targets", with respectively 82% and 80% of the respondents regarding them as either "very impactful" or "moderately impactful.

**Figure 11** provides further insight on the views of stakeholders concerning food waste prevention measures. 93% of the citizens think that "improving efficiency along the food supply chain" is a very or moderately impactful measure, while the option "education and training" and "facilitating donation of surplus food" have been identified as very or moderately impactful by 89 and 88% of the citizens, respectively.

"Improving efficiency along the food supply chain" is the option with highest rates in all the stakeholder groups, with the exception of "others". However, in the case of companies and business organizations the shares of respondents considering the various measures "very impactful" or "moderately impactful" are lower, being at maximum 56% for "improving efficiency along the food supply chain" and 55% for "best practice sharing". For the group "NGOs, consumers and environmental organizations" the second option with highest share of very and moderately impactful replies is "setting food waste reduction targets" (87%). The group "academy and research" the options "using surplus food and by-products", "fiscal incentives" and "clearer, more understandable date marking" have all the same rate of very and moderately impactful replies as "improving efficiency along the food supply chain", i.e. 88%. Instead, fiscal incentives do not have high rates in the case of business organizations and companies (42% of the respondents considered this option very or moderately impactful).

In the case of the group "others", which include also trade unions and non-EU citizens, the option with the highest share is "sharing of best practices".

**Figure 11.** Heat map showing the shares (%) of replies "very impactful" and "moderately impactful" for each proposed measure out of the total number of respondents, by group of stakeholders. The last row indicates the total number of respondents for each stakeholder group. **Table** 1 below shows the legend for the measures

| Measure | EU Citizens (%) | Companies and business organizations (%) | NGO, consumers, environmental organizations (%) | Public authorities (%) | Academia/ research (%) | Other (%) |
|---|---|---|---|---|---|---|
| 1 | 93 | 56 | 89 | 81 | 88 | 76 |
| 2 | 89 | 52 | 82 | 81 | 75 | 74 |
| 3 | 82 | 54 | 82 | 81 | 63 | 76 |
| 4 | 84 | 48 | 87 | 69 | 75 | 71 |
| 5 | 76 | 55 | 76 | 81 | 75 | 79 |
| 6 | 88 | 46 | 67 | 66 | 75 | 68 |
| 7 | 77 | 51 | 70 | 81 | 63 | 71 |
| 8 | 80 | 47 | 66 | 81 | 88 | 68 |
| 9 | 76 | 46 | 78 | 69 | 63 | 61 |
| 10 | 73 | 42 | 74 | 78 | 88 | 50 |
| 11 | 70 | 43 | 77 | 69 | 88 | 63 |
| 12 | 67 | 54 | 57 | 66 | 63 | 55 |
| 13 | 75 | 43 | 57 | 69 | 38 | 68 |
| 14 | 20 | 19 | 38 | 25 | 0 | 21 |
| Total number of respondents | 284 | 299 | 82 | 40 | 41 | 42 |

*Source:* Authors' own elaboration

**Table** 1 Legend of food waste reduction measures listed in **Figure 11**

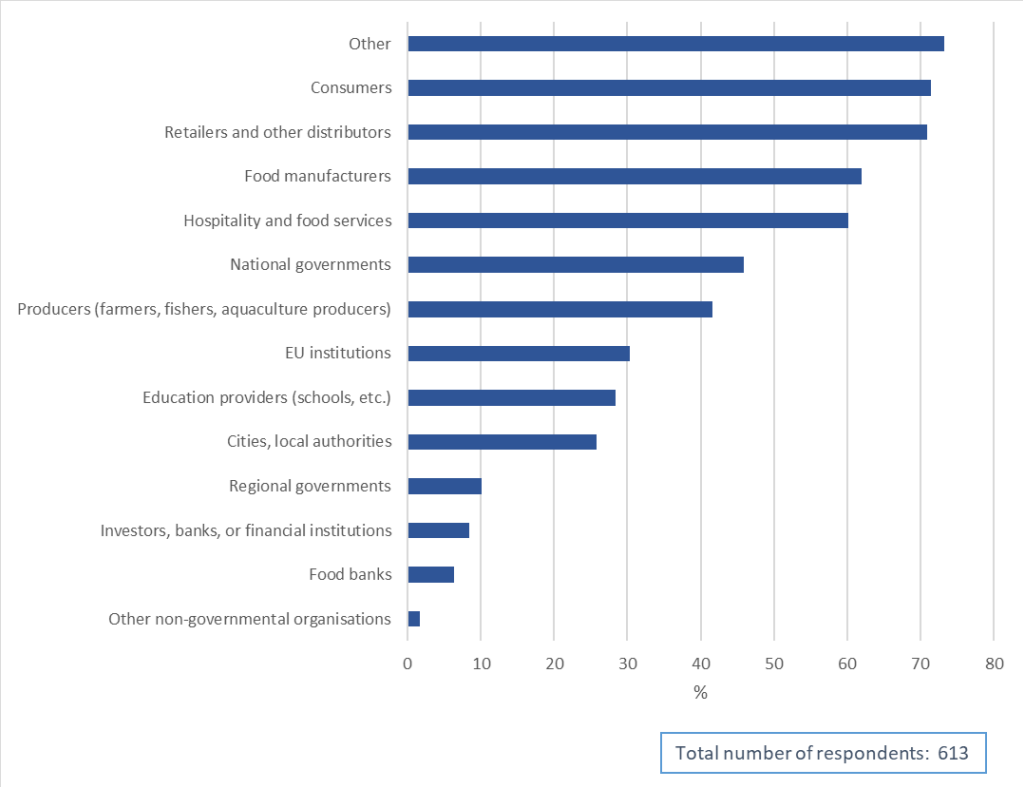
| Number | Measure |
|---|---|
| 1 | Improving efficiency along the food supply chain (e.g. better management of supply and demand) |
| 2 | Education and training (citizens, food business operators etc.) |
| 3 | Measuring food waste to track progress |
| 4 | Setting food waste reduction targets |
| 5 | Best-practice sharing |
| 6 | Facilitating donation of surplus food |
| 7 | Consumer-targeted campaigns |
| 8 | Using surplus food and by-products (e.g. for animal feed) |
| 9 | Digital tools and apps (e.g., to facilitate redistribution of surplus food) |
| 10 | Fiscal incentives (e.g., corporate tax credits for food donation) |
| 11 | Clearer, more understandable date marking |
| 12 | Packaging innovation (e.g., to extend shelf-life) |
| 13 | Public/private partnerships: voluntary agreements of food business operators to reduce food waste in the supply chain |
| 14 | Other regulatory initiatives |

*Source:* Authors' own elaboration

### 2.1.4 Who needs to take action

Question: *Fighting food waste requires action from multiple actors across the food supply chain and beyond. According to you, who needs to take more action to reduce food waste? (Please select up to 5 actors from the list below)*

**Figure 12.** Answers provided to the question on actors that need to take more action to reduce food waste. Percentage of respondents selecting each actor




*Source:* Authors' own elaboration

The surveyed stakeholders tend to identify the actors "other", "consumers" and "retailers and other distributors" as those who need to take more action to reduce food waste, followed by "food manufacturers" and "hospitality and food services" (**Figure 12**). No information was provided by the respondents on who they intended when selecting the option "other". The relevance given to consumers is in line with evidence showing that this group is responsible with the largest share of food waste generation. On the contrary, the least selected actor categories are "food banks" and "other non-governmental organizations".

The heat map (**Figure 13**) displays the most selected options from the different categories of stakeholders. The most selected options by EU citizens is "other" (74%), "retailers and other distributors" (71%) and "consumers" (68%). "Consumers" is the most selected option also by the stakeholder group companies and business organizations (82%), public authorities (90%), academia (86%) and others (91%). For the group of NGOs, consumer and environmental organization, instead, the most selected actors are "food manufacturers" (78%) and hospitality and food services (70%).

The actor "consumers" is identified as the most relevant actor to take action by large (55%) and micro (58%) companies (**Figure 14**). Instead, small companies selected in "food manufacturers" as actor for reducing food waste in most cases (65%). The group of medium companies shows the highest shares for the actors "retailers and distributors", "consumers" and "other" (63% each).

**Figure 13.** Heat map showing the shares of respondents selecting each actor category (rows), by group of stakeholders (columns). The last row indicates the total number of respondents for each group of stakeholders.

| | Citizens (%) | Companies and business organizations (%) | NGO, consumers, environmental organizations (%) | Public authorities (%) | Academia/ research (%) | Other (%) |
|---|---|---|---|---|---|---|
| Producers (farmers, fishers, aquaculture producers) | 34 | 43 | 64 | 17 | 71 | 55 |
| Food manufacturers | 57 | 60 | 78 | 62 | 57 | 70 |
| Retailers and other distributors | 71 | 74 | 65 | 66 | 57 | 76 |
| Hospitality and food services | 59 | 60 | 70 | 66 | 29 | 48 |
| EU institutions | 31 | 29 | 42 | 7 | 14 | 24 |
| National governments | 45 | 36 | 65 | 59 | 71 | 45 |
| Regional governments | 14 | 9 | 5 | 10 | 0 | 3 |
| Cities, local authorities | 29 | 21 | 19 | 41 | 43 | 27 |
| Food banks | 7 | 7 | 1 | 10 | 0 | 9 |
| Other non-governmental organisations | 2 | 0 | 1 | 10 | 0 | 0 |
| Investors, banks, or financial institutions | 13 | 3 | 7 | 10 | 29 | 0 |
| Education providers (schools, etc.) | 28 | 31 | 19 | 34 | 14 | 33 |
| Consumers | 68 | 82 | 41 | 90 | 86 | 91 |
| Other | 74 | 74 | 69 | 72 | 57 | 76 |
| **Tot. number of respondents** | **262** | **199** | **83** | **29** | **7** | **33** |

*Source:* Authors' own elaboration

**Figure 14.** Analysis of replies of question on actors who need to take more action to reduce food waste from companies, by company size. Numbers above the bars indicates the total number of replies for each company size

| | Large (250 or more) (%) | Medium (50 to 249 employees) (%) | Small (10 to 49 employees) (%) | Micro (1 to 9 employees) (%) |
|---|---|---|---|---|
| Producers (farmers, fishers, aquaculture producers) | 34 | 22 | 35 | 31 |
| Food manufacturers | 42 | 44 | 65 | 54 |
| Retailers and other distributors | 52 | 63 | 50 | 46 |
| Hospitality and food services | 40 | 41 | 45 | 54 |
| EU institutions | 17 | 22 | 20 | 27 |
| National governments | 20 | 22 | 30 | 23 |
| Regional governments | 1 | 0 | 10 | 4 |
| Cities, local authorities | 12 | 11 | 20 | 23 |
| Food banks | 5 | 7 | 0 | 12 |
| Other non-governmental organisations | 0 | 0 | 0 | 0 |
| Investors, banks, or financial institutions | 3 | 7 | 0 | 4 |
| Education providers (schools, etc.) | 23 | 26 | 25 | 31 |
| Consumers | 55 | 63 | 60 | 58 |
| Other | 52 | 63 | 50 | 46 |
| **Number of respondents** | **56** | **20** | **15** | **20** |

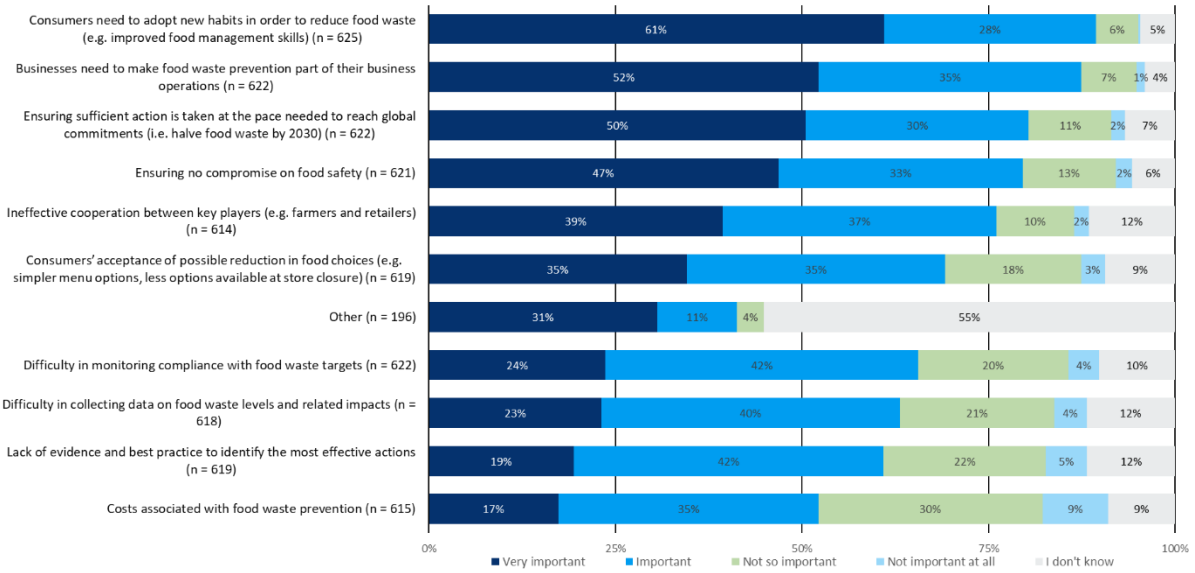
*Source:* Authors' own elaboration

### 2.1.5 Challenges for the food waste reduction initiatives

Question: *Food waste reduction initiatives may encounter several challenges. For each of the items listed below, please indicate how important you consider these challenges to be.*

According to the respondents, the most important challenge for the reduction of food waste concern the fact that consumers need to adapt to new habits (**Figure 15**) identified as challenge 2 in table 2. Indeed, counting the replies "very important" and "important", this is the first option for citizens (90% of all replies from this stakeholder), companies and business organizations (61%), public authorities (88%), academia and research institute (88%) and other (87%) (**Figure 16**). Instead, in the stakeholder group NGOs, consumer and environmental organizations, 76% of the respondents identified as "very important"/"important" the challenge that "businesses need to make food waste prevention part of their business operations" (challenge 1). This option obtained high shares also in other stakeholder groups, i.e. citizens (89%), public authorities (88%) and other (84%). Challenge 5 on costs associated with food waste prevention has the lowest share in various groups of stakeholders, including citizens (50%), companies and business organizations (36%), NGOs, consumer and environmental organizations (38%), and other (55%).

**Figure 15.** Answers provided to the question on challenges encountered by food waste reduction initiatives




*Source:* Authors' own elaboration

**Figure 16.** Heat map showing the shares of replies "very important" and "important" for each challenge, by stakeholder category. The definition of each challenge is provided in Table 2

| Challenge | EU Citizens (%) | Companies and business organizations (%) | NGO, consumers, environmental organizations (%) | Public authorities (%) | Academia/ research (%) | Other (%) |
|---|---|---|---|---|---|---|
| 1 | 89 | 56 | 76 | 88 | 75 | 84 |
| 2 | 90 | 61 | 71 | 88 | 88 | 87 |
| 3 | 79 | 44 | 66 | 78 | 88 | 74 |
| 4 | 72 | 43 | 56 | 66 | 63 | 66 |
| 5 | 81 | 50 | 73 | 88 | 75 | 74 |
| 6 | 77 | 54 | 67 | 78 | 63 | 84 |
| 7 | 57 | 44 | 48 | 50 | 50 | 66 |
| 8 | 61 | 41 | 56 | 59 | 38 | 71 |
| 9 | 67 | 40 | 60 | 63 | 63 | 71 |
| 10 | 50 | 36 | 38 | 56 | 63 | 55 |
| **Total number of respondents** | **264** | **299** | **90** | **32** | **8** | **38** |

*Source:* Authors' own elaboration

Looking at company size (**Figure 17**), replies are similar given that challenge 2 on consumers' habits is the one with the highest share of "important" and "very important" replies in the large, medium and small companies (60%, 70% and 100% respectively). For micro scale companies, instead, challenge 1 on business operations has the highest share (54%).

**Figure 17.** Analysis of replies from companies on challenges encountered by food waste reduction initiatives, by company size. Shares of replies "very important" and "important".

| Challenge | Large (250 or more employees) (%) | Medium (50 to 249 employees) (%) | Small (10 to 49 employees) (%) | Micro (1 to 9 employees) (%) |
|---|---|---|---|---|
| 1 | 56 | 70 | 90 | 54 |
| 2 | 60 | 70 | 100 | 50 |
| 3 | 47 | 48 | 75 | 46 |
| 4 | 44 | 52 | 75 | 42 |
| 5 | 52 | 59 | 85 | 42 |
| 6 | 53 | 52 | 85 | 46 |
| 7 | 47 | 56 | 70 | 38 |
| 8 | 41 | 48 | 75 | 35 |
| 9 | 42 | 44 | 70 | 35 |
| 10 | 35 | 33 | 50 | 35 |
| **Total number of respondents** | **86** | **27** | **20** | **26** |

*Source:* Authors' own elaboration

**Table 2.** Description of challenges supporting **Figure 17**

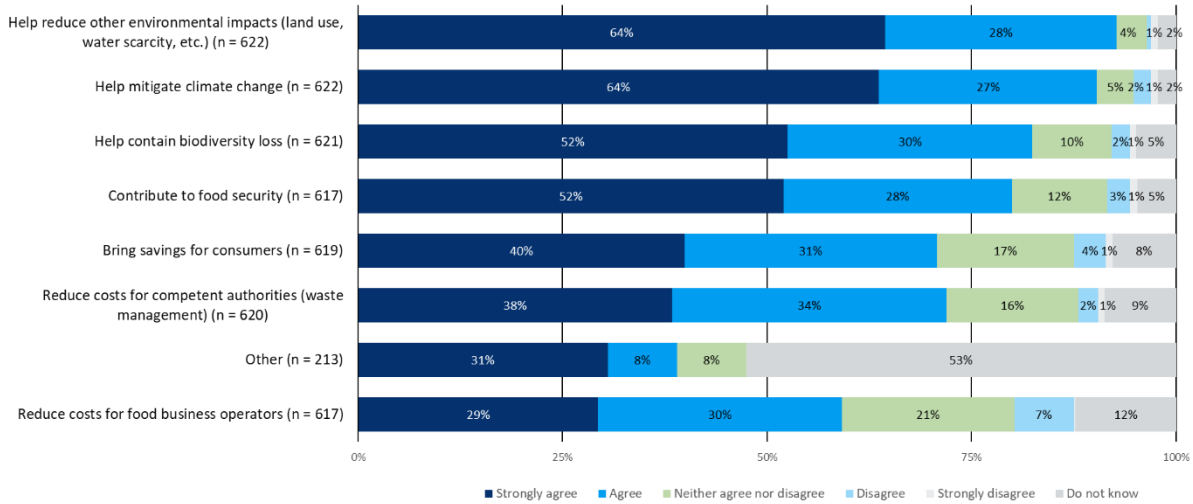
| Number | Challenge |
|---|---|
| 1 | Businesses need to make food waste prevention part of their business operations |
| 2 | Consumers need to adopt new habits in order to reduce food waste |
| 3 | Ineffective cooperation between key players |
| 4 | Consumers' acceptance of possible reduction in food choices |
| 5 | Ensuring sufficient action is taken at the pace needed to reach global commitments |
| 6 | Ensuring no compromise on food safety |
| 7 | Lack of evidence and best practice to identify the most effective actions |
| 8 | Difficulty in collecting data on food waste levels and related impacts |
| 9 | Difficulty in monitoring compliance with food waste targets |
| 10 | Costs associated with food waste prevention |

*Source:* Authors' own elaboration

### 2.1.6 Benefits of reducing food waste

Question: *The EU's Farm to Fork Strategy seeks to enable the transition to a sustainable food system that is fair, healthy and environmentally-friendly. It aims in particular to reduce the environmental and climate footprint of the EU food system, to protect citizens' health and ensure the livelihoods of economic operators. Taking action to reduce food waste is critical to achieving sustainable food systems. Please indicate if you agree that reducing food waste can lead to the following benefits.*

**Figure 18.** Answers provided to the question on the benefits of reducing food waste




*Source:* Authors' own elaboration

Climate change mitigation and the reduction of other environmental impacts are the most important benefits deriving from reducing food waste, according to the survey respondents, as in both cases 64% of respondents strongly agreed with these statements (**Figure 18**).

