

# FSSC 22000



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### GUIDANCE DOCUMENT: FOOD LOSS AND WASTE

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## REVISION HISTORY

Date Published	Issue	Changes
September 2023	1	First publication

## 1. PURPOSE

Guidance Document for organizations on how to implement the FSSC 22000 requirements on food loss and waste within their food safety management systems. Whilst reference is made on how to implement food loss and waste reduction, this is informative only and designed to assist organizations based on existing information available.

## 2. INTRODUCTION AND BACKGROUND

The United Nations General Assembly adopted a set of 17 Sustainable Development Goals (SDGs), with SDG 12 looking to ensure sustainable consumption and production patterns. SDG 12.3 calls for halving per capita global food waste at the retail and consumer levels and reducing food losses along production and supply chains (including postharvest losses) by 2030.

The mission of FSSC is to provide trust and deliver impact to the consumer goods industry. Our goal is to help organizations contribute to the global SDGs and create a better world. The addition of food loss and waste as an additional requirement into the FSSC 22000 Scheme supports this goal and aims to support organizations in their contributions to meeting the UN Sustainable Development Goals (SDGs).

According to the Champions 12.3 2022 Progress Report<sup>1</sup> on SDG 12.3, approximately 8% of all food produced in the world is lost at farm level; 14% is lost between the farm gate and the retail sector, e.g., manufacturers and producers; and 17% is wasted at the retail, food service, and household levels of the food supply chain. This results in significant impacts on human livelihoods and well-being, the global economy, and the environment. Over the past few years, events such as war and the COVID-19 pandemic have exacerbated food loss and waste by continually disrupting the human food supply chain. In addition, ISO has assembled a working group for the purposes of “standardization of food loss and waste, providing a framework for food organizations throughout the food chain, to work actively and effectively with measuring and reduction of food loss and waste” (ISO 2021).

This progress report<sup>1</sup> gives rise to further considerations on how food loss and waste affect us all:

- Food security: Nearly 1 in 10 people are undernourished (FAO 2018), whilst more than 2 billion tons of food each year never gets consumed (WWF-UK 2021).
- Economic costs: Food loss and waste result in more than US\$1 trillion in economic losses globally per year (Scialabba 2015; WWF-UK 2021).
- The environment: The production of food that is ultimately lost or wasted requires a land area greater than that of China (FAO 2013). Food loss and waste generate about 8–10% of global greenhouse gas emissions annually (IPCC 2020). To put this in perspective, if food loss and waste were a country, it would be the third-largest greenhouse gas emitter on the planet—surpassed only by China and the United States. In fact, reducing food loss and waste by half would avoid 1.5 gigatons of carbon dioxide equivalent emissions per year by 2050, an amount greater than the current energy-related and industry-related emissions of Japan (Searchinger et al. 2019).

Reducing food loss and waste, therefore, can save money for farmers, companies, and households; feed more people by wasting less; and reduce the burden on water, land, and the climate<sup>2</sup>.

Figure 1 below is the food waste pyramid developed by the UN's Food and Agriculture Organization (FAO) which outlines the most preferable solutions to address food loss and waste. The ideal solution is prevention and reduction, followed by repurposing and recycling, and lastly, recovery and disposal.