The option "help reduce other environmental impact" is the option with the highest share of "strongly agree" and "agree" replies in all stakeholder groups (**Figure 19**), ranging from 92% of citizens and 62% of companies and business organization. For this stakeholder group the option "help mitigate climate change" has the same share (62%) of "strongly agree" and "agree" responses. With the exception of the group academia and research (which counts only 8 replies in total), the other stakeholder groups also show high shares for the climate mitigation options (89% of citizens and NGOs, environmental and consumer organizations, 78% of public authorities, 82% of others).

Interestingly, business associations and organizations tend to disagree with the suggestion that food waste reduction could bring savings for food business operators (45%). This general tendency could either be explained by a low level of awareness of the potential savings associated with food waste reduction, or by the fact that these stakeholders have evidence that efforts to reduce food waste would not be worthwhile from an economic perspective.

**Figure 19.** Heat map showing the shares of replies "agree" and "strongly agree" to each benefit, by group of stakeholder

| | EU Citizens (%) | Companies and business organizations (%) | NGO, consumers, environmental organizations (%) | Public authorities (%) | Academia/ research (%) | Other (%) |
|---|---|---|---|---|---|---|
| Help mitigate climate change | 89 | 62 | 89 | 78 | 63 | 82 |
| Help contain biodiversity loss | 82 | 54 | 84 | 72 | 88 | 79 |
| Help reduce other environmental impacts | 92 | 62 | 91 | 81 | 88 | 87 |
| Contribute to food security | 78 | 54 | 80 | 66 | 63 | 74 |
| Reduce costs for food business operators | 56 | 37 | 64 | 56 | 63 | 58 |
| Bring savings for consumers | 68 | 46 | 78 | 75 | 63 | 61 |
| Reduce costs for competent authorities | 73 | 45 | 74 | 66 | 75 | 66 |
| **Total number of respondents** | **264** | **299** | **76** | **32** | **8** | **38** |

*Source:* Authors' own elaboration

In all the companies' categories "help mitigate climate change" and "help reduce other environmental impacts" are the options receiving the highest share of "strongly agree" and "agree" replies (**Figure 20**). For medium and small companies, also "contribute to food security" has a high share (67% and 65%, respectively).

**Figure 20.** Analysis of replies provided by companies, by company size. Shares of replies "strongly agree" and "agree".

| | Large (250 or more employees) (%) | Medium (50 to 249 employees) (%) | Small (10 to 49 employees) (%) | Micro (1 to 9 employees) (%) |
|---|---|---|---|---|
| Help mitigate climate change | 65 | 67 | 69 | 60 |
| Help contain biodiversity loss | 55 | 63 | 54 | 50 |
| Help reduce other environmental impacts | 63 | 74 | 73 | 60 |
| Contribute to food security | 55 | 67 | 65 | 45 |
| Reduce costs for food business operators | 40 | 26 | 42 | 50 |
| Bring savings for consumers | 47 | 44 | 42 | 50 |
| Reduce costs for competent authorities | 45 | 63 | 50 | 45 |
| **Total number of respondents** | **86** | **27** | **26** | **20** |

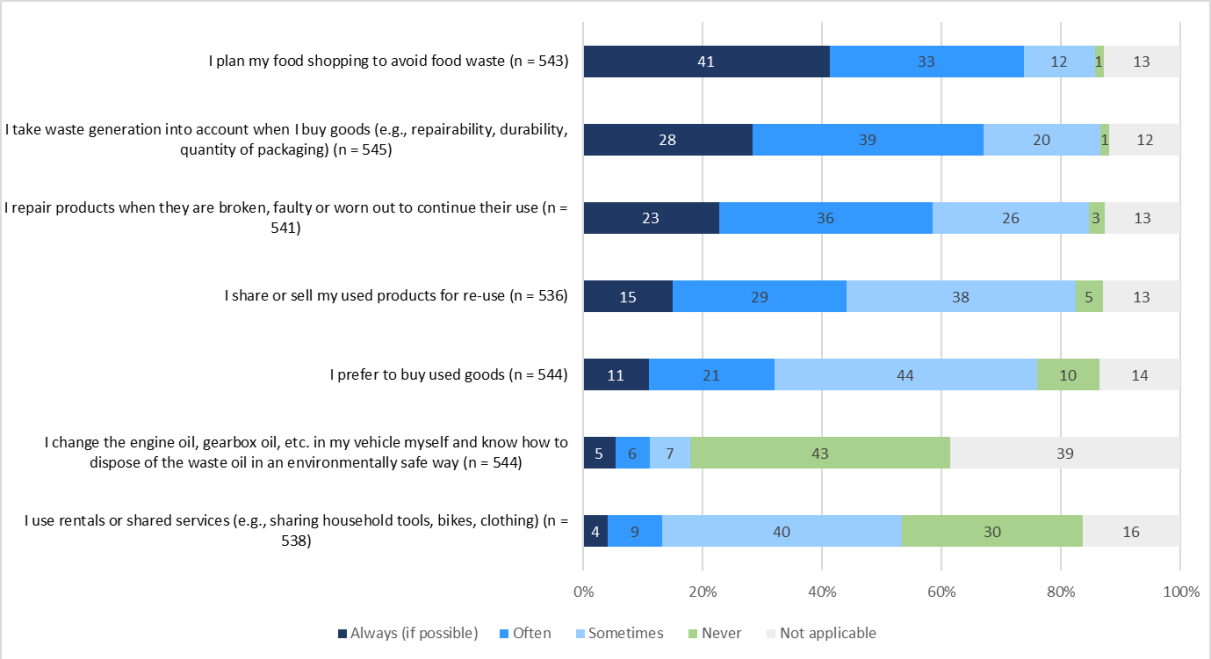
*Source:* Authors' own elaboration

### 2.1.7 Purchasing and consumption habits

Question: *Please indicate if and how frequently you do the following when you purchase and consume goods (these questions are intended for individuals or households so please reply in your personal capacity)*

When asked about purchasing and consumption habits, 74% of the respondents mentioned that they either always or often plan their food shopping to avoid food waste. This option showed the highest share of positive replies (sum of "always" and "often") compared to other waste reducing habits (**Figure 21**). As this question concerned the respondents in their personal capacity the analysis of stakeholders cannot be performed.

**Figure 21.** Answers provided to the question on purchasing and consumption habits




*Source:* Authors' own elaboration

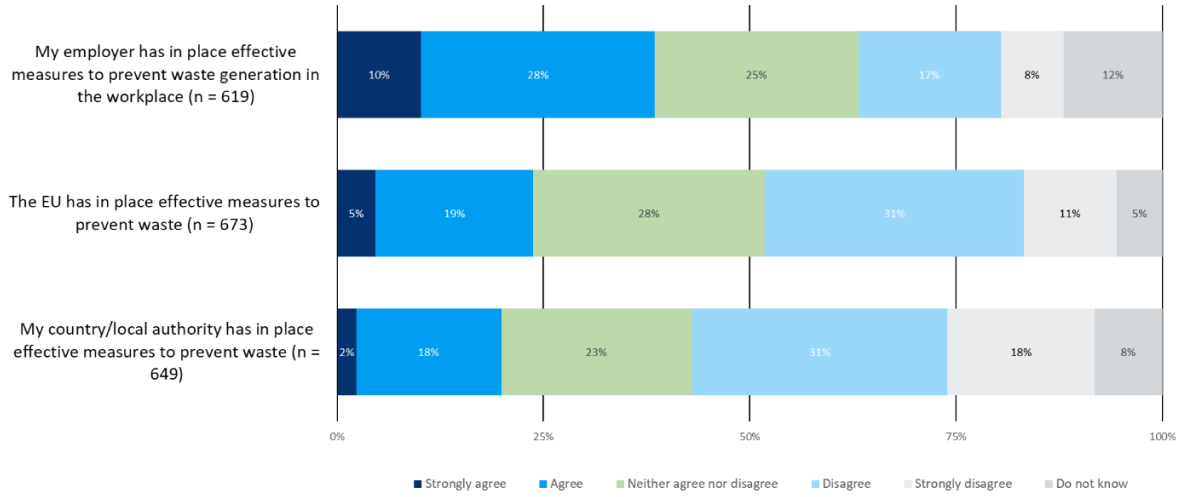
### 2.1.8 Implementation of effective measures to reduce waste

Question: *To what extent do you agree with the following statements?*

38% of the respondents agrees or strongly agrees with the statement "My employer has in place effective measures to prevent waste generation in the workplace", while this percentage is slightly lower when referring to the EU (24%) and countries (20%) (

**Figure 22**). This shows that, according to the survey respondents, business and authorities show significant room for improvement for putting in place waste reduction measures. It should be noted that this question is referred to waste in general rather than to food waste.

**Figure 22.** Answers provided to the question on the implementation of effective measures to reduce waste




*Source:* Authors' own elaboration

## 2.2 Additional insights from the position papers

The review of position papers sent within the consultation on the revision of the Waste Framework Directive resulted in 53 documents concerning food waste or including considerations about this topic. The total number of submitted position papers was 202. Almost half of the comments on food waste (26) came from business associations, 12 from non-profit organizations, eight from companies and seven from public authorities.

18 stakeholders are in favour of applying targets to the whole supply chain, thus including the primary production. In some cases, they stress the need to avoid rebound effects in the various phases of the supply chain (i.e. that reduction in a certain step could result in food waste increases in another step) and to recognize responsibility for all the actors of the supply chain. Two stakeholders, instead, disagree on the inclusion of the primary production or consider that the target should be lower compared to the consumption phase (where the biggest part of the food waste is produced). The arguments for this exclusion regard the markets dynamics (e.g. low agricultural prices making commercialization not convenient; unfair trading practices and unbalanced market power between various actors).

Ten respondents support the setting of ambitious targets (50%) and the alignment with the SDG target; while six comments concerned the need to take into account previous efforts in the food waste reduction (in two cases it is suggested to adopt a different baseline year, prior to 2020). Concerning the waste prevention actions, some papers stressed the importance of prioritizing the most impacting actions in terms of environmental impact reduction or climate change mitigation, using a food waste hierarchy approach. Some related comments concerned the importance of waste management options which increase circularity, e.g. composting and valorisation (e.g. to feed production) which might have higher environmental benefits than prevention actions.

Several stakeholders (17, mainly business associations) stressed the role of packaging for the prevention of food waste, including innovative packaging, which can extend the shelf-life of food products. The need to properly address food safety and hygiene is also mentioned by six stakeholders. Concerning the actions and policy initiatives that the EU should undertake, rules on date marking and actions for the awareness increasing and education are the most mentioned. The need for a harmonized food waste definition and a better monitoring system was acknowledged by several stakeholders and four suggested to provide fiscal incentives to spur food waste prevention and incentivize food donation. Policy coherence between food waste and other related policies (e.g. on labelling, climate action, Common Agricultural Policy) is also recommended.

# 3 Targeted consultation and data collection on food waste prevention actions

This section presents the outcome of the data collection performed in the timeframe March-June 2022, which aimed at collecting information on food waste prevention initiatives undertaken both at national level and by individual stakeholders. The data collection focused on costs of the initiatives, the amounts of food waste prevented as a result of the initiatives, social benefits and other features of the existing initiatives. The purpose of the data collection was to (i) support the assessment of the impact of setting binding food waste reduction targets for MSs, and to (ii) complement publicly available information to assess current efforts undertaken by MSs to prevent food waste, as part of the analysis presented in Section 4.

The data collection consisted of two parts:

- A survey for all stakeholders implementing food waste prevention initiatives, through an EU survey form (excluding initiatives run at Member State level) (Annex 1).
- A survey for the EU MSs concerning the actions implemented at national level (Annex 2).

## 3.1 Insights from stakeholders' data collection

This section details the data collection of initiatives on food waste prevention through a survey to stakeholders providing an overview of the questionnaire, the sample and the main outputs, including an analysis of data quality and sample representativeness.

### 3.1.1 Questionnaire

The questionnaire for stakeholders involved in food waste prevention initiatives was composed of three parts. The first one focused on general information, including questions on the aim of the initiative, its geographical scope, typology, stakeholders involved, phases of the supply chain addressed, etc. The second part aimed at receiving quantitative data on the costs of the initiatives and amount of avoided food waste. This was the core of the survey, which aimed at collecting data to support the assessment of the impact of the policy options. In order to contextualise the amounts of food waste avoided, the level of food waste generated before the initiative was enquired, and, in the case of initiatives implemented by food producers and food manufacturers, this part included also a question on the annual sales volume. In addition, to support an assessment of the environmental benefits linked to the food waste avoided, questions were posed on the composition of the avoided food waste and on the waste treatment option that would have been used had the food been wasted. The last part focused on social benefits, e.g. on the jobs created by the initiatives, training opportunities and volunteer work. The survey is presented in Annex 1.

Some respondents were contacted by email in order to have explanations or to confirm the information provided. Six interviews have been held with selected stakeholders, with the aim of sharing additional data and insights on their initiatives. When a web site of the initiative was available, data reported in the survey was compared with information published online.

### 3.1.2 Sample

This section describes the features of the sample of initiatives obtained from the survey to stakeholders. It details the response rate to the various questions, the type of initiatives, the stakeholders involved, the geographical distribution and supply chain stage(s) covered by the initiative.

#### *3.1.2.1 Response rate*

The survey collected replies on 62 initiatives, with various level of completeness in the answers provided for each question. In some cases, the replies were limited to qualitative information on the initiatives and did not provide quantitative data on costs or amounts of food waste.

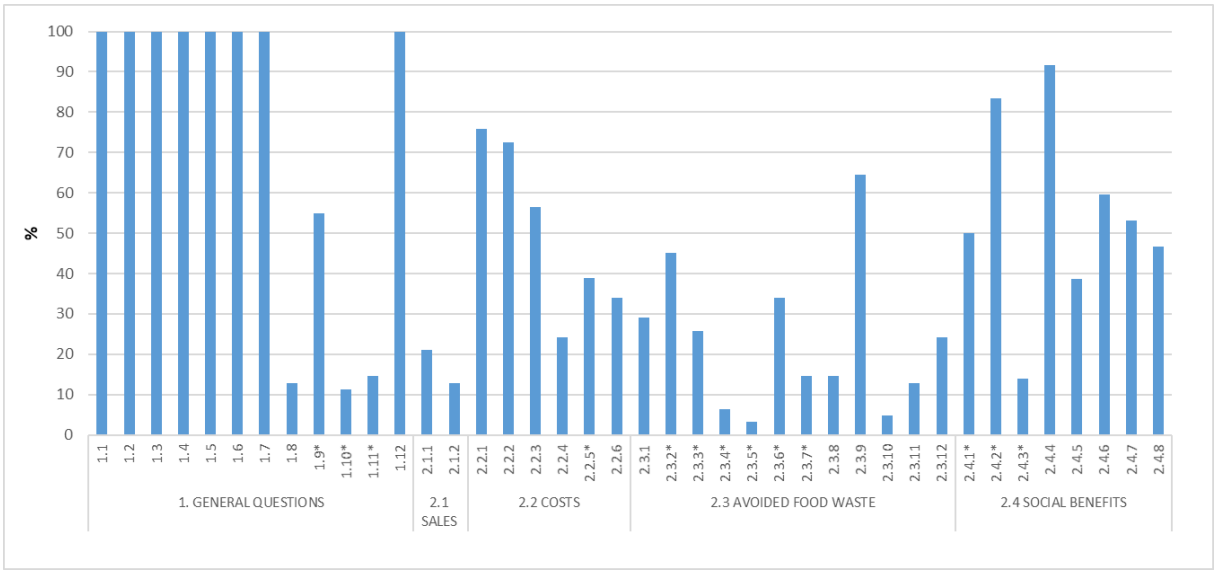
**Figure 23** shows the response rates for each question included in the survey. All the respondents provided general information on the initiatives, thus describing their aim, duration, geographical coverage, stakeholders involved, supply chain steps where the food waste is prevented. Few respondents provided information on their sales volume, as this question was relevant only for few of the stakeholders taking part in the survey. Costs to set up and maintain the initiatives were disclosed for more than 70% of the initiatives.

Some questions focused on the amounts and values of avoided food waste. Depending on the type of initiative, three different questions appeared. For food redistribution initiatives, for instance, the amount of food redistributed was enquired. Looking at the cumulative response rate for the three conditional questions, almost 70% of the respondents provided data on the amounts of avoided food waste. The overall response rate for questions on the value of avoided food waste, instead, was 34%. Only 29% of the respondents provided a figure on the amount of food waste generated before the initiative took place. Few initiatives (15%) reported the composition of avoided food waste in the dedicated table. The question on waste treatment, aimed at knowing which type of treatment would have been used for the food waste prevented by the initiative, was replied by 65% of the respondents, but some of them selected the option "unknown".

Questions on social benefits show high response rates (up to 90%). Three conditional questions addressed the food redistribution initiatives only: they regarded the number of meals redistributed and the beneficiaries of the redistributed food (food banks, charities, households, etc.). The third conditional question allowed to specify if other types of beneficiaries were addressed.

The remaining questions focusing on social benefits regarded the use of volunteers (92% replied), the jobs created by the initiatives (60%) and the training offered (53%). 49% of the respondent replied to the open question of the additional social benefits provided by the initiatives (results are discussed in section 3.1.3).

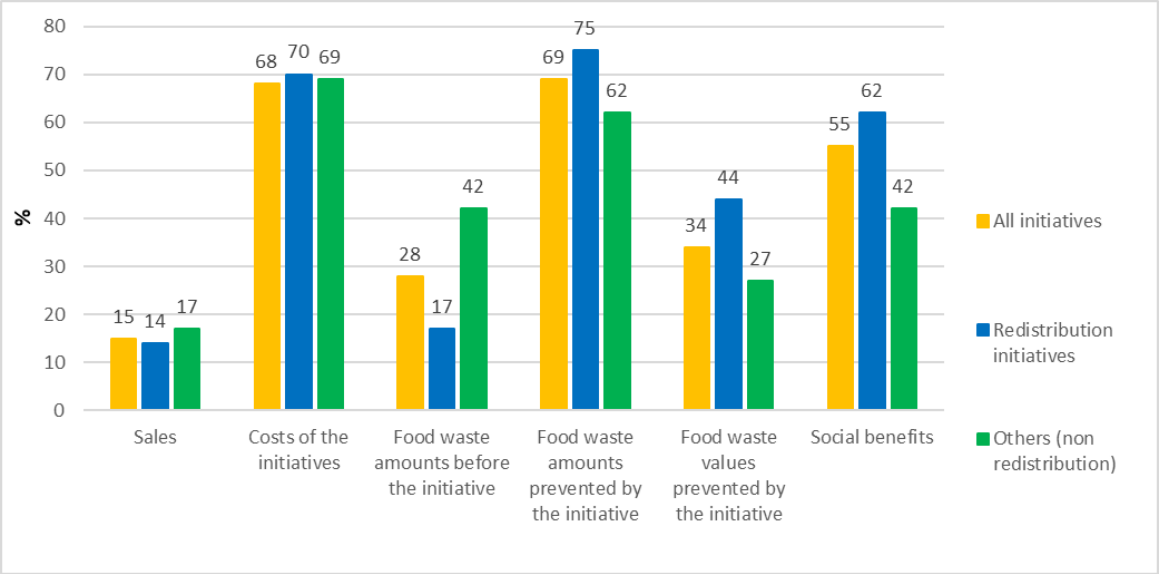
**Figure 23.** Response rate for each question of the survey. Questions with * are conditional, i.e. appeared only for certain types of initiatives.




*Source:* Authors' own elaboration

An overview of the response rate for each group of questions is provided in **Figure 24**, this information is displayed for all initiatives together, for all the redistribution initiatives (as this was the most reported typology, counting 30 initiatives out of 62) and for all the remaining initiatives. Food redistribution initiatives show higher response rates on food waste prevented (both in terms of amounts and values) and on social benefits. Response rates for the question on the amount of food waste before the initiative took place is instead lower for the redistribution type compared to the others. This is to be expected, as stakeholders in charge of redistribution activities are usually different from those generating the surplus food that would be in the position to monitor its generation before the initiative started.

**Figure 24.** Response rates by main type of initiative (numbers above bars indicates the number of replies)

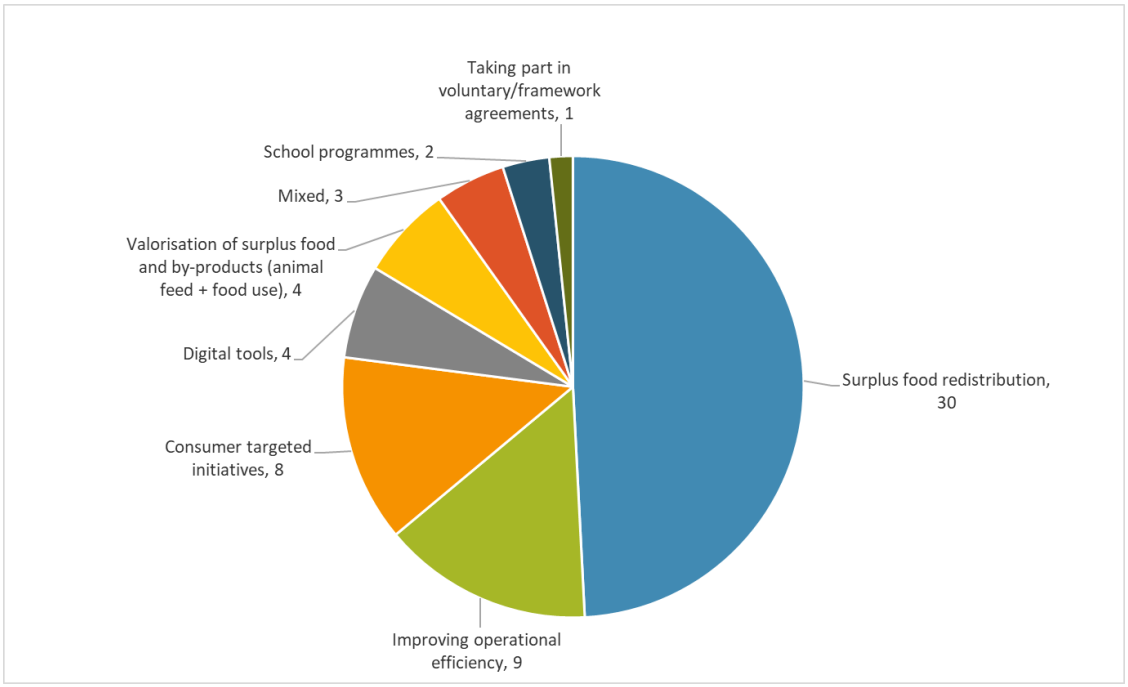



*Source:* Authors' own elaboration

### *3.1.2.2 Initiative types*

Multiple options could be selected when answering to the question on the type of initiative reported. Based on the replies provided and on the description of the initiative, the authors assigned to each a "prevalent type" (**Figure 25**). All the options available were selected at least once except for "measures to receive sustainability loans offered by private institutions". Surplus food redistribution was the most selected option (30 initiatives). Improving operational efficiency and consumer targeted initiatives are the second and third biggest group with nine and eight initiatives each.

**Figure 25.** Number of initiatives by initiative type

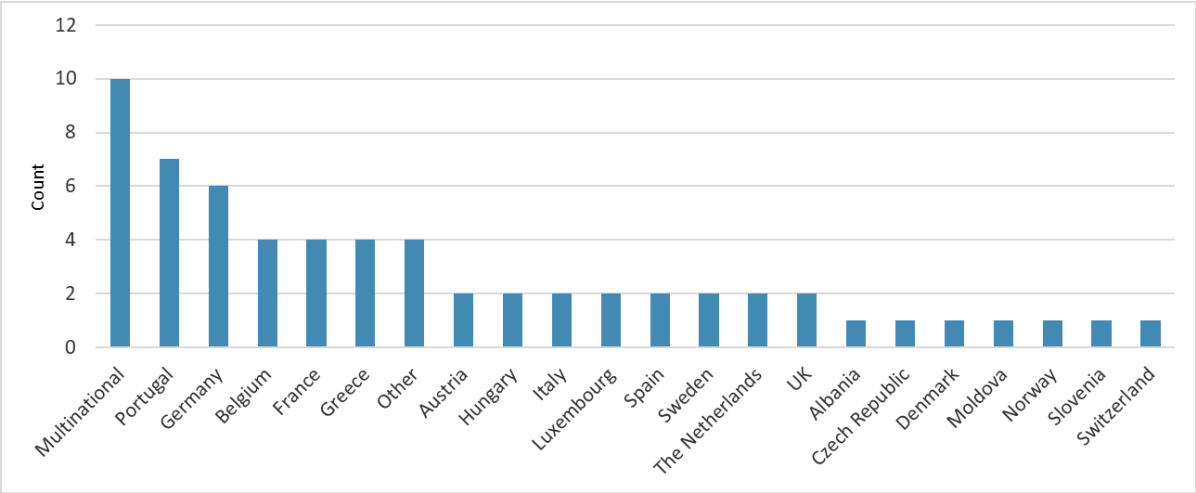



*Source:* Authors' own elaboration

### *3.1.2.3 Geographical distribution*

The survey received replies from 15 EU countries and five non-EU countries (**Figure 26**). The biggest group is formed by initiatives operating in more countries (named as "multinational" in the figure below) e.g. including the initiatives implemented by multinational companies in various venues around the world.

**Figure 26**. Number of initiatives by country



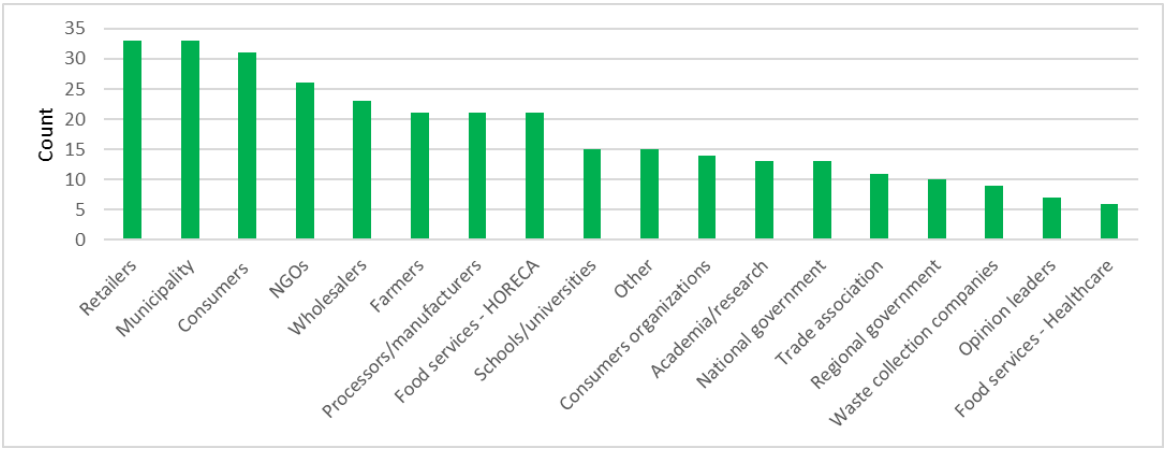

*Source:* Authors' own elaboration

### *3.1.2.4 Stakeholders and phase of the supply chain addressed by the initiatives*

The initiatives reported via the survey involve a variety of stakeholders. Retailers, municipalities and consumers were the most mentioned (**Figure 27**) and have been selected by approximately half of the respondents. Waste collection companies, opinion leaders and food services in the health care sector are the least selected, mentioned by six to nine initiatives.

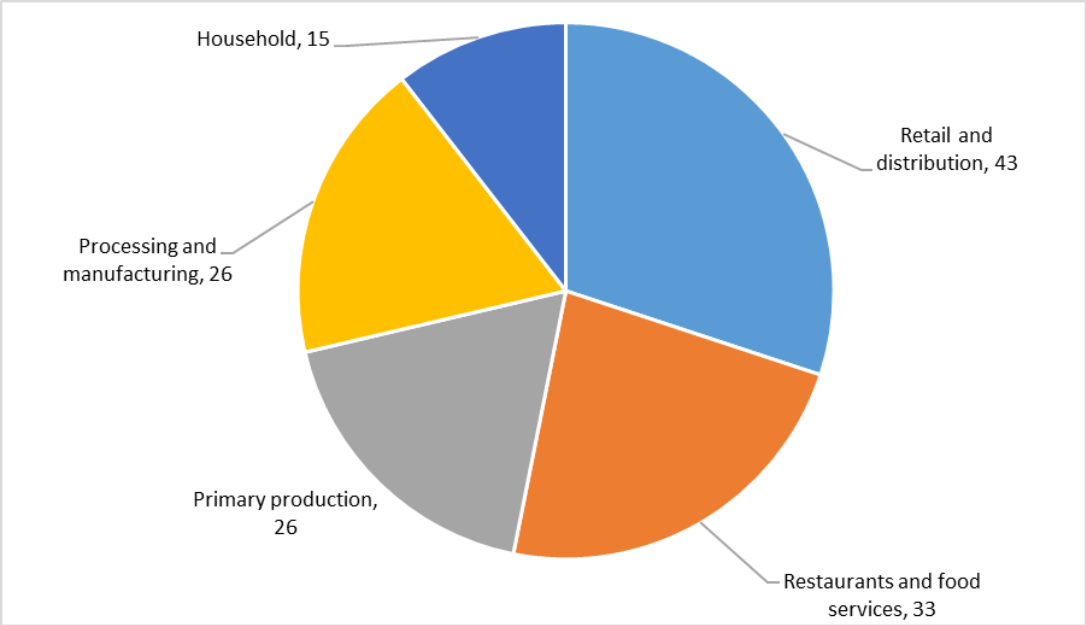
For the majority of the initiatives (43), the stage of the supply chain where food waste is prevented is retail and distribution. Of these, 27 were categorised as surplus food redistribution initiatives (**Table 3**). Only 15 initiatives aim at tackling food waste at household level (**Figure 28**).

**Figure 27.** Number of initiatives and type of stakeholder involved (multiple options allowed)




*Source:* Authors' own elaboration

**Figure 28.** Number of initiatives by targeted life cycle stage (multiple options allowed)




*Source:* Authors' own elaboration

**Table 3.** Number of initiatives by type and stage of the supply chain where food waste is prevented (multiple options allowed for the latter)

| Initiative type | Primary production | Processing and manufacturing | Retail and distribution | Restaurants and food services | Households |
|---|---|---|---|---|---|
| Consumer targeted initiatives | 1 | 1 | 3 | 4 | 4 |
| Digital tools | 1 | 2 | 4 | 3 | 2 |
| Gleaning | 1 | 1 | 0 | 0 | 1 |
| Improving operational efficiency | 4 | 4 | 2 | 6 | 0 |
| Mixed | 0 | 1 | 2 | 3 | 1 |
| School programmes | 0 | 0 | 1 | 1 | 1 |
| Surplus food redistribution | 17 | 16 | 27 | 15 | 5 |
| Taking part in voluntary/framework agreements | 1 | 1 | 1 | 1 | 0 |
| Valorisation of surplus food and by-products | 1 | 0 | 3 | 0 | 1 |

*Source:* Authors' own elaboration

### 3.1.3 Results

#### *3.1.3.1 Cost analysis*

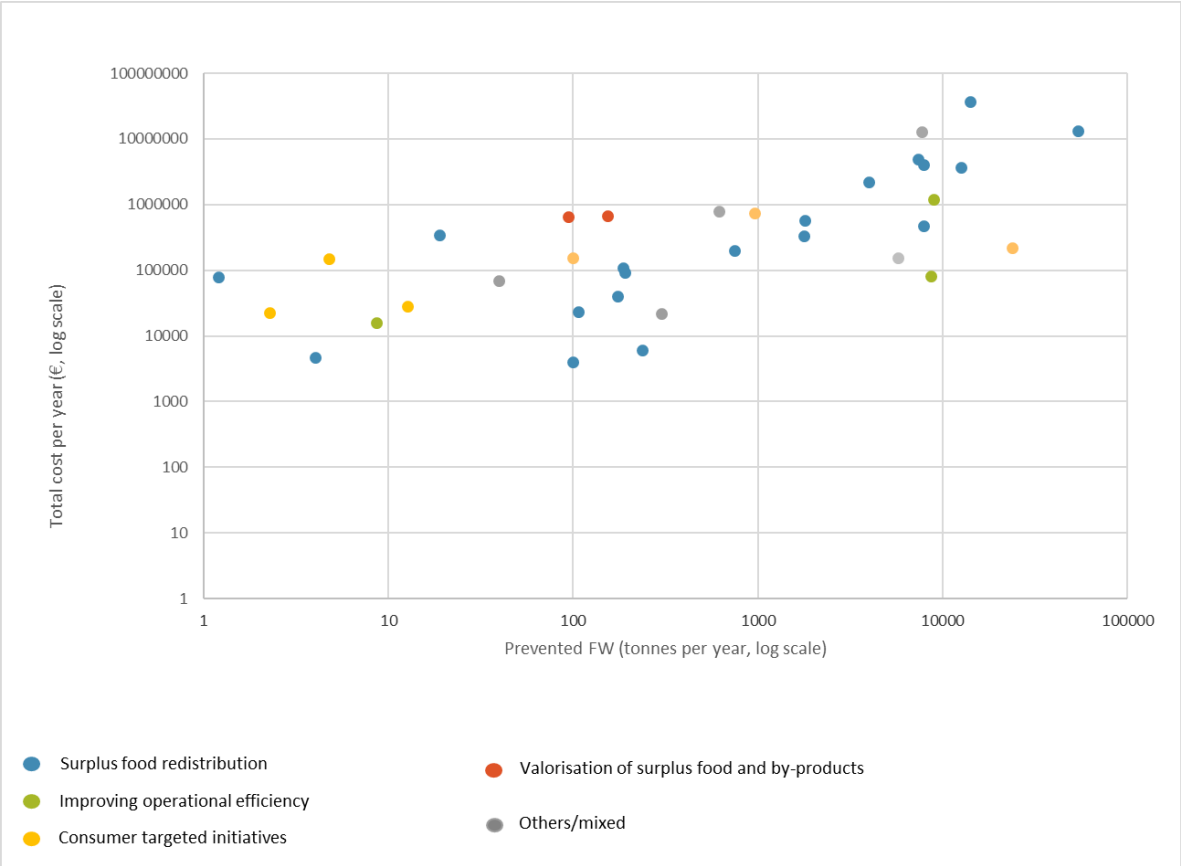
The second part of the survey aimed at gathering quantitative data on the initiatives, in order to explore the economic efficiency of food waste interventions. More than 70% of the respondents provided information on the costs of setting up the initiatives and annual costs to maintain them. A smaller share (24%) provided details on the type of stakeholder bearing these costs. **Figure 29** shows the main outcomes of the survey in terms of total annual costs and annual food waste prevented. Given the high variability of the data, a logarithmic scale was set in order to better visualize the results, which range from 4000 € to more than 37 million € in terms of costs, and from 2 to almost 54000 tonnes in terms of food waste prevented annually.

Aggregated data on costs of the initiatives and amounts of prevented food waste declared by the respondents are provided in **Table 4**, where it is possible to see that the average cost per tonne of avoided food waste is 44488 €, but when excluding outliers (i.e. values above 8000 €), the average value is 986 € per tonne.

In some cases, the respondents declared to have zero costs as the initiative fully relies on the work of volunteers or the food waste reduction project is managed internally in a company, without additional resources needed. Concerning the stakeholders funding the initiatives, the most cited entities are private donations (including in-kind donations), charities and foundations, public institutions (e.g. Ministry of Health), EU institutions.

In order to have a term of comparison for these results, **Figure 30** provides an overview of cost and avoided food waste retrieved from a literature review on food waste prevention at consumer level (Garcia Herrero et al., 2023). The data on costs of the initiatives found in literature is relatively scarce, as only two studies report both data on avoided food waste and cost, allowing the calculation of the cost per tonne. Three additional data points can be derived by the study performed by Caldeira et al., (2019) assessing the efficacy of food waste prevention actions. The average cost per tonne of avoided food waste is 60 € per tonne, with a maximum value of 160 € per tonne (**Table 5**). This value is significantly lower than the average cost per tonne resulting from our sample (even when outliers are removed in the calculation of the average value).

**Figure 29.** Annual costs and prevented food waste of the initiatives reported, by type of initiative.

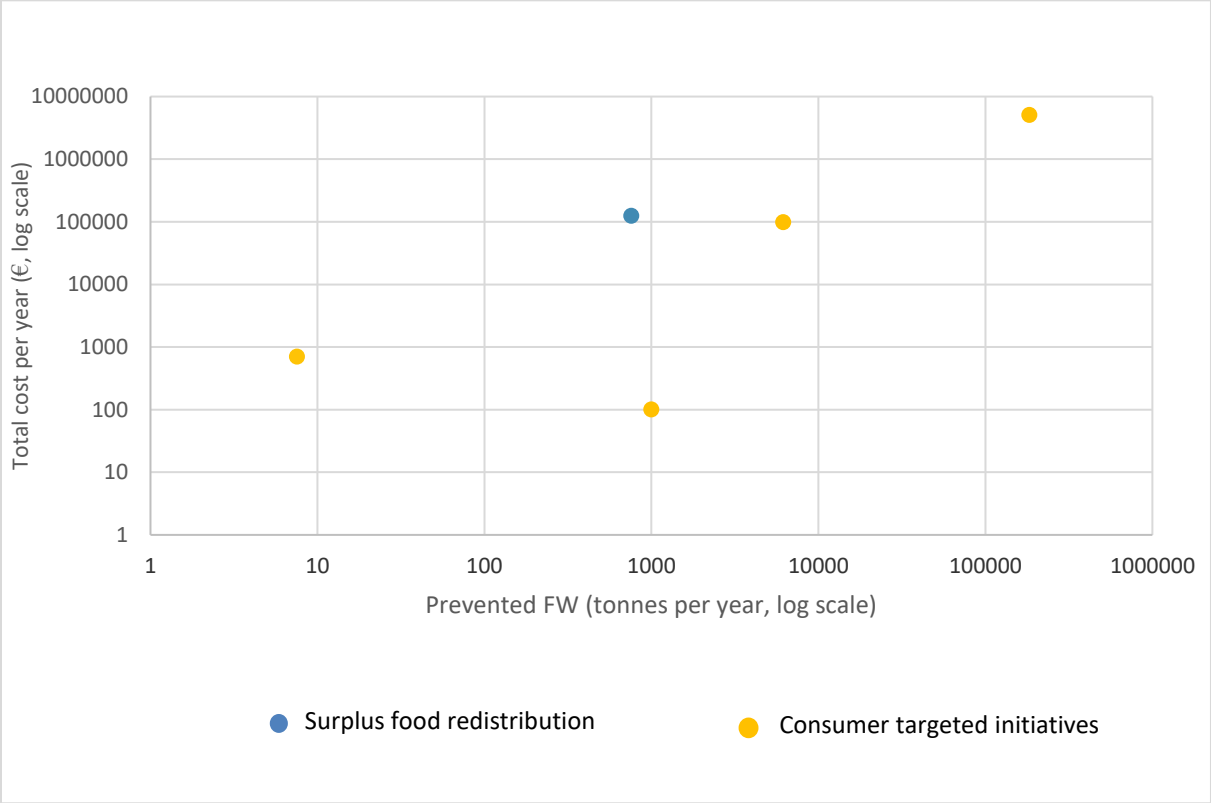



*Source:* Authors' own elaboration

**Table 4** Summary table of costs of the initiatives providing quantitative data via the survey (in brackets, values excluding outliers, i.e. higher than 8 thousand €)

| | Unit | Min | Mean | Max | Data points (n) |
|---|---|---|---|---|---|
| Annual costs | thousand €/year | 0 | 1730 | 37432 | 50 |
| Yearly amount of avoided food waste | thousand tonnes/year | 0.001 | 11.3 | 265 | 42 |
| Total cost per tonne of food waste avoided | €/tonne | 8.5 | 4448 (986) | 66667 (6789) | 35 (31) |