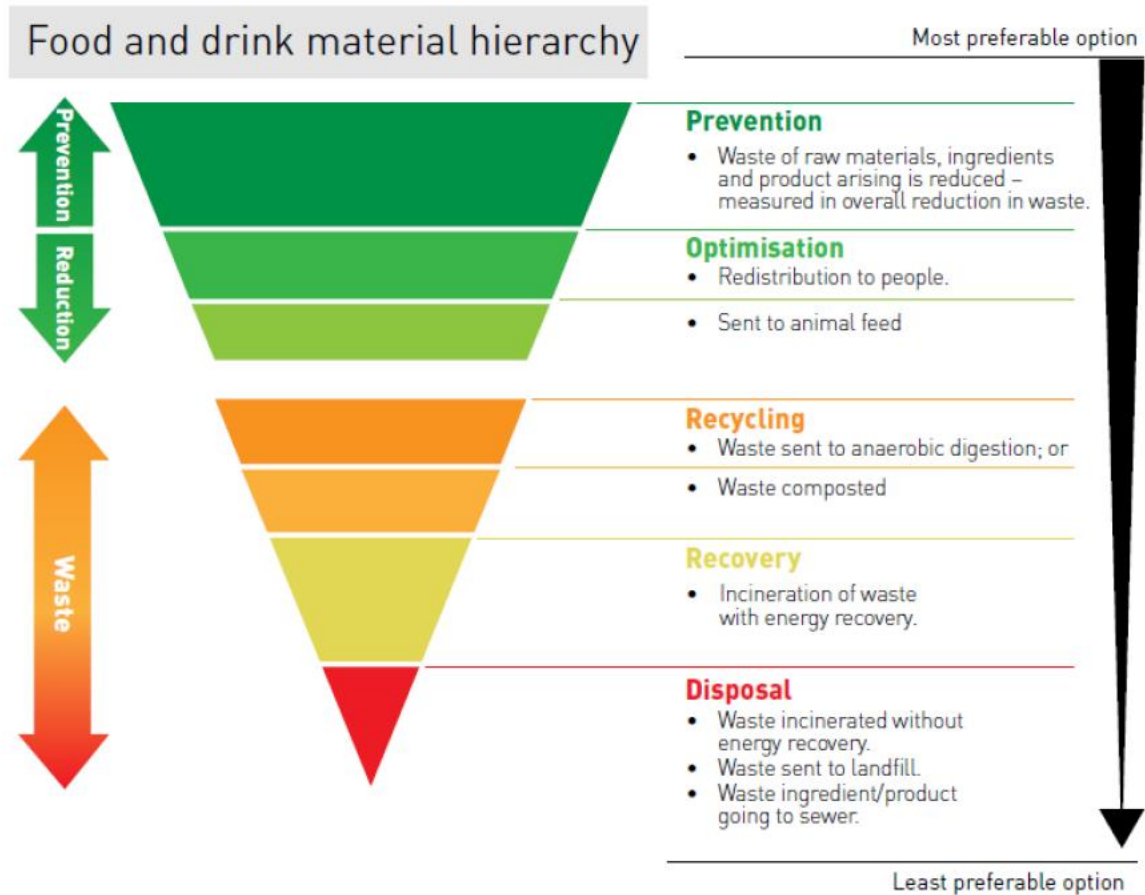


Figure 1: Food waste pyramid<sup>3</sup>

### 3. SCOPE

This FSSC 22000 Guidance document is meant as a guideline for the food industry to provide practical information and guidance on implementing FSSC Additional Requirement 2.5.16 Food Loss and Waste for All Food Chain Categories, excluding Category I.

## 4. FSSC 22000 SCHEME REQUIREMENTS

*Part 2 – Requirements for organizations to be audited against in Version 6*

### 2.5.16 FOOD LOSS AND WASTE (ALL FOOD CHAIN CATEGORIES, EXCLUDING I)

In addition to clause 8 of ISO 22000:2018, the organization shall:

- a) Have a documented policy and objectives detailing the organization's strategy to reduce food loss and waste within their organization and the related supply chain.
- b) Have controls in place to manage products donated to not-for-profit organizations, employees, and other organizations, and ensure that these products are safe to consume.
- c) Manage surplus products or by-products intended as animal feed/food to prevent contamination of these products.
- d) These processes shall comply with the applicable legislation, be kept up to date, and not have a negative impact on food safety.

## 5. GUIDANCE FOR IMPLEMENTATION

### 5.1 GENERAL GUIDANCE

The definition of food loss and waste in accordance with the FSSC 22000 Scheme V6, Appendix 1, is as follows:

- **Food loss** occurs before the food reaches the consumer as a result of issues in the supply chain (production, processing, storage, and distribution phases).
- **Food waste** refers to food that is fit for consumption but consciously discarded at the retail or consumption levels.

In the context of this document, wherever reference is made to food loss and waste or FLW, the organization should only consider food loss, or food waste, or food loss and waste as relevant to their operations and direct supply chain.