**Figure 30.** Annual costs and prevented food waste of initiatives from the literature, by type of initiative




*Source:* Authors' own elaboration

**Table 5** Summary table of costs of initiatives reported in (Garcia Herrero et al., 2023) and (Caldeira et al. 2019)

| | **Unit** | **Min value** | **Mean value** | **Max** | **N° of data points** |
|---|---|---|---|---|---|
| Annual cost | thousand €/year | 0.10 | 10595 | 5070 | 5 |
| Yearly amount of avoided food waste | thousand tonne/year | 0.008 | 38.38 | 183.3 | 5 |
| Total cost per tonne of food waste avoided | €/tonne | 0.1 | 60 | 165 | 5 |

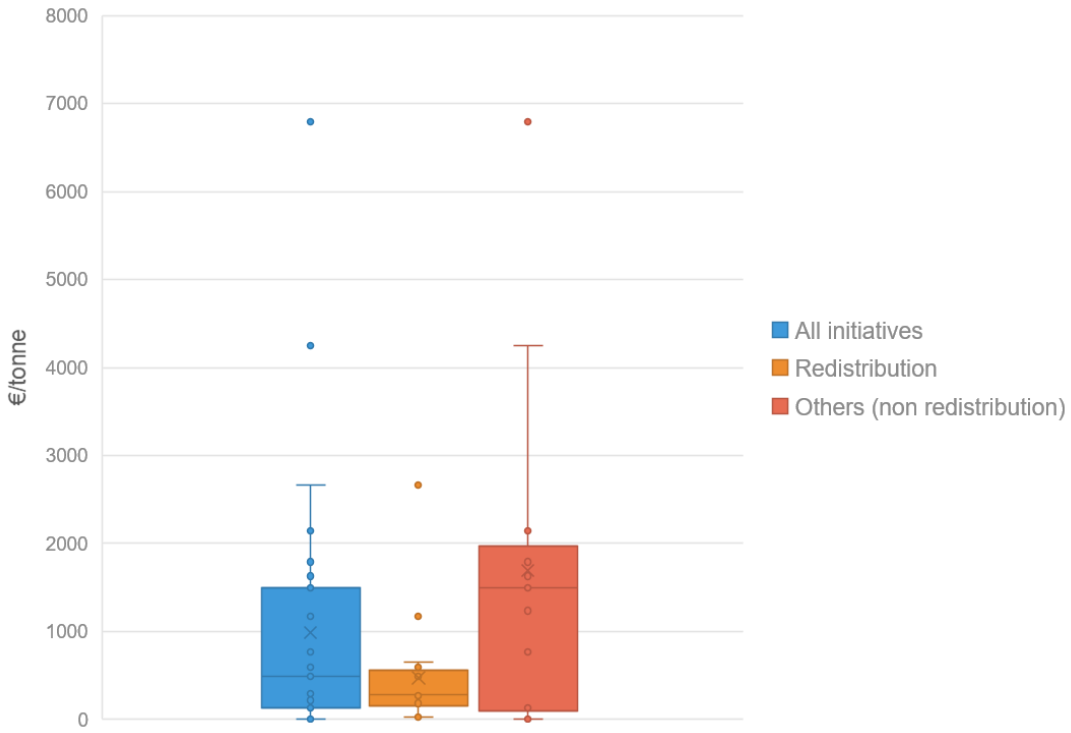
*Source:* Authors' own elaboration

**Figure 31** shows the distribution of the total costs per tonne of food waste prevented of the initiatives gathered through the survey, considering the redistribution initiatives (which are the biggest group) compared with the entire set of initiatives and the others (non-redistribution). The graph does not show the outliers and the distribution is right skewed, with the mean greater than the median. The set "other initiatives" presents the greatest variability, with values ranging from o 8.5 € per tonne to 30.6 thousand € per tonne (however, in **Figure 31** outliers were removed).

In general, results from the sample show a high variability in cost per tonne of food waste reduction. Furthermore, the average values of cost per tonne of food waste reduction are much higher than those reported in literature (which, however, are very few data points). The high costs reported across all initiative types can be explained considering the following reasons:

- In some cases (e.g. for some redistribution initiatives), the main objective of the initiative is to support people in need and provide food or help the professional reinsertion of unemployed people: food waste is therefore a secondary benefit of these actions.
- In the case of school campaigns education activities are carried out in addition to food waste measurements in the canteen. Long terms benefits can be expected in terms of behavioural change, as well as consequential domestic reduction in food waste. However, food waste reduction is measured only in the school canteens and does not capture long term or domestic reductions.

**Figure 31.** Distribution of total annual costs of initiatives per unit of avoided food waste (excluding outliers above 8000 €/tonne)




*Source:* Authors' own elaboration

### *3.1.3.2 Social benefits*

While responding to an ethical principle, food waste prevention actions can have additional social benefits in terms of employment generation (if the initiatives put in place to reduce food waste allows the creation of new jobs) and social cohesion (e.g. through the involvement of citizens in volunteer work which can result in a more intense sense of community and social life). In the case of food redistribution initiatives, positive impacts can be observed especially in terms of supporting deprived households, reducing marginalization and improving food security.

**Table 6** shows results for four quantitative indicators calculated using data from the survey. On average, each initiative involved 23 thousand volunteers, even though the variability is high, with values ranging from 0 to 582 thousand involved, reflecting the heterogeneity of the sample. The volunteer hours used in each initiative ranges from 0 to 16.5 million hours per year. The number of new jobs created in the initiative is on average 19.6 with a maximum value of 106, in the case of a company developing food waste reduction tools (in this case, the initiative coincides with the company itself). If these figures are divided by the amount of food waste avoided, on average 121 volunteer hours enabled to prevent one tonne of food waste.

**Table 6** Overview table on social benefits - All initiatives (FW: food waste)

| Indicator | Unit | Total | Min | Mean | Max | N° of data points |
|---|---|---|---|---|---|---|
| Number of volunteers involved | thousand volunteers | 674 | 0 | 23.2 | 582 | 31 |
| Annual volunteer hours | million hours/year | 17.1 | 0 | 0.9 | 16.5 | 23 |
| Number of jobs created | N | 705 | 0 | 19.6 | 106 | 38 |
| N° of volunteer hours/tonne of prevented FW | hours/tonne | | 0 | 121.0 | 1276 | 18 |

*Source:* Authors' own elaboration

**Table 7** shows indicators related to food redistribution initiatives only. As described in section 3.1.2.2 this type of initiative was the most selected one, counting 30 initiatives in total. The 15 redistribution initiatives that provided quantitative data on number of meals redistributed report, in total, 235 million of meals redistributed annually, which results in an average of 16 million meals per initiative (**Table 7**). The annual costs for these initiatives range from 0 to more than 37 million € and the average cost per meal redistributed was 1.1 €, ranging between close to 0 and 7.2 € per meal ([2]).

The average number of people reached annually by the redistribution initiatives is 0.59 million. This typology of initiative strongly relies on volunteers, making use on average of 1.22 million volunteer hours per year, based on information reported for 14 initiatives. Based on the 10 initiatives that provided both information on volunteer hours and on meals redistributed, on average each meal required 0.02 volunteer hours. The initiatives redistributed the surplus food to charity organizations in 23 cases and directly to households/citizens in need in 13 cases. 10 initiatives provide surplus food to food banks and 9 initiatives use food sharing applications (**Figure 32**).

**Figure 32.** Recipients of redistributed food (number of initiatives, multiple answers allowed)


*Source:* Authors' own elaboration

[2] In some cases very low costs, divided by the number of meals, result in unitary cost per meal close to 0

**Table 7** Overview table on social benefits - Food redistribution initiatives

| Indicator | Unit | Min | Mean value | Max | N° of data points |
|---|---|---|---|---|---|
| Meals redistributed per initiative | million meals/year | 0.009 | 16 | 128 | 15 |
| Annual costs | thousand €/year | 0([1]) | 2960 | 37432 | 23 |
| Cost / n° of meals | €/meal | ~ 0.00 | 1.10 | 7.22 | 12 |
| Number of people reached | million persons/year | 0.027 | 0.59 | 1.67 | 8 |
| Number of volunteers | thousand persons | ~ 0.00 | 4.64 | 60 | 19 |
| Annual volunteer hours | million hours/year | 0 | 1.22 | 16.5 | 14 |
| Volunteer hours / n° of meals | hours/meal | 0.00 | 0.02 | 0.12 | 9 |

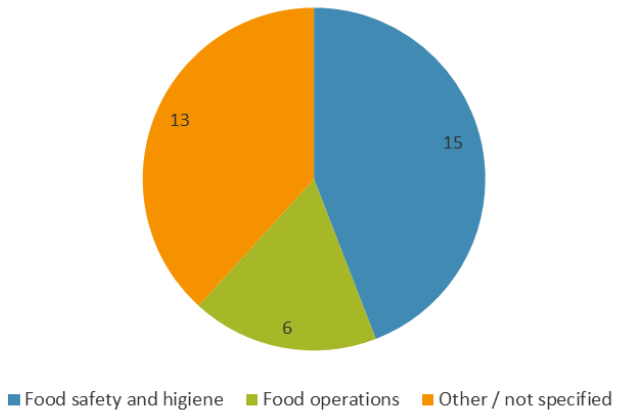
[1] In some cases zero costs were reported, stating that, for instance, all activities are carried out by volunteers, who offer their time, labour and transportation with no cost for the initiative.

*Source:* Authors' own elaboration

As additional social benefits, several initiatives provided training to employees or volunteers, on food safety and hygiene, food operations and other topics (**Figure 33**).

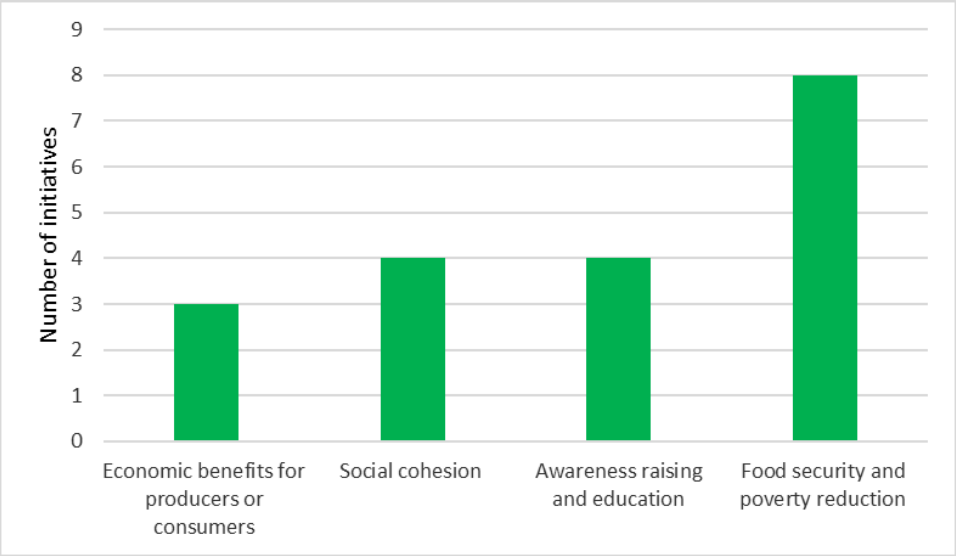
**Figure 34** summarises the replies given on additional social benefits, classified into four areas. The one with the highest frequency concerns food security and poverty reduction, followed by benefits related to awareness raising and education and social cohesion. Three initiatives mentioned economic benefits for producers and consumers.

**Figure 33.** Type of training provided as part of the initiative (number of initiatives)




*Source:* Authors' own elaboration

**Figure 34.** Additional social benefits provided by the initiative (number of initiatives)




*Source:* Authors' own elaboration

## 3.2 Insights from Member States data collection

### 3.2.1 Questionnaires

The survey on food waste reduction initiatives (available in Annex 2) was sent to MSs in March 2022. Based on the country profiles published in the EU Food Loss and Waste Prevention Hub ([3]), the survey listed all the relevant food loss and waste prevention initiatives carried out by each Member State. The survey included two tables in a word file to be filled in by the MS representative with the following information:

- initiatives start and end dates
- stage of the supply chain addressed
- geographical scope (if applied at national or regional level)
- amount and value of food waste prevented
- links to websites, if available
- data on costs of the initiatives, including total, fixed and variable costs (i.e. linked to the amounts of food waste prevented).
- indication of the type of figures disclosed (if estimated or measured).

### 3.2.2 Sample

The survey received replies from 20 MSs ([4]), with a total of 145 initiatives reported. Based on the description of the initiatives provided in the survey, we assigned an initiative "macro type" using the classification proposed in Caldeira et al., (2019) (**Table 8**), to which "monitoring" was added as an additional type of action given that MSs are supposed to measure the amount of food waste and the effect of food waste reduction policies following the requirement of Directive 851/2018/EC. Data on their overall costs was provided for 18% of the initiatives reported, while 13% of them included data on the amounts of reduced food waste – with 6% providing both (**Figure 35**).

[3] https://ec.europa.eu/food/safety/food_waste/eu-food-loss-waste-prevention-hub/eu-member-states

[4] AT, BE, BG, HR, CZ, DK, EE, FI, DE, EL, HU, LT, PO, PT, RO, SK, SI, ES, SE

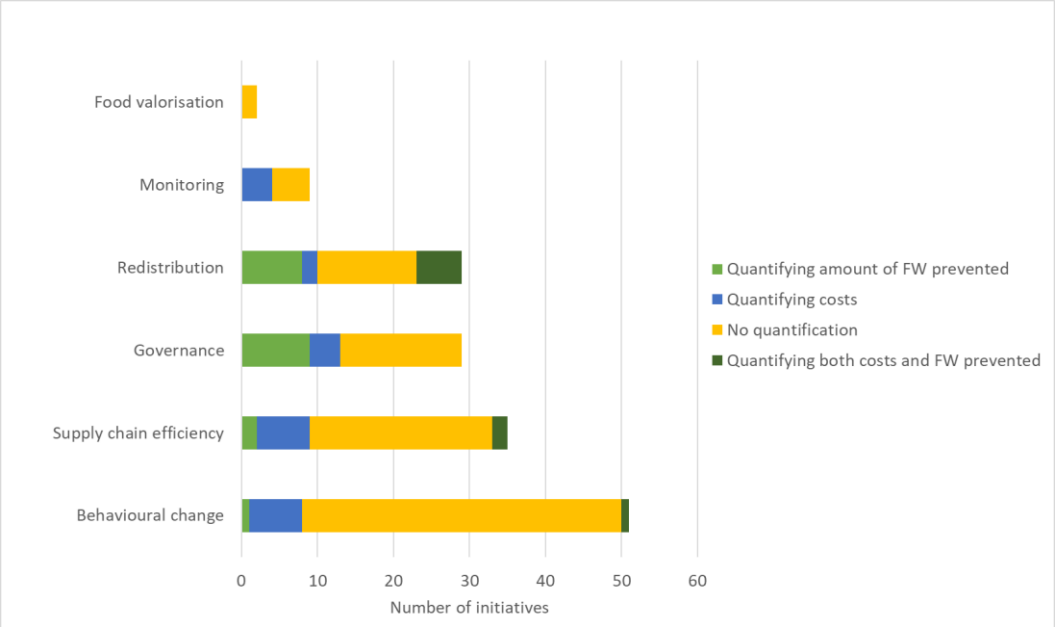
**Table 8** Classification of food waste prevention initiatives based on Caldeira et al. 2019 and number of initiatives reported by MSs, by macro-type

| Macro type | Action type | Number of MS initiatives |
|---|---|---|
| Behavioural change | Awareness/educational campaign | 51 |
| | Digital tools (for behavioural change) | |
| | School programmes | |
| | Awards | |
| Supply chain efficiency | Training & guidelines | 33 |
| | Public procurement | |
| | Process innovation | |
| | Digital tools (for supply chain efficiency) | |
| | Price discount | |
| | Imperfect product sale | |
| | Innovation of products - packaging | |
| | Innovation of products - date marking | |
| Redistribution | Surplus food redistribution | 21 |
| | Gleaning | |
| | Digital tools | |
| Food valorisation | Animal feed | 2 |
| | Value added processing | |
| Governance | Voluntary agreement | 28 |
| | Regulatory framework/policy | |
| | Fiscal incentives | |
| | National food waste prevention programme | |
| Monitoring | Monitoring | 10 |

*Source:* Authors' own elaboration

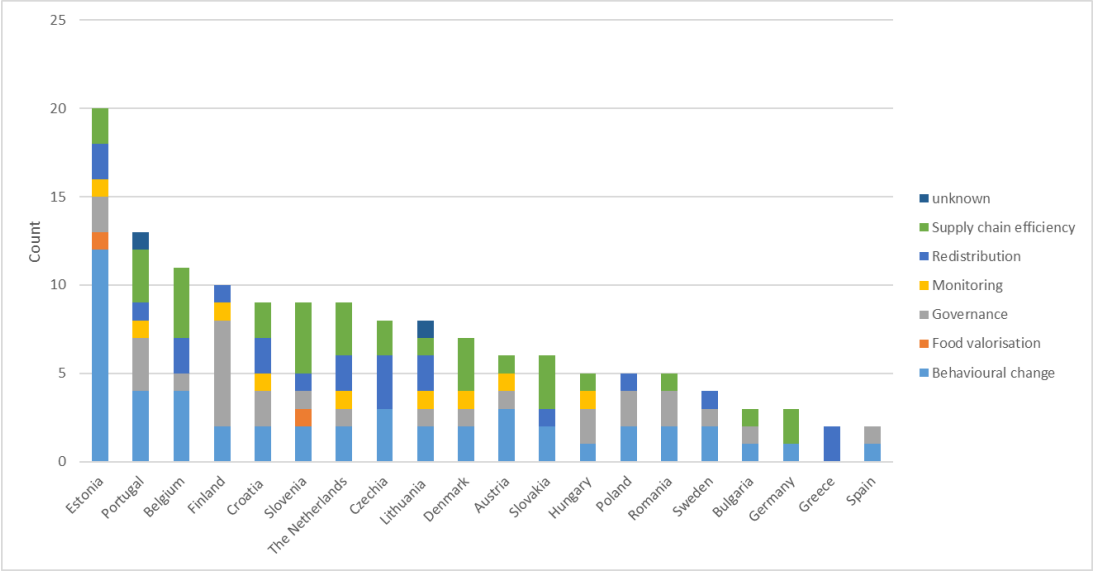
The most frequent type of initiative among the reported ones is the behavioural change (34%), followed by initiatives on supply chain efficiency (23%) and governance (19%). EE and PT were the countries reporting the highest number of initiatives (**Figure 36**).

**Figure 35.** Number of initiatives reported by MS by type and quantitative data disclosure. FW: food waste




*Source:* Authors' own elaboration

**Figure 36.** Food waste prevention initiatives by type and Member State



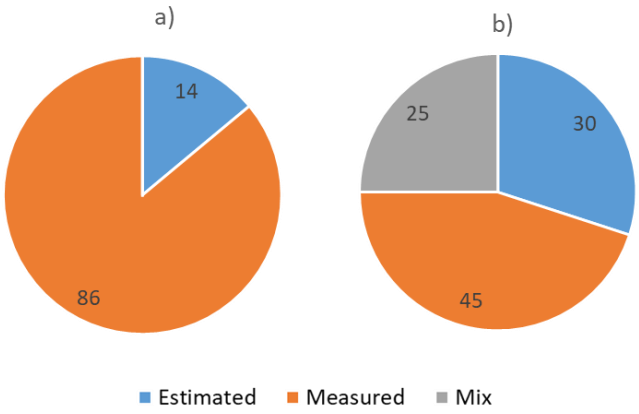

*Source:* Authors' own elaboration

### 3.2.3 Results

The respondents could specify if the data reported in the survey was a measurement or an estimation. The shares of data that was measured is 86% for costs and 45% for prevented food waste (**Figure 37**).

The annual amount of prevented food waste per initiative shows a high variability and ranges from 32 tonnes to 60 thousand tonnes, while the annual costs of the initiatives range from 300 € to 3550 thousand € (**Table 9**). As a results, costs per tonne of food waste prevented also show high variability (calculated for the nine initiatives that provided both information on amounts of food waste prevented and costs), as shown in **Figure 38**. In this case, the average value is equal to 1708 €/tonne, ranging between 7 and 11449 €/tonne (**Table 9**).

**Figure 37.** Shares of measured and estimated data for costs (a) and food waste prevented (b)




*Source:* Authors' own elaboration

**Table 9** Overview table of MS initiatives and related variables

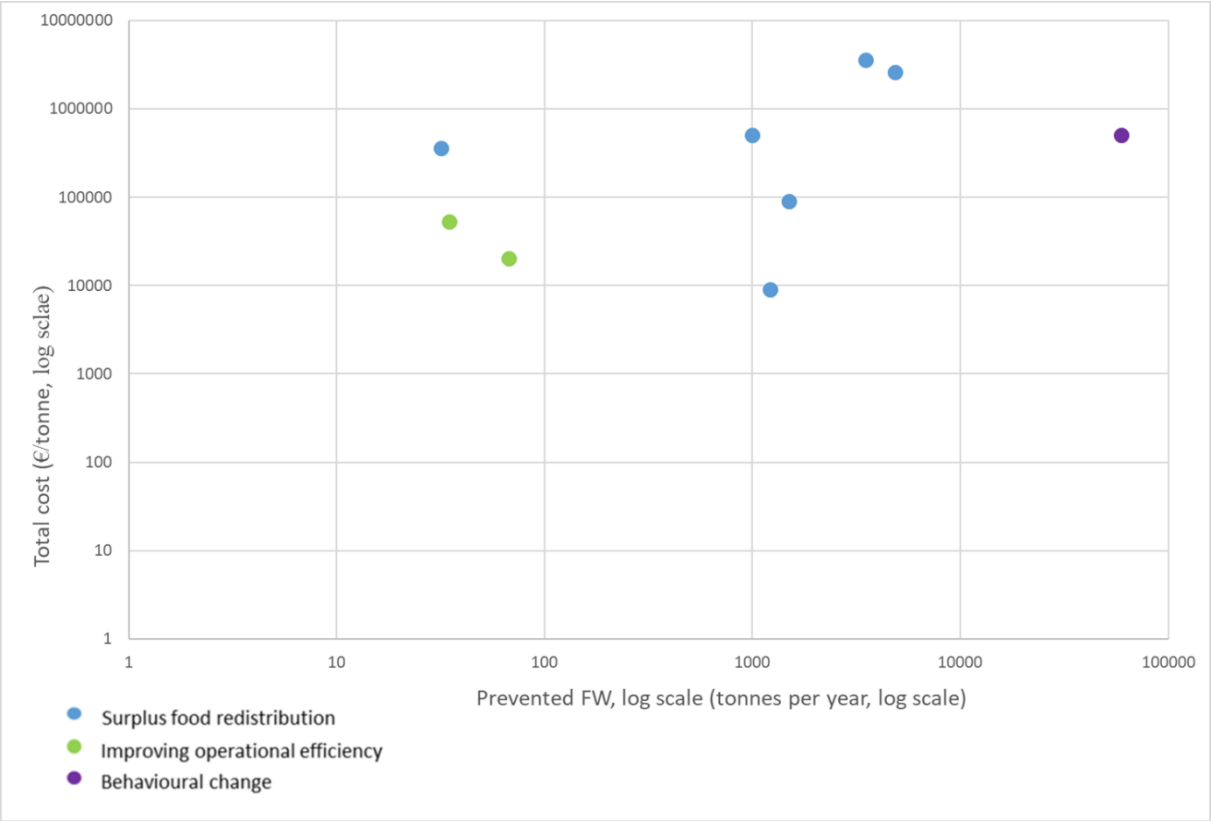
| | **Unit** | **Min** | **Mean value** | **Max** | **Data points (n)** |
|---|---|---|---|---|---|
| Annual cost | thousand €/year | 0.3 | 210 | 3550 | 55 |
| Yearly amount of FW prevented | thousand tonnes/year | 0.032 | 7 | 60 | 19 |
| Total cost per tonne of FW prevented | €/tonne | 7 | 1708 | 11449 | 9 |

*Source:* Authors' own elaboration

The limited amount of quantitative data disclosed through this survey suggests that the monitoring of food waste prevention initiatives effectiveness is generally poorly implemented at national level. Various reasons can be envisaged to explain this. For behavioural change initiatives, measurable immediate effects are difficult to obtain as impacts can be expected in the medium-long term only. In some cases, respondents explained that even if a monitoring of the total reduced food waste was performed, it was not possible to establish how much food waste was prevented individually by each action implemented by the MS.

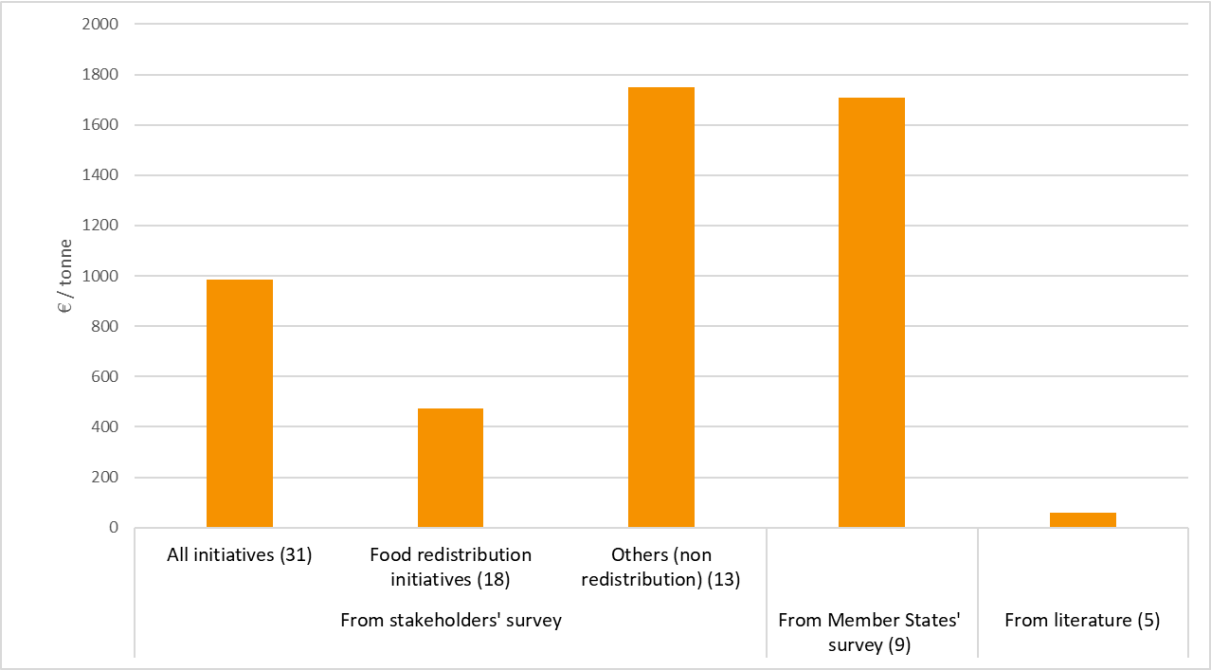
**Figure 39** compares the average cost per tonne of food waste prevention initiatives as derived from the surveys for stakeholders (considering the various types of initiatives), from the survey for MS and from the literature. The latter (which refers mainly to initiatives implemented in the UK) show a much lower value compared to those resulting from the survey. Given this high variability of costs and the heterogeneity of the initiatives replying to the survey (e.g. in terms of scope and size), the results of the analysis were not used in the modelling exercise performed to assess potential impacts of the policy initiative on food waste reduction targets.

**Figure 38.** Total (i.e. fixed + variable) annual costs and prevented food waste of the initiatives replying to the survey for MSs, by type of initiative




*Source:* Authors' own elaboration

**Figure 39.** Overview of initiatives costs as results of the stakeholder survey (distinguishing between three main groups of initiatives), MS survey and from literature review. In brackets, number of data points for each type of initiative; outliers (values above 8000 Euro/tonne) have been excluded.




*Source:* Authors' own elaboration

# 4 Analysis of prevention efforts undertaken by Member States

The objective of this analysis is to define the current state of food waste prevention policies in the EU, to explore whether there is substantial information on effective policy implementation and finally to collect evidence of the food waste reductions achieved as a result of the policy initiatives, when this information was provided.

A recent report by the UN (United Nations Environmental Program, 2021) calls on governments to follow the "Target-Measure-Act" approach promoted by the high-level coalition Champions 12.3 as a proven way (for both governments and companies) to achieve rapid and concrete results regarding food waste prevention (Champions 12.3, 2022). Targets set ambition and can help guide effective action based on food waste diagnostics (that is, carrying out a baseline assessment of food waste levels and identifying "hotspots" and suitable corresponding solutions). The 2022 progress report warns that global progress by governments and companies on achieving SDG Target 12.3 is slower than necessary.

The analysis of the status of food waste prevention policy was established by extracting information for each MS from the EU Food Waste and Prevention Hub (European Commission, 2020), complementing the available information with what was reported in the survey to MSs (Section 3.2) Additional information was extracted from a survey carried out in 2020 by the German Presidency (Council of the European Union, 2020). The survey focused on EU Platform recommendations and contributions to the progress assessment and on implementation of the 2016 Council Conclusions on Food Losses and Food Waste. The need to collate information from different sources to establish this overview arose from the uneven compilation of the information on the EU Food Waste and Prevention Hub from MSs. After defining a classification of the policy initiatives retrieved (presented in Section 4.1) the level of ambition of current policies was determined by scoping the aforementioned sources and charting a schematic overview of all the different initiatives undertaken by each MS (as presented in Section 4.2). A classification of the ambition of the MSs' food waste prevention policies was established based on the single policies collected in the overview and considered two main criteria: reliance on an evidence-based "Target-Measure-Act" approach and timeline of implementation. The review included also an assessment of quantitative results achieved by the implemented policies, in an attempt to establish whether these policies had any effect on the actual food waste levels monitored. This classification is presented in Section 4.3. The analysis presented in this section is limited primarily by the inaccessibility of information from institutional sources for the various MSs. By starting from the EU Platform Prevention Hub, it was possible to snowball to the primary source of the MSs strategies or legislative documents, but often links were broken and the search inconclusive. It is also acknowledged that many of the primary documents are not in English language and some misinterpretation might have occurred in the translation process.

## 4.1 Classification of policies for food waste prevention

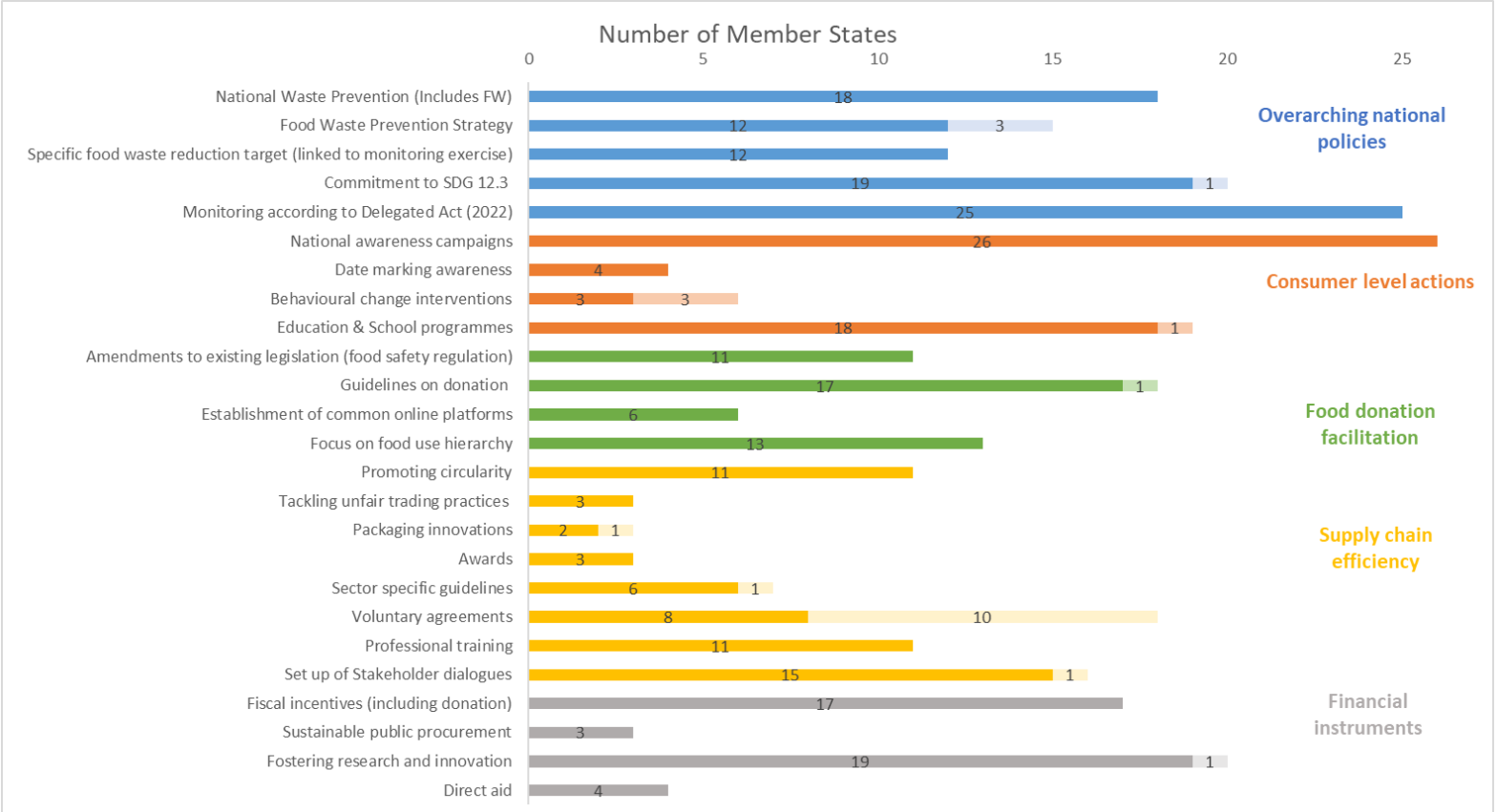
First of all, a distinction is due on the nature of the national policy introduced by each MS: national food waste prevention strategies are considered separately from national waste prevention plans, which also include food waste prevention. The difference lies in the policy implementation mechanism, as the former is associated with a greater ambition and relevance, while the latter is the consequence of the reception of the updated Waste Framework Directive. Starting from this general disclaimer, the policies were categorized as follows:

- national policies & monitoring: national waste prevention plans, national food waste prevention strategies, target setting and monitoring of food waste levels;
- consumer targeted actions: covering the actions aimed at reducing consumer food waste or changing behaviours;
- facilitation of donations: combining all the initiatives, regulatory or not, that create an enabling environment for surplus food donation;
- improvement of supply chain efficiency: various actions that are aimed at improving relations between food supply chain stakeholder, as well as the implementation of innovations which can overcome the technical challenges of food waste reduction;
- economic instruments: tax incentives, direct aid or financing.

## 4.2 Policies' uptake across the EU

An overview of the coverage of each policy initiative across the different MSs is presented in **Figure 40**.

**Figure 40.** Overview of food waste policies and actions at MS level ([1,2])




Notes: ([1]) Apart from the category "Monitoring according to Delegated Act (2022)" the total reference number is considered to be 28, as the regions of Flanders and Wallonia were mapped separately ([2]) In darker hue, the policies of which the implementation was clear (legislative documents or reports available) and in lighter hue, the number of policies for which implementation status was unclear but some evidence was found (i.e. on websites or on the prevention hub).

*Source:* Authors' own elaboration

The analysis showed how all MSs have adopted varied legislative and non-legislative national measures to reduce food loss and waste and continue to integrate them in their national strategies or relevant legal frameworks as part of an ongoing policy process. In many cases, the distinction between the political commitment to SDG 12.3 and concrete implementation of policies to reach it is difficult to discern. Generally, it can be affirmed that the policy actions that are implemented mostly concern "soft" regulation (facilitating self-regulation from businesses) or education, as they are prioritizing consumer/stakeholder awareness raising above restriction, while "hard" regulations such as legally binding rules and bans are generally not implemented. The following sections describe in detail the uptake of the different groups of initiatives resulting from the analysis.

### 4.2.1 Overarching National Policies

15 MSs have put in place specific strategies, three of which are either in a draft stage or have unclear implementation status, while in 18 MSs food waste prevention is an action within a national waste prevention plan. In some cases, MSs (FR, GE, IE, PT, SL) have implemented both.

Although the majority (20) MSs have confirmed their political commitment to SDG Target 12.3, few MSs have actually taken an evidence-based approach in setting targets, implementing actions to address specific hotspots, and monitoring their effectiveness. 12 MSs have included targets that are either more ambitious than SDG 12.3 or differ slightly in the milestone figures and timeline. The apparent lack of evidence reported by MSs on the success of their strategies in reducing food waste at national level may indicate the need to further emphasise and promote the use of measurement tools and evaluation frameworks to support MSs in adopting a more evidence-based approach to inform their decision-making.

### 4.2.2 Consumer level actions

Food waste at the consumption stage is the hotspot in food supply chains across Europe, therefore actions targeting consumers are especially important. However, policies implemented to target consumer food waste revolve mostly on awareness campaigns (implemented by 26 MSs), whose effectiveness in fostering behaviour change is debatable (Reynolds et al., 2019; Simões et al., 2022; Stöckli et al., 2018). Furthermore, it is often unclear how awareness campaigns are designed, whom is targeted, whether their outreach is monitored, and effects evaluated. In addition, four MSs put in place awareness campaigns specifically addressing date marking misunderstanding, which is a driver of consumer food waste and emerged as common content for consumer-targeted messages. Behavioural change interventions, meaning those actions that elicit changes in consumers' attitudes and behaviours beyond the mere provision of information, are concretely implemented by three MSs with three others recognizing the relevance of such interventions but without a detailed action plan in place. School programmes are also a popular policy initiative, implemented by 18 MSs by including food waste education in school curricula, either nationwide or through pilot projects.

### 4.2.3 Food donation facilitation

All MSs have taken different measures at national level to encourage food donation, which is often the first step in the establishment of national food waste prevention programmes. Some have taken measures and/or established guidance to clarify the roles and responsibilities of food business operators and food banks and other charity organisations, also by setting up stakeholder fora. Some MSs (e.g. CZ, FR, PO, and HU) have made donation of surplus food mandatory for specific sectors, typically retail. In fewer cases (e.g.: SE, IE), redistribution is facilitated by the organization of common digital platforms. 13 MSs also employ fiscal incentives through the reduction or exemption of VAT on food donated. The application of the waste hierarchy enshrined in the Waste Framework Directive, foresees human consumption as the most favourable destination of surplus food that would have been wasted after prevention, therefore the category is included in between food donation and supply chain efficiency.

### 4.2.4 Supply chain efficiency

Most MSs have put in place structured processes to engage and consult with different actors in the food supply chain and other stakeholders (e.g. platforms, voluntary agreements). 18 MSs mention the organization of a voluntary agreement between stakeholders. According to (Burgos et al., 2019) a voluntary agreement is a policy measure that can drive food waste reduction by bringing supply chain stakeholders together towards common objectives, which can be collectively established by the members of the agreement. The nature of a voluntary agreement is quite flexible, therefore **Figure 33** shows eight MSs with an established

implementation plan, while the remaining 10 represent the MSs that are going to implement a voluntary agreement in the future, do not provide clear plans or do not have a whole supply chain approach.