In the context of the FSSC 22000 Scheme:

- Food loss and waste only relates to food – it does not include packaging material wastage. Therefore, the weight of packaging material is to be excluded from the measurement of food loss and waste. However, edible packaging is considered to be food.
- Pre-harvest wastage is excluded from the measurement of food loss and waste as farming is not covered in the scope of the FSSC 22000 Scheme.
- Food loss and waste includes both food (including ingredients, additives, drinks, pet food, etc.) intended for consumption (human and animal alike) and associated inedible parts removed from the food supply chain which is not intended for consumption.
- The requirement also includes safe and wholesome food rescued/recovered and supplied to secondary markets to feed people, e.g., donations to charities. This differs from the scope of the food loss and waste inventory report required by the FLW Protocol<sup>2</sup>, which requires that food rescued and donated not be included in the food loss and waste quantity accounted for in the FLW inventory report.

## 5.2 DOCUMENTED POLICY AND OBJECTIVES

In accordance with 2.5.16 (a), the organization shall have a documented policy and objectives detailing the organization's strategy to reduce food loss and waste within its organization and the related supply chain.

### 5.2.1 GUIDANCE FOR ALL ORGANIZATIONS

In order to establish a basic food loss and waste strategy, an organization can implement the following 3-step process<sup>1,4</sup>:

1. Target:

- a) Quantify the food loss and waste currently generated by the organization and the supply chain they have control over in order to establish a baseline/base year quantity.

To do this, the organization should:

- Establish the scope of their food loss and waste by:
  - Identifying all the types of food loss and waste generated in each step in the production process (e.g., procurement, processing, packing, storage, distribution, etc.) as well as the steps in their supply chain that are within their control.
- Establish the time period over which to quantify the current food loss and waste.
- Calculate and quantify the current food loss and waste for each type of food waste the organization generates. The organization determines the quantification unit to be used, e.g., weight in kilograms (kg), volume in liters (L), relevant currency, and environmental impact, e.g., percentage of greenhouse gas emissions.
- Determine the current processes in place to manage the food loss and waste generated by the organization based on a defined methodology.
- Investigate the root causes of current food loss and waste and determine how this can be addressed.

- b) Establish a prevention plan including the organization's food loss and waste objectives:

- Decide which types of food loss and waste generated by the organization will be focus areas, based on 1.a) above, taking into account the type, quantity, and value of the food loss and/or waste.
- Set objectives and targets for these types of food loss and waste:
  - Short-term, e.g., annual/quarterly
  - Long-term, e.g., over 5 or 10 years

The objectives and targets set may be internally established by the organization or based on regulations or industry associations' targets. An organization should take into consideration whether their government or local authority has set standards or targets relating to the reduction of food loss and waste and aim to align with that to the extent possible.

- Define actions to be taken to reduce the food loss and waste per type, including responsibilities for implementing these actions, resources required, timeframes for completion, FSMS updates needed, etc.

The actions implemented should look to:

- i. Prevent food loss and waste from occurring,
- ii. Rescue food for donation,
- iii. Redistribute to other destinations; refer to Figure 1<sup>2</sup>.

Note: The intent is to move waste up the hierarchy. E.g., waste currently sent to a disposal destination should be investigated to

determine whether there are solutions to move this waste up to recovery, recycling, or optimization destinations.

2. Measure:

- a) Define monitoring procedures to measure food loss and waste against the baseline/year at defined regular intervals and to determine the causes of the food loss and waste.
- b) Monitor and measure food loss and waste at defined intervals by using a defined methodology suitable to the organization.
- c) Monitor the current destination of the food loss and waste to move food loss and waste up the food and drink material hierarchy (Figure 1).
- d) Evaluate the results to determine whether the objective and target have been achieved.

3. Act:

- a) Where it has been identified that the target has not been met, the organization needs to investigate and determine the causes for the target not being met and then implement suitable actions to address this.
- b) Where it has been identified that the target has been met, the organization should still evaluate the current quantity of food loss and waste, as well as the destination of the food loss and waste, to determine whether further reductions are possible and whether another feasible destination could have a larger sustainable impact.

In addition to the above-mentioned, in accordance with 2.5.16 (d), the strategy implemented shall comply with the applicable legislation, be kept up to date, and not have a negative impact on food safety.

Documented information is to be available to support targets and objectives established and the resulting measurement and monitoring. The review of the food loss and waste targets and objectives should be considered in the management review process.

Organizations should look at ways to improve efficiencies to reduce the amount of product that needs to be downgraded, e.g., put measures in place to assess the amount of product having to be downgraded or sent to waste and see what target could be set to reduce this.

Where products do not meet quality parameters in line with their finished product specifications, the organization should look for alternative markets in order to prevent the products from being disposed of, thereby reducing food loss and waste.

Organizations should also look to review the established shelf life of their products to establish whether the shelf life is still correct or whether the shelf life of products could be increased whilst still being safe for consumption. This would assist in reducing food loss and waste by not discarding products that are still safe for consumption. Effective stock rotation, e.g., FIFO and FEFO, is also vital in reducing food loss and waste.

Further detailed guidance, based on the FLW Protocol's food loss and waste accounting and reporting standard<sup>2</sup> (FLWARS), is summarized under Appendix A, in line with the figure below.

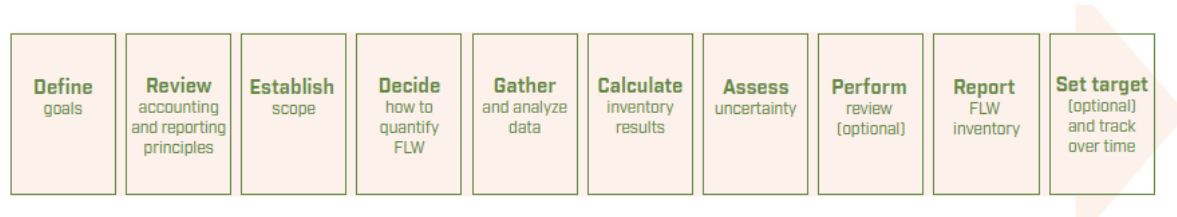


Figure 2: Overview of steps in the food loss and waste accounting and reporting standard<sup>2</sup>

The FLW Protocol's measurement tool is an example of a measurement tool that can be utilized by organizations; other measurement tools are also available. It is up to the organization to decide on an appropriate method and measurement tool that is suitable for their operations.

## 5.2.2 SPECIFIC GUIDANCE FOR ORGANIZATIONS OTHER THAN FOOD/FEED MANUFACTURERS

In addition to 5.2.1 above, the following also applies:

### 5.2.2.1 FOOD CHAIN CATEGORY E ORGANIZATIONS - CATERING AND FOOD SERVICE:

For sub-category E organizations, the strategy implemented by the organization should consider effective inventory management (including correct ordering and stock control), training on recipe management, menu construction to take into account multi-use ingredients (used in more than one dish), taking seasonality into account, effective portion control, etc. Organizations can also look to educate their customers and create awareness of food loss and waste.

### 5.2.2.2 FOOD CHAIN CATEGORY F ORGANIZATIONS - TRADING, RETAIL, WHOLESALE AND E-COMMERCE:

For sub-category FI organizations, Retailers and Wholesalers, the objectives and targets they set should also look to educate their customers and create awareness of food loss and waste to assist in a reduction of food loss and waste at the consumer household level, e.g., via marketing and awareness campaigns.

For sub-category FII organizations, Brokers and Traders, as they do not physically handle any product, the objectives and targets they establish as part of their food loss and waste strategy need to relate to the suppliers in their food supply chain. Sub-category FII organizations should assist their suppliers with implementing food loss and waste strategies within their food supply chain. This can be undertaken when establishing their supplier agreement with their suppliers.

### 5.2.2.3 FOOD CHAIN CATEGORY G ORGANIZATIONS - TRANSPORT AND STORAGE:

For category G organizations, as they do not manufacture any product, the objectives and targets they establish as part of their food loss and waste strategy should relate to the controls they implement to maintain the shelf-life of the product during transport and storage, so as to prevent wastage, as well as to implement effective stock rotation systems taking FEFO (first-expired-first-out) and FIFO (first-in-first-out) principles into account. Organizations should also look to minimize damages resulting in product disposal, by considering moving damaged foodstuffs up the food and drink material hierarchy (Figure 1), where it does not pose a food safety risk.