Other MSs have put in place efforts to facilitate stakeholder collaboration through sector specific platforms. Initiatives to improve supply chain efficiency and prevent food waste from all stages include a variety of policy instruments: issuing guidelines for specific stages and sectors (six MSs), enabling professional training (11 MSs), promoting circularity and industrial synergies to increase the correct application of the food use hierarchy (13 MSs), in few cases (three MSs) legislation targeting Unfair Trading Practices (implementation of Directive (EU) 2019/633).

### 4.2.5 Financial instruments

17 MSs employ financial instruments, such as fiscal incentives and economic support, to encourage food waste prevention. Concrete examples include providing incentives such as VAT exemption from donated food. Another type of financial support, such as fostering research and innovation, is also provided to help players take action in their operations. Direct financial aid to stakeholders to set up waste prevention initiatives is also mentioned by four MSs (FR, ES, NL, HR), sometimes related to the direct financing of research and innovation projects or support to small and medium enterprises (SMEs). Sustainable public procurement and food waste related criteria for tenderers are indicated by three MSs only and without very clear information.

## 4.3 Evaluation of policies

Evaluation of national strategies is scarce, especially in quantitative terms: most strategies have been implemented in the past two to five years, and in some cases, it is not clear whether they are fully implemented or represent aspirational objectives. SE, NL, AT, FR and DE seem to have established the capacity, or at least the awareness, for evaluation, together with a more transparent dissemination of monitoring and evaluation efforts. FR provides an evaluation of its legislation on facilitation of food waste redistribution (EY consulting, 2019). In NL, the organization *Samen tegen Voedselverspilling* provides information on the success of its voluntary agreement and various initiatives linked to it; furthermore, the collaboration with educational institutions also entails the availability of scientific literature on some initiatives conducted in this country, as reported by de Visser-Amundson et al., (2020) and van Dooren et al., (2020). AT has published a qualitative evaluation of its past food waste prevention strategy (which ran from 2013 to 2019), but it does not provide information in terms of food waste quantities associated to specific actions. DE has developed a dedicated platform for sharing information on the progress of its stakeholder dialogues, but as the food waste prevention strategy is quite recent, there is no evidence of its performance yet. In DK, the voluntary agreement run by the Danish Think Tank "One\Third" has published a report in which the development of food waste generated by its members has been monitored from 2015 to 2020.

This analysis showed how monitoring and evaluation is not yet a widespread practice, even for the countries that have a medium to high level of policy commitments to reducing food waste. This outcome is in line with the conclusions of the above-mentioned Champions 12.3 report (2022). As a consequence, little data could be gathered on the quantitative results of policy initiatives in terms of observed food waste reductions. The only MSs for which quantitative data was retrievable from publicly shared information are NL and SE. This scarcity led to the inclusion of the UK (although this country is no longer a MS) in the table, as one of the few countries with a consistent track record in food waste data monitoring and sharing. The data that was retrieved is displayed in **Table 10**.

In many cases, the data is not representative of all the actors in the MS's food supply chain but reports only the information gathered through a voluntary agreement's monitoring, therefore it might refer to a non-representative sample of the food supply chain's stakeholders. The UK is the country with the most reliable data for food waste reduction associated to its Waste Reduction Roadmap. NL has monitored food waste quantities and are able to report reductions at household and retailer level, but not for the other steps in the supply chain. These results highlight the scarcity of data on food waste occurring at primary production and processing stages.

**Table 10:** Available quantitative information on food waste (FW: food waste)

| | **Retail and distribution** | | **Food services** | | **Household** | |
|---|---|---|---|---|---|---|
| Country | FW reduction | Reference time | FW reduction | Reference time | FW reduction | Reference time |
| NL | 3.60%[1] | 2018-2022 | | | 29%[2] | 2010-2019 |
| SE | | | 3.00%[3] | 2018-2020 | | |
| UK | 8%[4] | 2018-2021 | | | 21%[5]<br>17.8%[6] | 2007-2012<br>2007-2018 |

*Source*: [1] WUR, (2022), [2] Stichting Voedingscentrum (2019), [3] Naturvårdsverket, (2022),[5] Champions 12.3,(2017) [4,6] WRAP (2022).

In parallel to the analysis described, timelines for the implementation trajectories of selected MSs were drafted (provided in Annex 3). The timelines present the start of the policy initiatives and of monitoring activities and important milestones found in official documentation. Evaluation of measures was included when available.

Building on the evidence collected and displayed in the previous paragraphs and in the timelines illustrating the implementation of food waste prevention efforts, MSs were classified according to the ambition of the action and timeline of implementation, as illustrated in **Table 11**. The classes include:

- high level actions performed by very few MSs who have implemented measures according to the "Target-Measure-Act" approach even before EU mandates;
- two classes for mid-level actions based on the clarity of the MS commitment to SDG 12.3;
- a lower category for those MS that do not have a clear action plan for food waste prevention.

**Table 11:** Classification of MSs policy ambition

| | **1) High level actions** | **2a) Mid-to-high level actions** | **2b) Low-to-mid level actions** | **3) Low level actions** |
|---|---|---|---|---|
| Type of action | Evidence-based policy, implementing a Target-Measure Act-approach | Overall strategy/plan in line with SDG 12.3 but implementation is in progress with limited/partial evidence of monitoring and evaluation | National level actions in early stage of development and limited to certain areas, monitoring and evaluation of actions are unclear | Sporadic and limited measures with little or no documentation of results available |
| Timeline of implementation | 5 to 10 years | < 5 years | 2 to 5 years | NA |
| Member States | NL*, DE*, FR* | FI, IE, PT, IT, ES*, SE*, BE (Flanders* and Brussels capital), HR, AT* | BG, EL, SL, CZ, LV, LT, EE, SK, DK*, LU, HU | CY, MT, PL, RO |

Notes: (*) denotes MSs for which a timeline of policy implementation is provided in Annex 3

*Source*: Authors' own elaboration

Three front-runner MSs (NL, DE, FR) are those that have taken an evidence-based approach in setting targets, implementing actions to address specific hotspots, and monitoring their effectiveness, following the recommended "Target-Measure-Act" approach. While the majority of other MSs have actions in place, it seems that only nine of these have developed national strategies/roadmaps or plans in line with the SDG 12.3, even though with limited or partial evidence of monitoring and evaluation of their effectiveness. Other 11 MSs report on actions undertaken at national level; however, these appear to be still at an early stage of development and/or are limited to certain areas only (e.g. voluntary agreements, redistribution and awareness campaigns), whilst monitoring and evaluation of actions are either not defined or unclear. Significantly, for

this group of MSs, overall coordination of efforts at national level is unclear. For the remaining four MSs, actions have been implemented only very recently, and measures are sporadic and/or limited, with little or no documentation of results available. Overall, based on the nature and level of activity in the MSs presented in **Table 11** and on the few quantitative results collected (**Table 10**) it seems that only 3 MSs are well positioned to make a significant contribution to SDG Target 12.3.

According to the analysis presented, all MSs have reported implementing a waste prevention program, in accordance with the Waste Framework Directive. In addition, the majority has committed to SDG Target 12.3 of halving food waste at retail and consumer level while reducing food waste at all other levels of the food supply chain. National governments have initiated various policies addressing food loss and waste prevention. However, the level of ambition of the policy action, the degree to which measures have been implemented, and results obtained seem to be very heterogeneous.

# 5 Conclusions

This report describes part of the study conducted by JRC to support the impact assessment of a legislative proposal on setting binding food waste reduction targets.

The public consultation allowed to investigate the public opinion concerning the food waste policy initiative and to understand the level of consensus regarding the policy options setting food waste reduction targets. The development of policy options in the impact assessment process, including the definition of the targets format and way of expressing them, took into account the results of the consultation. The public consultation showed that the level of consensus on food waste reduction targets is generally high, especially in the case of citizens and organizations (of consumers, NGOs, environmental). Views from SMEs do not show significant differences compared to those of large companies, on topics such as setting food waste reduction targets, benefits of reducing food waste, associated challenges and actors who need to take action.

The targeted consultation included a data collection performed at Member State and stakeholder level, through the submission of dedicated surveys. It aimed at collecting quantitative data on costs of the waste prevention initiatives and amounts of prevented food waste. Moreover, the survey for stakeholders included questions on social benefits and other features of the initiatives (e.g. types of stakeholders involved, supply chain stage addressed, resources needed to run the initiative). The survey for stakeholders received 62 replies and allowed to collect quantitative data for about 50% of the initiatives. The most commonly reported initiative type was the surplus food redistribution taking place at the retail stage, although most of the initiatives have multiple purposes and aim at reducing food waste at various stages of the supply chain. The high heterogeneity in the types of initiative and the multi-purpose nature of some of them resulted in a high variability in terms of amounts of prevented food waste and costs. In particular, costs per tonne of prevented food waste are very variable and on average significantly higher than the values reported in the literature. Possible reasons include the fact that, in some cases, initiatives are funded to support citizens and households in need, or provide professional reinsertion to unemployed people, and therefore food waste reduction is an additional outcome of the initiative. The outcome of this consultation was used in the impact assessment to support the assessment of the policy options' impact, in particular regarding the possible effects on employment. The high variability of the costs of initiatives submitted via the survey to stakeholders, however, prevented the use of this information in the MAGNET (Modular Applied GeNeral Equilibrium Tool) model ([5]), which was used to assess the impact of the policy options.

The survey submitted to MSs received 20 replies presenting a total of 145 initiatives but only few of them disclosed quantitative data on amounts of food waste prevented and related costs (and only nine initiatives provided information on both). In some cases, respondents stressed the difficulty of allocating food waste reductions to a particular action. Moreover, the quantification of prevented food waste resulted particularly challenging in the case of initiatives promoting behavioural change, which can have longer term effects in consumers' habits. Information collected via this survey supported the assessment of efforts currently undertaken by MSs to prevent food waste.

The analysis of national initiatives on food waste prevention establishes the current state of food waste prevention policies in MSs. Results suggest a general lack of evidence-based policy making, and in most cases a significant deficiency in monitoring and evaluation of the effectiveness of the initiatives that have been put in place. There is a divide between formal commitment to internationally set targets, such as SDG 12.3, and the application of ambitious policy measures. Furthermore, there is scarce information on monitoring efforts, even though this might change in the future thanks to the introduction of the mandatory reporting in 2018. The results of the analysis emphasize that voluntary action, as it developed now, might not be enough to significantly reduce food waste amounts in line with the target set by SDG 12.3.

In the context of the policy impact assessment, this analysis contributed to the problem definition and helped understanding the problem drivers for what concerns the lack of evidence-based and coordinated approaches in MSs. Furthermore, the information collected in this analysis and in the surveys to MS was used to develop an analysis of the feasibility of reaching the food waste reduction targets set out in the three policy options.

[5] The analysis performed using the MAGNET model in support to the Impact Assessment is presented in De Jong et al., (2023).

## References


Burgos, S., Colin, F., Venice, G., & Mahon, P. (2019). Voluntary Agreements as a collaborative solution for food waste reduction.

Caldeira, C., De Laurentiis, V., Corrado, S., van Holsteijn, F., & Sala, S. (2019). Quantification of food waste per product group along the food supply chain in the European Union: a mass flow analysis. Resources, Conservation and Recycling, 149(August 2018), 479–488. https://doi.org/10.1016/j.resconrec.2019.06.011

Champions 12.3. (2017). *The Business Case for Reducing Food Loss and Waste*.

Champions 12.3. (2022). SDG TARGET 12.3 ON FOOD LOSS AND WASTE: 2022 PROGRESS REPORT An annual update on behalf of Champions 12.3. https://champions123.org/sites/default/files/2022-09/22_WP_SDG Target 12.3_2022 Progress Report_v3_0.pdf

Council of the European Union. (2020). Food losses and food waste: assessment of progress made in implementing the Council conclusions adopted on 28 June 2016. https://data.consilium.europa.eu/doc/document/ST-11665-2020-INIT/en/pdf

De Laurentiis, V., Caldeira, C., Biganzoli, F., Serenella, S., & European Commission. Joint Research Centre. (2021). Building a balancing system for food waste accounting at national level. https://doi.org/10.2760/316306

de Visser-Amundson, A. (2020). A multi-stakeholder partnership to fight food waste in the hospitality industry: a contribution to the United Nations Sustainable Development Goals 12 and 17. Journal of Sustainable Tourism, 0(0), 1–28. https://doi.org/10.1080/09669582.2020.1849232

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.

EC - European Commission. (2020). A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system. COM/2020/381 final.

EU. (2002). 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 saf.

EU. (2008). Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (Text with EEA relevance).

European Commission. (n.d.). EU Food Loss and Waste Prevention Hub. 2019. https://ec.europa.eu/food/safety/food_waste/eu-food-loss-waste-prevention-hub/

Eurostat. (2023). Food waste and food waste prevention – estimates.

EY consulting. (2019). Evaluation of the application of the provisions of the law of 11 February 2016 on the fight against food waste, and the implementing decree of 28 December 2016.

García Herrero, L; Casonato, C; Caldeira, C; De Laurentiis, V; Bruns, H; Nohlen, H; Sala, S, (2023). Scoping consumer food waste: an evaluation framework of prevention interventions. JRC Interim report.

Leverenz, D., Schneider, F., Schmidt, T., Hafner, G., Nevárez, Z., & Kranert, M. (2021). Food waste generation in germany in the scope of european legal requirements for monitoring and reporting. Sustainability (Switzerland), 13(12). https://doi.org/10.3390/su13126616

LNV. (2020). Kamerbrief over evaluatie voedselagenda 2016-2020 en het voedselbeleid. https://open.overheid.nl/documenten/ronl-8f8abddf297d0ecc6477dcd25ef3c4ce6ac4ee9b/pdf

Ministère de l'Agriculture et de l'Alimentation. (2021). Bilan du 2e Pacte national de lutte contre le gaspillage alimentaire (2017-2020).

Naturvårdsverket. (2022). Livsmedelsavfall i Sverige 2020. https://www.naturvardsverket.se/om-oss/publikationer/8800/978-91-620-8891-0/

Reynolds, C., Goucher, L., Quested, T., Bromley, S., Gillick, S., Wells, V. K., Evans, D., Koh, L., Kanyama, A. C., Katzeff, C., Svenfelt, Å., & Jackson, P. (2019). Review: Consumption-stage food waste reduction interventions –

What works and how to design better interventions. Food Policy, 83, 7–27. https://doi.org/10.1016/j.foodpol.2019.01.009

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

Simões, J., Carvalho, A., & Gaspar de Matos, M. (2022). How to influence consumer food waste behavior with interventions? A systematic literature review. Journal of Cleaner Production, 373, 133866. https://doi.org/10.1016/j.jclepro.2022.133866

Soethoudt, H., & Vollebregt, M. (2019). Monitor Voedselverspilling: update 2009-2019: Hoeveel kilo gaat er in Nederland verloren? https://doi.org/10.18174/558030

Stichting Voedingscentrum. (2019). Synthesis report on Food Waste in Dutch Households in 2019. https://www.voedingscentrum.nl/Assets/Uploads/voedingscentrum/Documents/Professionals/Pers/Persmappen/Verspilling 2019/VC_Synthesis report on food waste in Dutch households 2019.pdf

Stöckli, S., Niklaus, E., & Dorn, M. (2018). Call for testing interventions to prevent consumer food waste. Resources, Conservation and Recycling, 136, 445–462. https://doi.org/10.1016/j.resconrec.2018.03.029

UN General Assembly. (2015). Transforming our world: the 2030 Agenda for Sustainable Development. In New York: United Nations.

United Nations Environmental Program. (2021). FOOD WASTE INDEX REPORT 2021.

van Dooren, C., Mensink, F., Eversteijn, K., & Schrijnen, M. (2020). Development and Evaluation of the Eetmaatje Measuring Cup for Rice and Pasta as an Intervention to Reduce Food Waste. Frontiers in Nutrition, 6. https://doi.org/10.3389/fnut.2019.00197

WRAP. (2022). Food Waste Reduction Roadmap - Progress report. https://wrap.org.uk/resources/report/food-waste-reduction-roadmap-progress-report-2022

WUR. (2022). Minder voedselverspilling in supermarkten. https://www.wur.nl/nl/onderzoek-resultaten/onderzoeksinstituten/food-biobased-research/show-fbr/nederlandse-supermarkten-maken-voedselverspilling-inzichtelijk-f00dwa5-1.htm

## List of abbreviations and definitions

| | |
|---|---|
| AT | Austria |
| BE | Belgium |
| BG | Bulgaria |
| CZ | Czech Republic |
| DE | Germany |
| DK | Denmark |
| EE | Estonia |
| EL | Greece |
| ES | Spain |
| EU | European Union |
| FI | Finland |
| FW | Food waste |
| HR | Croatia |
| HU | Hungary |
| JRC | Joint Research Centre |
| LT | Lithuania |
| MAGNET | Modular Applied GeNeral Equilibrium Tool |
| MS | Member State |
| NGO | Non-Governmental Organization |
| PO | Poland |
| PT | Portugal |
| RO | Romania |
| SDG | Sustainable Development Goal |
| SE | Sweden |
| SI | Slovenia |
| SME | Small and Medium Enterprise |
| SK | Slovakia |
| UK | United Kingdom |
| WFD | Waste Framework Directive |

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# Annexes

## Annex 1. Survey for stakeholders

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Date: 19/05/2022 11:50:30

# Food waste prevention initiatives_stakeholders

Fields marked with * are mandatory.

## Introduction

Thank you for participating in this survey on food waste prevention initiatives.
The aim of this survey is to collect quantitative information on both ongoing and completed food waste prevention initiatives, excluding those carried out at national level by national authorities, which are addressed through a separate survey sent to all Member State representatives.

- In case you represent an association, please forward the survey to your members, so that the survey can be filled in directly by those developing the food waste prevention initiatives (in case your members are national associations, please ask them to forward it to their members, for the same reason). The replies to the survey will be sent directly to the Commission: if you wish to view your members' replies, please ask them to save a PDF version of their contribution after finalizing the survey.
- For Member States representatives and other public entities: please feel free to disseminate this survey with your networks of private sector stakeholders active in food loss and waste prevention.

The present survey will inform a modelling exercise developed in the context of the Impact Assessment to set food waste reduction targets. The modelling exercise will help compare the expected environmental, economic and social costs and benefits of the baseline scenario and the different policy options.
The survey collects information on any type of initiative regardless of its scope and size, as long as it qualifies as a food waste prevention initiative. Please note that, as the survey was designed for a range of different stakeholders and types of initiatives, not all questions will apply to your specific case. Please feel free to skip all non-relevant questions. Some of the questions are mandatory (marked with *), as they collect basic information needed for the modelling exercise.
We would be grateful to receive your input by the **6th June 2022**.

**Instruction for the compilation**

- If do not want to complete the survey in one go, you can save your contribution as a draft in EU Survey and continue later.
- Click Submit at the end of the survey when you finished filling out the fields with the necessary information. After submitting, you can save a PDF of your contribution.

**Data treatment**

1

The data disclosed through the survey will be used in as aggregated data and will therefore not be published in a disaggregated form. Data will be used within the European Commission and will not be transferred to third parties.