#### 5.2.2.4 FOOD CHAIN CATEGORY K ORGANIZATIONS – PRODUCTION OF BIO/CHEMICALS:

In relation to additional requirement 2.5.16 on food loss and waste, Category K organizations would still need to show how they meet the requirement for 2.5.16 (a) & (d). The requirements for 2.5.16 (b) and (c) may not be applicable, depending on the operations of the organization.

The organization would need to have a documented policy and objectives detailing the organization's strategy to reduce food loss and waste within their organization and the related supply chain.

In general, where category K organizations have products that do not meet specifications, these out-of-specification products would likely not be wasted but downgraded to other technical grades, thereby preventing wastage. If the organization has certain products that cannot be downgraded, then the organization should investigate to see if there is any other use for the product outside of the industries the organization already works in, to see if it can be used in another manner to prevent it from having to be disposed of. The overall intent of the food loss and waste requirement is to have organizations assess their overall food loss and waste and see whether there are alternative avenues to prevent the wastage of useable material and see whether an alternative destination (as per Figure 1) can be established.

In addition, the organization should look at ways to improve efficiencies to reduce the amount of product that needs to be downgraded, e.g., put measures in place to assess the amount of product having to be downgraded or sent to waste and see what target could be set to reduce this.

### 5.3 MANAGEMENT OF DONATED PRODUCTS

In accordance with 2.5.16 (b), the organization shall have controls in place to manage products donated to not-for-profit organizations, employees, and other organizations; and ensure that these products are safe to consume.

Where an organization has surplus product or products that do not meet quality specifications, and they intend to rescue this product and donate it to not-for-profit organizations such as charities and food banks, or to employees, or other organizations, then they need to ensure that they implement suitable controls to manage these products and ensure that these products are still safe for consumption.

The controls implemented by the organization shall take into account the applicable legislation and shall not have a negative impact on the food safety of the donated products. Some of the controls to be implemented by the organization include maintaining the products under the correct storage conditions and ensuring that the traceability of the products is being maintained. If the product to be rescued and donated is a customer-branded product, then the organization should first obtain agreement from the customer before donating this product.

### 5.4 MANAGEMENT OF SURPLUS PRODUCTS OR BY-PRODUCTS

In accordance with 2.5.16 (c), the organization shall manage surplus products or by-products intended as animal feed/food to prevent contamination of these products.

Surplus products or by-products intended as animal feed/food need to be stored separately from waste to prevent contamination of these products and traceability maintained. In accordance with 2.5.16 (d), the products shall be managed and comply with the applicable legislation.

If the surplus product is a customer-branded product, it shall be managed in accordance with customer requirements.

## 6. GUIDANCE FOR AUDITORS

The following is a non-exhaustive list of questions that an auditor can use to assess the FSSC Additional Requirement 2.5.16:

- Has a policy and objectives, with measurable and time-bound targets, been established for food loss and waste?
- Have the objectives been met, and if not, were suitable actions taken? This would not apply in the first year of establishing the policy and objectives.
- Does the organization donate products, and if so, are there controls in place, including controls to ensure the food safety of these donated products?
- Does the organization produce surplus products or by-products intended as animal feed/food, and if so, are there controls in place to prevent contamination of these products?
- Are legal requirements and food safety taken into consideration when establishing the policy and objectives, including any controls established?

Auditors need to verify that the necessary documented information is available.

## 7. REFERENCES

1. Champions 12.3. SDG Target 12.3 on Food Loss and Waste: 2022 Progress Report. URL: [Champions 12.3](#)
2. FLW Protocol. Food Loss and Waste Accounting and Reporting Standard, V1.0, 2016. URL: [Food Loss and Waste Protocol](#)
3. UNEP, FAO. Prevention and Reduction of Food and Drink Waste in Businesses and Households: Guidance for Governments, Local Authorities, Businesses and Other Organizations. Version 1.0. URL: [UNEP](#)
4. BV. Food Waste Management System - A Holistic Approach to Reduce Food Loss and Waste Whitepaper. June 2022. URL: [Bureau Veritas](#)

## 8. RELATED INDUSTRY INFORMATION

The references below are not an exhaustive list, are for information purposes only, and may not apply to all organizations. The requirements of the Scheme shall be adhered to in all cases.

- Champions 12.3. URL: [Home | Champions 12.3 \(champions123.org\)](https://champions123.org)
- Commission for Environmental Cooperation. URL : [Case Studies on Food Loss and Waste in North America \(cec.org\)](https://cec.org)
- European Union Guidelines on food donation. URL: [EUR-Lex - 52017XC1025\(01\) - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/lexuri/ui.do?uri=CELEX:52017XC1025(01):EN:EUR-Lex)
- European Union Guidelines for the feed use of food no longer intended for human consumption. URL: [EUR-Lex - 52018XC0416\(01\) - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/lexuri/ui.do?uri=CELEX:52018XC0416(01):EN:EUR-Lex)
- European Consumer Food Waste Forum. URL: [European Consumer Food Waste Forum | Knowledge for policy \(europa.eu\)](https://ecfwforum.eu)
- EU Platform on Food Losses and Food Waste. URL: [EU Platform on Food Losses and Food Waste \(europa.eu\)](https://euplatformonfoodlossesandfoodwaste.eu).
- EU Food Loss and Waste Prevention Hub: [European Food Loss and Waste Prevention Hub - Explore the Member States Initiatives \(europa.eu\)](https://eufoodlossandwaste.eu)
- EU Guidance on Best Before and Use By Dates to prevent food waste. URL: [fw lib best before en.pdf \(europa.eu\)](https://europa.eu/food/food-safety/food-waste/best-before)
- EU Farm to Fork Strategy. URL: [Farm to Fork Strategy \(europa.eu\)](https://europa.eu/farm-to-fork)
- EU Food Waste. URL: [Food Waste \(europa.eu\)](https://europa.eu/food/food-waste)
- Interreg Europe. URL: [interregeurope.eu/find-policy-solutions/policy-briefs/food-waste](https://interregeurope.eu/find-policy-solutions/policy-briefs/food-waste)
- ReFED. URL: [Resources and Guides | ReFED](https://refed.eu)
- Stop Food Waste Australia. URL: [Australian Food Pact - To Reduce Food Waste in Australia \(stopfoodwaste.com.au\)](https://stopfoodwaste.com.au)
- The Consumer Goods Forum, Case Study Booklet on Food Waste. URL: [Environmental-Sustainability-Food-Waste-Booklet-2018.pdf \(theconsumergoodsforum.com\)](https://theconsumergoodsforum.com/Environmental-Sustainability-Food-Waste-Booklet-2018.pdf)
- Together Against Food Waste. URL: [Together Against Food Waste \(samentegenvoedselferspillings.nl\)](https://samentegenvoedselferspillings.nl)
- UNEP, FAO. Prevention and reduction of food and drink waste in businesses and household – Guidance for governments, local authorities, businesses and other organizations, Version 1.0. URL: [Prevention and Reduction of Food and Drink Waste in Businesses and Households: Guidance for Governments, Local Authorities, Businesses and Other Organisations. Version 1.0 \(unep.org\)](https://www.unep.org/resources/publication/prevention-and-reduction-of-food-and-drink-waste-in-businesses-and-households-guidance-for-governments-local-authorities-businesses-and-other-organisations-version-1.0)
- UN Global Compact. No time to lose (Food). URL: [Report: Food Loss on the Table - UN Global Compact Network Netherlands \(gcnetherlands.nl\)](https://gcnetherlands.nl)
- WRAP. Food Waste Reduction Roadmap. URL: [Food Waste Reduction Roadmap | WRAP](https://wrap.org.uk/18000/food-waste-reduction-roadmap)
- WRAP. Guidance for Food Retail operations. URL: [Food Retail operations | WRAP](https://wrap.org.uk/18000/food-retail-operations)
- WRAP. Guidance for the Dairy Sector. URL: [Dairy processing | WRAP](https://wrap.org.uk/18000/dairy-processing)
- WRAP. Guidance for the Meat Sector. URL: [Meat processing | WRAP](https://wrap.org.uk/18000/meat-processing)
- WRAP. Guidance for the Fresh Produce Sector. URL: [Fresh produce | WRAP](https://wrap.org.uk/18000/fresh-produce)
- WRI. URL: [Reducing Food Loss and Waste: Setting a Global Action Agenda](https://www.wri.org/publication/2012/01/reducing-food-loss-and-waste-setting-a-global-action-agenda)
- WRI. URL: [Reducing Food Loss and Waste: Ten Interventions to Scale Impact](https://www.wri.org/publication/2012/01/reducing-food-loss-and-waste-ten-interventions-to-scale-impact)
- WUR. URL: [The effect of date marking terminology of products with a long shelf life on food discarding behaviour of consumers](https://wur.nl/en/food-loss-waste-research/the-effect-of-date-marking-terminology-of-products-with-a-long-shelf-life-on-food-discarding-behaviour-of-consumers)
- WUR. URL: [Date marking related visual cues can reduce food waste - WUR](https://wur.nl/en/food-loss-waste-research/date-marking-related-visual-cues-can-reduce-food-waste)
- WUR. URL: [Wageningen researchers take a journey into the world's food systems in search of losses, waste and ways to solve them - WUR](https://wur.nl/en/food-loss-waste-research/wageningen-researchers-take-a-journey-into-the-worlds-food-systems-in-search-of-losses-waste-and-ways-to-solve-them)
- WWF-US. URL: [No Food Left Behind | Pages | WWF \(worldwildlife.org\)](https://www.worldwildlife.org/pages/no-food-left-behind)