**Contact**
Please contact JRC-FOOD-WASTE@ec.europa.eu in case you have any doubt or question regarding the survey.

## Overview

* Name of the initiative

* Can we contact you for some follow-up questions on the answers provided, if necessary?
  - ○ Yes
  - ○ No

If yes, please provide your email below

## 1 - General information

* Short summary of the initiative, focusing on its implementation and monitoring of the results
  *500 character(s) maximum*
  Example: *initiative taking place at urban scale, where the surplus food generated by 10 small retailers was delivered to a food bank for re-distribution to charities/civil society organisations. The amounts (tonnes) of surplus food delivered daily were recorded for each main product group.*

* What is the aim of the initiative?
  *250 character(s) maximum*

* Type of initiative
  For combined initiatives, please select all the relevant options.
  - ☑ Surplus food redistribution (human consumption)
  - ☐ Gleaning
  - ☐

2

Improving operational efficiency (e.g. manufacturing/processing optimisation, cold chain management, inventory management, storage and handling, improving canteen/food service efficiency, logistics)

- [ ] Retail promotions (e.g. price discounts for imperfect products and/or products close to end of shelf-life)
- [ ] Packaging (e.g. innovation to increase shelf life, facilitate use, different formats e.g. single-serve etc…)
- [ ] Date marking
- [ ] Consumer targeted initiatives (e.g. behavioural interventions, awareness/educational campaigns etc.)
- [ ] Digital tools (e.g. websites, apps)
- [ ] School programmes (e.g. educational materials)
- [ ] Professional training
- [ ] Awards/certification
- [ ] Measures to receive fiscal incentives (e.g. corporate tax credits for food donation)
- [ ] Measures to receive sustainability loans offered by private institutions
- [ ] Taking part in voluntary/framework agreements
- [ ] Aligning with regulatory frameworks/policies
- [ ] Aligning with national food waste prevention programme
- [ ] Valorisation of surplus food and by-products: for food use (human consumption)
- [ ] Valorisation of surplus food and by-products: animal feed
- [ ] Valorisation of surplus food and by-products: for non-food use
- [ ] Other

If you selected other, please specify

*100 character(s) maximum*

Geographic coverage

- ○ Municipality
- ○ Region
- ○ Country

Please specify further (e.g. Municipality - Copenhagen)

* Stage of the food supply chain where food waste was prevented (multiple choice available)

- [ ] Primary production
- [ ] Processing and manufacturing
- [ ] Retail and distribution
- [ ] Restaurants and food services
- [ ] Households

* Stakeholders taking part in the initiative (multiple choice available)

- [ ] National government
- [ ] Regional government
- [ ] Municipality
- [ ] NGOs

3

- [ ] Trade associations
- [ ] Consumers organisations
- [ ] Farmers
- [ ] Processors/manufacturers
- [ ] Wholesalers
- [ ] Retailers
- [ ] Waste collection companies
- [ ] Food services - HORECA
- [ ] Food services - Healthcare
- [ ] Food services - Schools/universities
- [ ] Food services - other
- [ ] Academia/research
- [ ] Consumers
- [ ] Opinion leaders
- [ ] Other

If you selected other, please specify

*100 character(s) maximum*

When did the initiative start?

*100 character(s) maximum*

For long-lasting initiatives, this would be the date of establishment.

If concluded, when did it end?

*100 character(s) maximum*

Please select the correct answer

- ○ The organisation makes available surplus food generated in its operations to a third party in charge of redistributing it
- ○ The organisation redistributes directly surplus food generated in its operations
- ○ The organisation recovers surplus food from third parties and redistributes it to other entities and/or directly to end beneficiaries
- ○ The organisation provides services to facilitate food redistribution (e.g. digital tools/platforms)

* Was the initiative upscaled from a pilot phase (i.e. an initial testing phase, conducted at a smaller scale)?

*If yes, we would like to contact you to ask you more details on this.*

- ○ Yes
- ○ No

## 2. Quantitative information

This section collects information on the cost and the results of the food waste prevention initiative. It is very important that all the quantitative data provided refer to the **same reference time** (e.g. one week, one month, 12 months).

* Please specify the **reference time** to which all data provided are referred.

*100 character(s) maximum*

In case of long-lasting initiatives, the reference time can either be the full duration of the initiative or the last year/n years.

## 2.1 Information on total sales (for private companies)

If applicable, what is your company's average **annual** sales volume (tonnes)?

*100 character(s) maximum*

If applicable, what is your company's average value of **annual** sales (expressed in €)?

*100 character(s) maximum*

## 2.2 Information on costs

* **A** - What was the cost to set up the initiative (expressed in €)?

*100 character(s) maximum*

In case the initiative coincides with an organisation, please report the cost to establish the organisation. Please consider all costs incurred to set up the initiative, including administrative overheads. If some elements cannot be expressed in financial terms (e.g. administration overheads in full time equivalent - FTE) please express the total number of FTEs assigned to this initiative, considering an average of 250 yearly working days for a FTE (average EU value).

* **B** - What is the cost of maintaining the initiative during the **reference time** after it has been set up?

*100 character(s) maximum*

In case the initiative coincides with an organisation, please report the operational costs of the organisation. Please consider all maintenance costs incurred, including administrative overheads. If some elements cannot be expressed in financial terms (e.g. administration overheads in full time equivalent - FTE) please express the total number of FTEs assigned to this initiative, considering an average of 250 yearly working days for a FTE (average EU value).

Which share of the costs reported under point **B** refers to fixed costs (independent from changes in the scale of the initiative)?

*100 character(s) maximum*

Please provide a value between 0 and 100%. For instance, if you answer 40%, we will assume that variable costs account for the remaining 60%.

In some cases, more than one stakeholder will be responsible for bearing the costs. Please provide through this table how the costs provided in point A and B are distributed across the different stakeholders.

Please ensure that the sum of each column is 100%.

| | Stakeholder name (referring to some or all of the stakeholders selected above) | Share of costs (% of A) - setting up the initiative | Share of costs (% of B) - maintaining the initiative |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |

Could you provide an estimate of the total distances covered to carry out the initiative during the **reference time** and the (average) type of vehicle?

Example: *for the redistribution activities we used a small truck and travelled a total of 300 km during the reference time*

In case the initiative involved printing books, leaflets, posters or other materials, can you provide some details below on the numbers and types of materials printed during the **reference time**?

Example: *A total of 1000 leaflets and 10 posters were printed as part of the awareness campaign*

## 2.3 Avoided food waste

If relevant, food waste generated in the **reference time** before the initiative took place.
Please **specify the unit** used (kg, tonnes, etc.)

*100 character(s) maximum*

E.g. 100 tonnes of food waste over one year

Surplus food redistributed in the **reference time** - expressed in mass (kg, tonnes, etc.)

*100 character(s) maximum*

Please use the same unit as in the previous question

Value of surplus food redistributed in the **reference time** - expressed in €

*100 character(s) maximum*

Composition of the surplus food redistributed / food waste avoided

Answers provided will help assess the environmental benefits linked to the initiative.

| | Share of product group over total redistributed amounts / share of product group over total food waste avoided (%). Please leave blank if not applicable. | Share of product group sales over total company's sales (%). Please leave blank if not applicable. |
|---|---|---|
| Cereal products | | |
| Sugar | | |
| Vegetables and pulses | | |
| Fruit and nuts | | |
| Dairy | | |
| Eggs | | |
| Fish and seafood | | |
| Meat | | |
| Oils | | |
| Ready meals | | |
| Tea and coffee | | |
| Beer and wine | | |
| Other | | |

Had the food waste been generated, what treatment process would have been used?

Answers provided will help assess the environmental benefits linked to the initiative.

- ○ Anaerobic digestion
- ○ Composting
- ○ Incineration
- ○ Landfill
- ○ Unknown / Other

If known, can you specify the cost of waste treatment (gate fee per tonne of waste)?

*100 character(s) maximum*

If thanks to this initiative you received some fiscal incentives, please specify the type of fiscal incentive received, its value, and on which measure the value of the incentive is based (e.g. kg of food waste prevented).

*100 character(s) maximum*

Were there any additional economic savings linked to implementing this initiative?

*100 character(s) maximum*

## 2.4 Social benefits of the initiative

If applicable, what was the total number of meals redistributed in the **reference time** and, if known, the average meal size?

*100 character(s) maximum*

Where was the surplus food delivered?

- ☐ Food banks (back-line organisations)
- ☐ Charity organisations (making food directly available to citizens)
- ☐ Citizens/households in need
- ☐ Users of a food-sharing application
- ☐ Other

If you selected other, please specify

*100 character(s) maximum*

In case the initiative relies on the support of volunteers, how many volunteers were involved?

*100 character(s) maximum*

If applicable, how many volunteer-hours were worked during the **reference time**?

*100 character(s) maximum*

Did this initiative create new jobs? If yes, please specify the number of people employed, specifying if employed with temporary contracts.

*100 character(s) maximum*

Did the initiative foresee some training of the staff involved and/or of the volunteers? Which new skills were created as a result?

*100 character(s) maximum*

Are there any additional social benefits linked to this initiative? Please provide some details below.

*100 character(s) maximum*

**Contact**

Contact Form

**Annex 2. Survey for Member States**

# Food waste prevention initiatives

## Survey for Member States Representatives

## Introduction

Thank you for participating in this survey on food waste prevention. The aim of this survey is to collect relevant information from **Member States representatives** on both ongoing and completed food waste prevention initiatives conducted at **national level,** in particular their costs and impacts. The analysis of costs and effects of national policies is of crucial importance for the preparation of the Impact Assessment to set food waste reduction targets and the data collected through this survey will inform a modelling exercise developed in the context of the Impact Assessment.

Should you have any questions regarding the survey, please contact us at:

- For questions concerning the initiative to set food waste reduction targets please contact: SANTE-FOOD-WASTE@ec.europa.eu or call +32 229 60 647
- For questions concerning the interpretation of the questionnaire please contact: JRC-FOOD-WASTE@ec.europa.eu or call +39 0332 786185

The surveys are pre-filled individually for each Member States based on the country profiles published in the EU Food Loss and Waste Prevention Hub. We would like to ask to check if the information is correct and if all the relevant food loss and waste prevention initiatives carried out by your Member State have been included in the survey. We encourage you to correct or update information about the initiatives in the first column of both tables below, as necessary.

Ideally, you would be able to provide the fixed and variable costs for each individual initiative and estimate its effect in terms of mass of avoided food waste. However, if this is not possible, you may also provide the total reduction of food waste mass in the given period. Please let us know if the values you provide were obtained via measurements or are estimates. At this stage it would be best not to provide information on expected future costs/savings.

**Table 1: Overall information and data on food waste amounts**

*Please ensure that all quantitative information provided refers to the reporting period indicated in the second column (start and end of initiative)*

| Initiative ([6]) | Dates of initiative (start and end) | Stages of the food supply chain* targeted | Geographical area targeted (if sub-national please provide the details) | Food waste reduced or food saved (if possible to assign it to the initiative**) | | | Link to the initiative and additional information - |
|---|---|---|---|---|---|---|---|
| | | | | Mass (e.g. tonnes) | Value in EUR (e.g. in case of food redistribution) | Are values measured (M) or estimated (E)? - *leave the correct answer* | |
| [Initiative 1] | | | | | | M/E | |
| [Initiative 2] | | | | | | M/E | |
| [Initiative n] | | | | | | M/E | |
| [Initiative 10] Monitoring | | | | | | M/E | |
| Other (*please add more actions if necessary*) | | | | | | M/E | |
| Total | | | | | | M/E | |

* Please select one or more of the following: primary production; processing and manufacturing; retail and distribution; restaurants and other food services; households.

** If not, it can be provided in the final row as "Total"

[6] Country action copied from the EU Food Loss and Waste Prevention Hub

**Table 2: Data on costs**

*Please ensure that all quantitative information provided refers to the reporting period indicated in Table 1 (start and end of initiative)*

| Initiative ([7]) | Total Cost in EUR | Fixed cost in EUR * | Variable cost in EUR (linked to the amounts of food waste reduced)** | Are values measured (M) or estimated (E)? - *leave the correct answer* | Additional information on costs (as needed) |
|---|---|---|---|---|---|
| [Initiative 1] | | | | M/E | |
| [Initiative 2] | | | | M/E | |
| [Initiative n] | | | | M/E | |
| [Initiative] Monitoring | | | | M/E | |
| Other (*please add more actions if necessary*) | | | | M/E | |
| Total | | | | M/E | |

* Fixed costs should include costs of setting up the initiative as well as other fixed costs for the period of the initiative, including administrative overheads. If some elements cannot be expressed in financial terms (e.g. administration overheads in full time equivalent - FTE) − please mention this in the last column "Additional information on costs".

** For redistribution activities, examples of variable costs are: those linked to maintaining storage areas (e.g. energy, equipment) and the fuel used. For awareness campaigns, examples are: renting venues and equipment for workshops and events.

Do you agree to be contacted for an interview? − Y/N

[7] Country action copied from the EU Food Loss and Waste Prevention Hub

## Annex 3. Timelines of policy implementation of selected Member States

The following section collects a visualization of the food waste policy implementation for selected Member States (generally for the MSs who have more information retrievable on the EU FLW Platform – Prevention Hub or on their institutional websites). Each timeline contains the key actions, in particularly:

- Introduction of key policy or regulation acts, signalled by the icon:
- Monitoring of food waste, signalled by the icon:
- The moment in which the analysis was carried out (2022) is signalled as such:
- The part of the timelines in lighter blue signals the time between the present (i.e. the mandatory reporting of food waste quantities from MSs) and the fulfilment of the SDG 12.3 target in 2030.

**Netherlands**

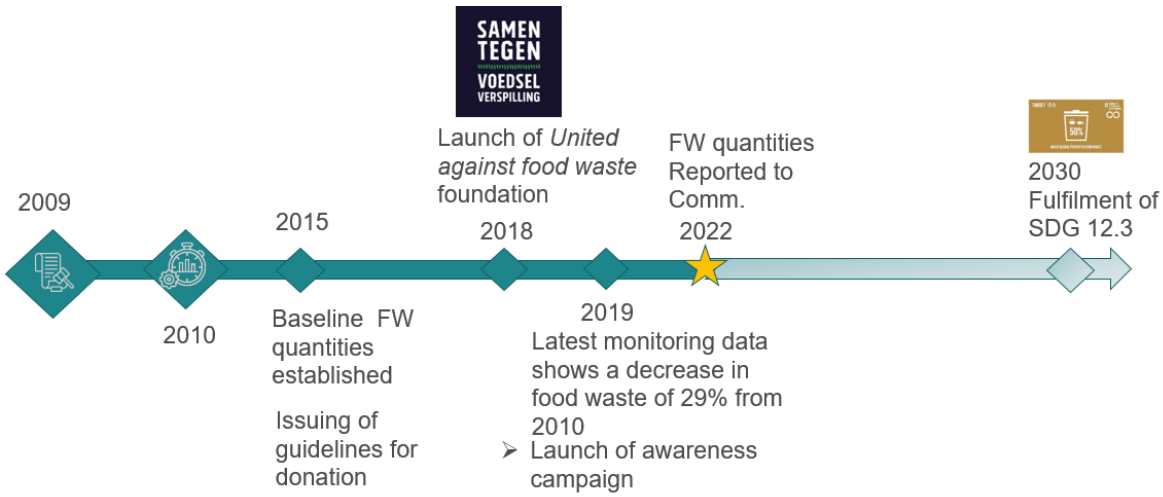


**Figure 41**: timeline of food waste prevention policies implementation in the Netherlands

**Key figures:**

- Food waste monitoring for the Netherlands has started in 2010 and has been routinely updated since then. The first retrievable data for total amount of food waste referred to 2012, a year in which the estimates established that the amount of food waste was between 1.67 and 2.62 million tons, corresponding to between 100 and 157 kg per capita. In 2019, the estimates indicated a between 88 and 138 kilograms per capita, a slight reduction in the average which is attributable to a 29% reduction in **household food waste** between 2010 and 2019 (Stichting Voedingscentrum, 2019).
- The latest report on retail specific food waste has shown a decrease of 3.6% of supermarket waste (WUR, 2022).
- No data available for the whole supply chain – no information on actions upstream (farming and processing) (Soethoudt & Vollebregt, 2019).

**Specific actions taken by the Netherlands:**

- The Dutch government has placed food waste prevention on its policy agenda as early as 2009.
- Voluntary agreement: organized through an organization called *Samen tegen voedselverspilling*, consisting of a multistakeholder 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 ([8]).

[8] https://samentegenvoedselverspilling.nl/

- Monitoring: since 2012, target set in alignment with SDG 12.3; findings are disseminated through yearly reports issued by Wageningen Research ([9]).
- Stakeholder involvement & platform.
- Recovery & redistribution: development of online redistribution platform.
- Awareness raising: week against food waste; consumer awareness through nudging at household level
- Date marking campaign.
- Promotion of education of consumers (actions in schools) and for stakeholders.
- Fostering research and innovation through direct financial assistance to food business operators implementing innovative food waste prevention strategies.

Evaluation of food strategy from Dutch Government: "*With regard to the subject of food waste, the bundling of activities through the United Against Food Waste Foundation have been called successful. The concrete targets for waste have contributed to attention and commitment. The evaluation indicates that a continued commitment to food waste needed to meet the target of halving food waste by 2030 compared to attainable by 2015.*" (LNV, 2020).

**Germany**

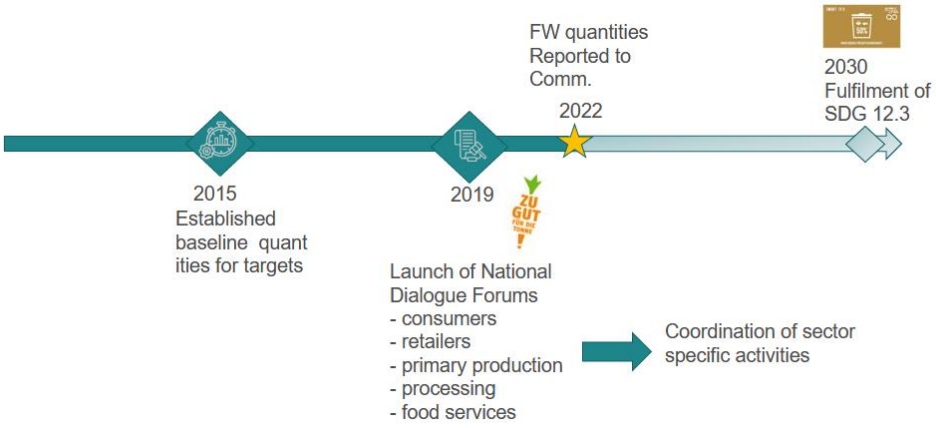


**Figure 42:** timeline of food waste prevention policy implementation in Germany

**Key figures:**

- Baseline food waste levels established in 2015 for the whole value chain: about 11.4 million tonnes of food waste are estimated to be produced yearly in Germany, more than half is supposed to be avoidable or still fit for human consumption (Leverenz et al., 2021).
- No reduction in household food waste was detected through monitoring exercises from 2012 onwards.
- Strategy for food waste prevention is articulated mainly through sector specific stakeholder dialogues for each step of the supply chain: primary production, processing and manufacturing, retail, food services and private households.
- A study on retailers' food waste using product mark down rates (used as a proxy for food waste prevented by using discounting) shows slight decreases between 2019 and 2020.

**Specific actions taken by Germany:**

- Target for reduction aligned with SDG 12.3.
- Set of baseline in 2015 - Ongoing monitoring efforts for creating reliable databases and establish indicators for reduction.

[9] https://www.wur.nl/nl/onderzoek-resultaten/onderzoeksprojecten-lnv/soorten-onderzoek/kennisonline/monitor-voedselverspilling-f00dwa5.htm

- In 2019, the German Ministry of Food and Agriculture launched the national food waste strategy, which is articulated through different stakeholder dialogues divided by the same sub-sectors mentioned above ([10]).
- National level awareness campaign: *Zu gutt fur die Tonne*, (too good for the bin) ([11]).
- Set up and facilitation of stakeholder actions and governance at territorial level through German federal structures.
- Education campaigns in schools.
- Consumer awareness pilot project centred on coaching and skills development ([12]).