## APPENDIX A

The Food Loss & Waste Protocol (FLW Protocol) has developed the Food Loss and Waste Accounting and Reporting Standard for quantifying food and/or associated inedible parts removed from the food supply chain. The below is a condensed summary of this standard, to assist organizations in quantifying and reporting on their food loss and waste<sup>2</sup>.

STEP	GUIDANCE/ADDITIONAL DETAIL	REFERENCE IN FLWARS <sup>2</sup>
<p><b>Define goals</b></p>	<p>Establish the rationale or goal of quantifying Food Loss and Waste for your organization.</p> <ul style="list-style-type: none"> <li>• Goals may relate to food security, economic performance, environmental impact, or a combination thereof.</li> <li>• Mandatory goal: mandatory policy or regulation established by a government or another authority.</li> <li>• Voluntary goal: Organization adopts FLW reduction goals as part of a voluntary commitment either undertaken alone or as part of a consortium e.g., the United Nations has set a voluntary target as part of the SDGs. Likewise, an organization may also set its own corporate FLW reduction goal and apply it to themselves as well as their supply chain. Industry associations may also set goals for their members. The CGF set a target of halving food waste with its retail and manufacturing operations members by 2025, in addition to contributing to the UN SDGs by 2030.</li> </ul>	<p>Part I: Overview</p> <p>Section 3 – Goals of quantifying food loss and waste</p>
<p><b>Review accounting and reporting principles</b></p>	<p>Principles for account and reporting include relevance, completeness, consistency, transparency and accuracy.</p>	<p>Part I: Overview</p> <p>Section 5 – Principles of FLW accounting and reporting</p>

STEP	GUIDANCE/ADDITIONAL DETAIL	REFERENCE IN FLWARS <sup>2</sup>
<b>Establish scope</b>	<p>This may either be established by the organization, or by an external party (industry association, government, or intergovernmental body, etc.)</p> <ul style="list-style-type: none"> <li>• <b>Timeframe:</b> the period of time for which the inventory results are being reported.</li> <li>• <b>Material type(s):</b> the materials that are included in the inventory (food only, inedible parts only, or both). Packaging materials are excluded.</li> <li>• <b>Destination(s):</b> where FLW goes when removed from the food supply chain. Refer to Figure 1 and Table 1.</li> <li>• <b>Boundary:</b> the food category (the types of food reported on), lifecycle stage (the stages in the food supply chain being reported on), geography (geographic borders being reported on), and organization (organizational units being reported on).</li> </ul> <p>Refer to table 1 and table 2 on the following pages.</p>	Part II: Main requirements, Section 6 – Establishing the scope of a food loss and waste inventory