**France**

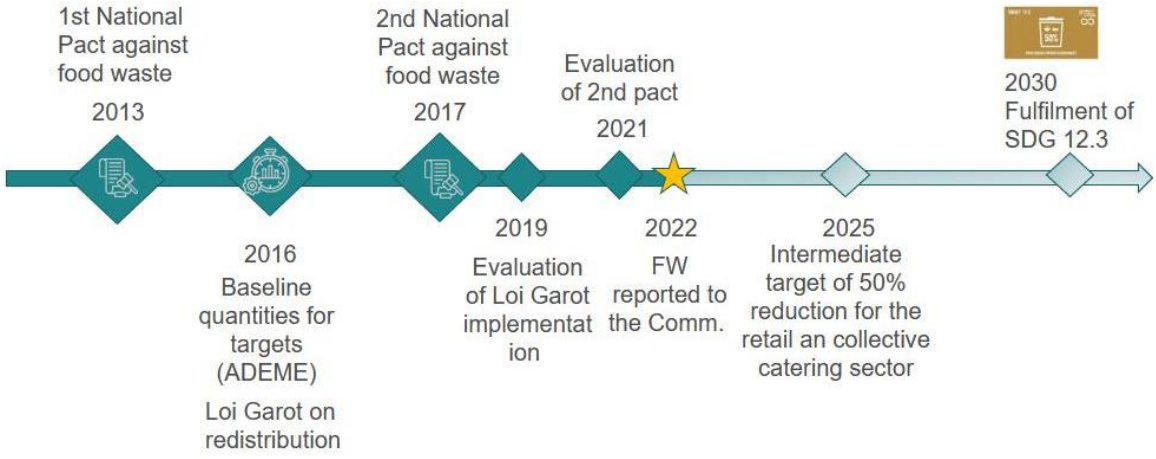


**Figure 43:** timeline of food waste prevention policy implementation in France

**Key Figures:**

- In 2016, ADEME (the French Agency for the Environment) published the first monitoring for food waste levels in France. Food waste along the supply chain was quantified as 10 million tonnes per year, with 33% quantified at consumption level, 32% at primary production and 14% at retail level ([13]).

**Specific actions taken by France:**

- France has put food waste on its policy agenda since almost a decade, issuing a first pact against food waste in 2013, a second strategy was launched in 2017, and the last and third in 2021. The French government's harmonized institutional action against food waste through "national pacts" which are strategies specifically issued to tackle food waste.
- The target set by the French government is an ambitious 50% reduction before 2025, with a baseline to 2015.
- In 2016, the French Government established the Garot law, requiring retailers exceeding 400 square meters of surface to establish partnerships with charities to ensure redistribution of surplus. Largely qualitative evaluation of the Second Pact against food waste, running from 2017 to 2020, shows that the pact is a **useful tool for the public administration and stakeholders to unify towards a common goal**, to raise awareness on the issue and establish a common framework of reference. On the operational level, the implementation of concrete measures has been "minimal or not very visible" (Ministère de l'Agriculture et de l'Alimentation, 2021) The pact was met with an initial momentum and involvement of different stakeholders, both public and private, but the enthusiasm quickly dissipated. The

10 https://www.united-against-waste.de/lebensmittelabfall/dialogforum
11 https://www.zugutfuerdietonne.de/
12 https://www.zugutfuerdietonne.de/strategie/dialogforen/private-haushalte
13 ADEME (2016)

main effect of the pact was the implementation **of regulatory and normative actions, highly focused on specific issues and not integrating a more transversal approach or communicating progress to all involved participants**. There was no mid-term evaluation of the program, which is also seen as a weak spot in the success of the plan. Nonetheless, the evaluation of the Garot law on redistribution minimum requirements was instrumental in shedding light on the functioning and effectiveness of this normative tool, highlighting how it bolstered the redistribution efforts from retailers.

**Sweden**

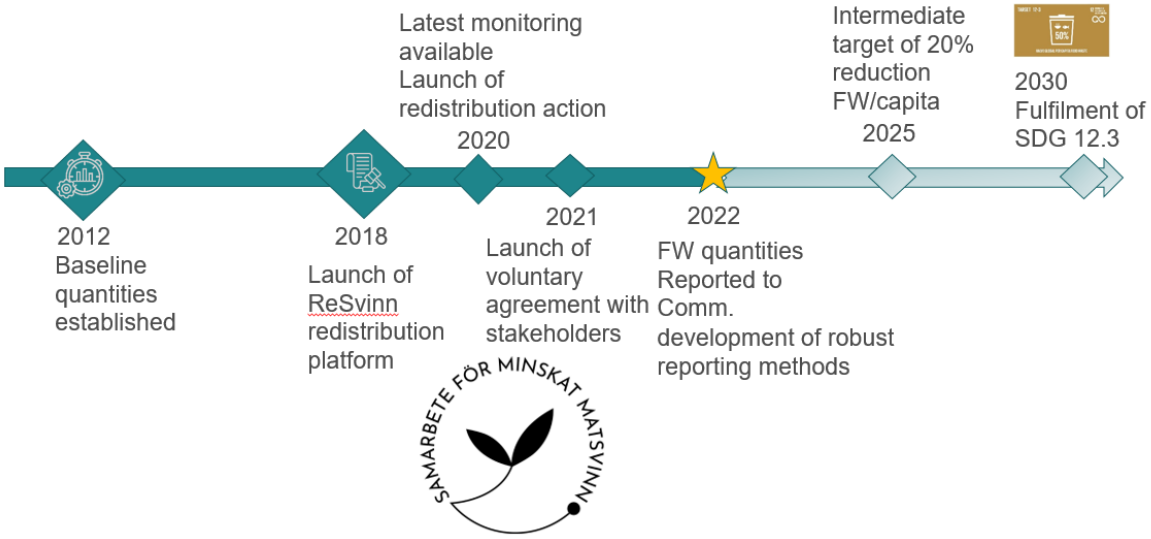


**Figure 44:** timeline of food waste prevention policy implementation in Sweden

**Key figures:**

- Impact report issued in 2021 shows an average reduction of food waste in food services, food industries are the largest producers of food waste (of the stakeholders participating in the voluntary agreement) ([14]).
- The voluntary agreement has been proved successful in involving stakeholders in starting monitoring and reporting food waste levels, however, the recent establishment of the initiative cannot establish a reduction effect associated to it.
- No reduction of food waste was registered at retail level, however monitoring efforts have helped indicate which products are the ones wasted the most (in line with literature, fruits and vegetables and dairy products).

**Specific actions taken by Sweden:**

- Sweden has placed intermediate targets for food waste reduction: 20% reduction per capita between 2020 and 2025 and an increase in efficiency of food supply chain by 2025 to reduce food waste.
- Establishment of a common organization for food waste redistribution including a common online platform: ReSvinn (the platform for redistribution) which operates through various actions: logistics, IT systems and business models. The platform involves 50 partners ([15]).
- Sweden is the only MS openly targeting legislation on unfair trading practices as a leverage to reduce food waste along the food supply chain ([16]).

[14] 2022 monitoring report ; Report on initiatives for food waste prevention in schools
[15] Report on redistribution
[16] Report on Unfair trading practices in Sweden

- Awareness campaigns focused on the environmental effects of food waste ([17]).
- Voluntary agreement with stakeholders: *Samarbete för minskat matsvinn* (SAMS) ([18]).
- Education in schools and dissemination.
- Enforce correct implementation of food use hierarchy.

**Austria:**

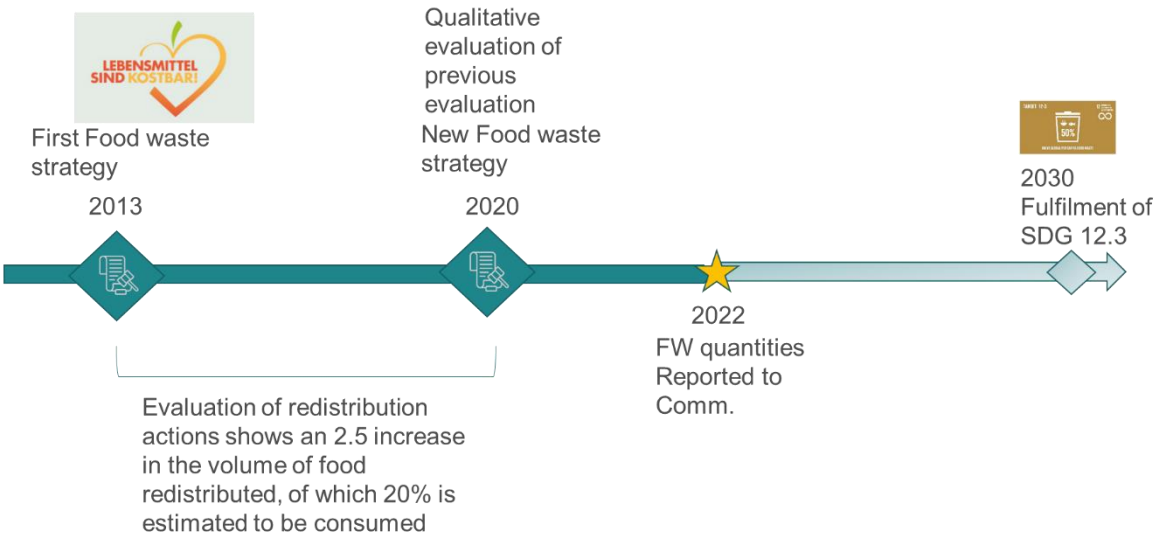


**Figure 45:** timeline of food waste prevention policy implementation in Austria

**Key figures:**

- The evaluation established that redistribution of surplus food was expanded as a result of the national policy, doubling from 2013 (6,600 tons) to 2017 (12,250 tons) - 20% of this food was used; this number increased further in 2020 to 20000 tons ([19]). Food use hierarchy implementation led to a use of food waste for animal feeding of 10000 tons per year.

**Specific actions taken by Austria**:

- The Austrian government implemented a food waste prevention strategy from 2013 onwards and provided a qualitative evaluation of its actions. An awareness campaign with different target groups and strategies was deployed but no information is shared on any monitoring activities or evaluation of impact and outreach.
- From 2020, a new waste strategy is put in place up to 2030. An evaluation of progress of the strategy is foreseen for 2026. The strategy would follow the line set by the previous one, with the branding "Lebensmittel sind kostbar!" ([20])

17 Report on consumer knowledge, attitude and behaviour on food waste
18 Official website of the Swedish voluntary agreement
19 Programme of the Austrian government's initiative Lebensmittel sind kostbar!
20 Programme of the Austrian government's initiative Lebensmittel sind kostbar!

**Denmark**:

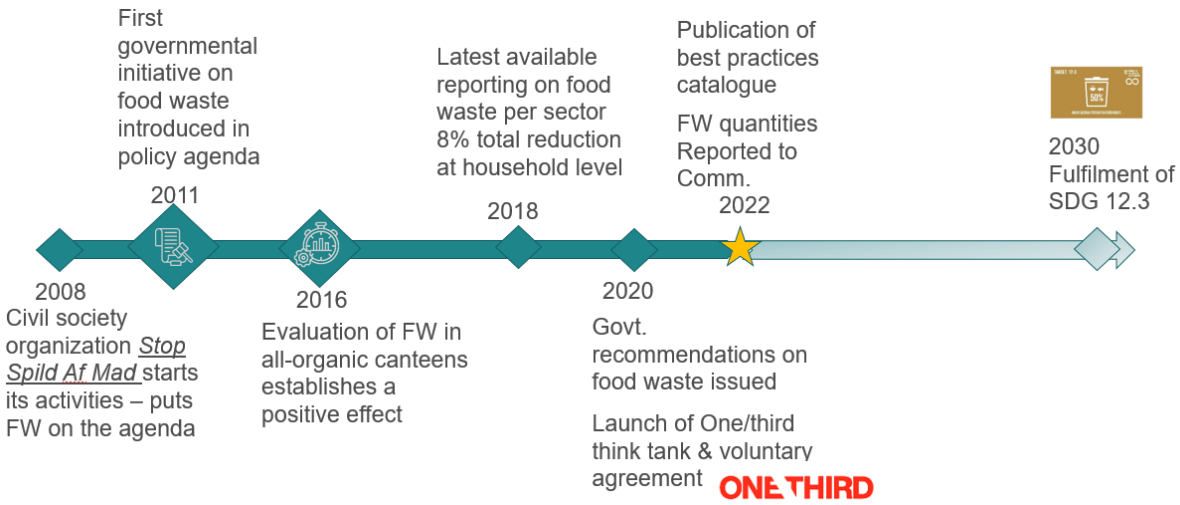


**Figure 46:** timeline of food waste prevention policy implementation in Denmark

**Key figures:**

- Large scale national awareness campaign has not shown effectiveness in altering attitudes in consumers (according to impact report).
- 51 stakeholders are participating in the voluntary agreements organized by the think tank One/Third, no information available on the coverage of the Danish market by stakeholders participating in the voluntary agreement.
- Latest sector level monitoring available dates to 2018 and covers household food waste, the effects of the voluntary agreement on the waste produced by processing companies.
- At manufacturing and processing level, there are significant fluctuations in the amount of food waste and food loss in the period 2015-2020, including a big increase in 2019-2020 (a decrease of 20.8% reduction until 2019).
- Consumer food waste has been reduced in the period 2011-2017, but significantly for the population living in apartment buildings and not in single family homes, total reduction from all households types amounts to 8%.
- Monitoring of food waste in restaurants/food services establishes that the data collected might be unreliable because waste separation is not yet the norm, leading to underreporting. It is estimated that 60% of food waste at this stage is avoidable ([21]).

**Specific actions taken by Denmark:**

- Food waste prevention actions in Denmark are reported as early as 2008, although from civil society organizations rather than institutional actions.
- In 2011, the Danish Ministry of the Environment introduced voluntary policies for food waste prevention through a voluntary initiative (“Initiative Group Against Food Waste”).
- Further development of a Voluntary agreement between stakeholders and support of institutions, coordinated by One/third think tank ([22]).
- Target for participants of the Voluntary Agreement is aligned with SDG 12.3.
- Awareness campaign with focus on date marking understanding, no show of effectiveness in increasing awareness according to impact report.
- VAT reduction to facilitate food surplus donation and redistribution has been in place since 2015 ([23]).

21 https://onethird.dk/
22 Evaluation report of One Third voluntary agreement

- Education campaign in schools, targeting food served in canteens (organic public procurement and waste reduction).
- Fostering research and innovation for education institutes and stakeholders.

**Belgium (Flanders):**

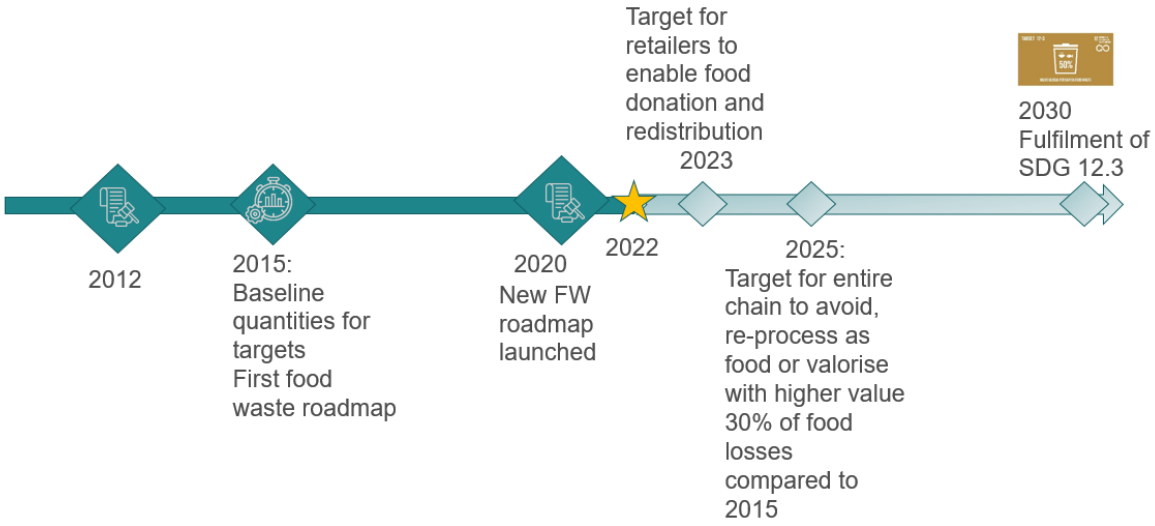


**Figure 47:** timeline of food waste prevention policy implementation in Flanders

**Key figures:**

- Flanders have established a baseline measurement in 2015, which was updated in 2017. The region implemented a circular economy/efficient use of resource strategy for the 2015-2020 period and implemented a new one after the termination of the previous plan ([24]).
- Amount of food waste is decreasing in fisheries and auctions sectors. There is a slight increase in retail food waste which is probably due to more accurate measurement.
- Registered increase in food surplus redistribution.

**Specific actions taken by Flanders:**

- Introduction of food waste in public policy as early as 2012.
- Establishment of a Food Waste reduction Roadmap for the whole supply chain, renewed for the period 2020-2025.
- Encourage stakeholder collaboration, focus on food waste flows for specific products to maximise impacts (Fruit & vegetables, dairy, bread, potato, meat and fish).
- Awareness raising.
- Training.
- New Business models: scale up circular entrepreneurship.
- Facilitating donation through VAT exemption.
- Research investment, support to start-ups focused on food loss prevention.
- Consistent monitoring.
- Stimulate domestic recycling and valorisation of food waste.

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[23] 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

[24] Main source: https://www.voedselverlies.be/

**Spain:**

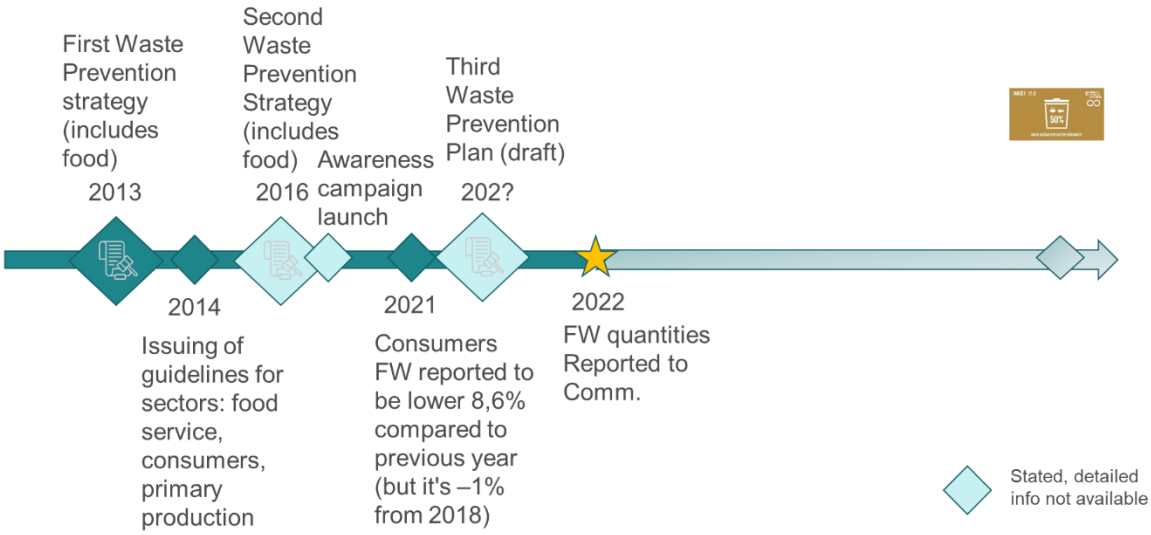


**Figure 48:** timeline of food waste prevention policy implementation in Spain

**Key figures:**

- A recent survey showed a decrease in household food waste between 2020 and 2021 (8% total, or 2,72 kg per capita), however it referred to a baseline recorded during COVID-19 lockdowns and therefore is not representative of a trend.

**Specific actions taken by Spain:**

- Inception of national strategy: 2013 – 2016; second stage of national strategy: 2016 - 2020 (policy areas prioritized: monitoring in all FSC stages; education and awareness; R&I, collaboration); third stage strategy being revised 2021 – 2026 (draft) ([25]).
- Monitoring of household and food service food waste.
- Coordination of action among food supply chain stakeholders.
- Food services: voluntary agreements for actors in the sector, find best practices and objectives.
- Educational material, guidelines and brochures (industry, consumers, canteens, primary production).
- Food donation legislation & facilitation (tax credit for donation: 35% of net book value can be corporate tax credit).
- Issuing of guidelines for redistribution in 2020.
- Awareness campaign and platform “mas alimento, menos desperdicio” & date marking awareness campaign “el etiquetado conta mucho” from Food safety agency) ([26]).
- Multilevel governance and implementation of waste prevention program at local level: subnational plans and legislation, e.g. Catalunya ([27]).
- Application of food use hierarchy (draft law on waste and contaminated soils).
- Tax incentives for businesses that set up waste prevention plans.

[25] Waste strategy until 2020 ; New strategy proposal draft 2021
[26] Awareness campaign on label use
[27] Regional law on food waste

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