**TABLE 1: DESTINATION TYPES<sup>2</sup>**

DESTINATION	DEFINITION
<b>Animal feed</b>	Diverting material from the food supply chain (directly or after processing) to animals. This excludes crops intentionally grown for bioenergy, animal feed, seed, or industrial use.
<b>Bio-based materials/biochemical processing</b>	Converting material into industrial products. Examples include creating fibers for packaging material; creating bioplastics (e.g., polylactic acid); making “traditional” materials such as leather or feathers (e.g., for pillows); and rendering fat, oil, or grease into a raw material to make products such as soaps, biodiesel, or cosmetics. “Biochemical processing” does not refer to anaerobic digestion or production of bioethanol through fermentation.
<b>Co-digestion/anaerobic digestion</b>	Breaking down material via bacteria in the absence of oxygen. This process generates biogas and nutrient-rich matter. Co-digestion refers to the simultaneous anaerobic digestion of FLW and other organic material in one digester. This destination includes fermentation (converting carbohydrates, such as glucose, fructose, and sucrose, via microbes, into alcohols in the absence of oxygen to create products such as biofuels).

DESTINATION	DEFINITION
<b>Composting/aerobic processes</b>	Breaking down material via bacteria in oxygen-rich environments. Composting refers to the production of organic material (via aerobic processes) that can be used as a soil amendment.
<b>Controlled combustion</b>	Sending material to a facility that is specifically designed for combustion in a controlled manner, which may include some form of energy recovery (this may also be referred to as incineration).
<b>Land application</b>	Spreading, spraying, injecting, or incorporating organic material onto or below the surface of the land to enhance soil quality.
<b>Landfill</b>	Sending material to an area of land or an excavated site that is specifically designed and built to receive wastes.
<b>Not harvested/plowed-in</b>	Leaving crops that were ready for harvest in the field or tilling them into the soil.
<b>Refuse/discards/litter</b>	Abandoning material on land or disposing of it in the sea. This includes open dumps (i.e., uncovered, unlined), open burn (i.e., not in a controlled facility), the portion of harvested crops eaten by pests, and fish discards (the portion of total catch that is thrown away or slipped).
<b>Sewer/wastewater treatment</b>	Sending material down the sewer (with or without prior treatment), including that which may go to a facility designed to treat wastewater.
<b>Other</b>	Sending material to a destination that is different from the 10 listed above. This destination should be described.

TABLE 2: EXAMPLES OF GOALS AND RELATED INVENTORY SCOPE<sup>2</sup>

ORGANIZATION TYPE	GOAL TYPE	EXAMPLE GOAL	MATERIAL TYPE	DESTINATION	TIME-FRAME	BOUNDARY
<b>Retailer</b>	Economic	Reduce food loss and waste going to landfill by 50% by 2030 in order to reduce tipping fee costs.	Food and associated inedible parts	Landfill	Annual	<ul style="list-style-type: none"> <li>Food category: All food categories</li> <li>Geography: All countries in which retailer operates</li> <li>Lifecycle stage: Retail (ISIC 4721 and 4722)</li> <li>Organization: All 500 stores managed by the retailer</li> </ul>
<b>Food manufacturer</b>	Environmental	Work with suppliers in three provinces to reduce on-farm food loss and waste of potatoes by 30%.	Food and associated inedible parts	All	Annual (quantified during harvest season and scaled up)	<ul style="list-style-type: none"> <li>Food category: Potatoes</li> <li>Geography: Selected provinces</li> <li>Lifecycle stage: Growing of vegetables and melons, roots and tubers (ISIC 0113)</li> <li>Organization: All 20 farms supplying food manufacturer through dedicated purchasing contracts</li> </ul>
<b>Soft drink manufacturer</b>	Economic	Reduce quantities of product lost in wash water during batch change-over by 10% by using new technology.	Food	Sewer/wastewater treatment	Monthly (to rapidly assess the effectiveness of the new technology)	<ul style="list-style-type: none"> <li>Food category: soft drinks</li> <li>Geography: All locations of processing plants</li> <li>Lifecycle stage: All economic sectors producing FLW (household, retail, catering/food service, manufacturing)</li> <li>Organization: All 100 manufacturing plants</li> </ul>

STEP	GUIDANCE/ADDITIONAL DETAIL	REFERENCE IN FLWARS <sup>2</sup>
<p><b>Decide how to quantify</b></p>	<p>Establish quantification method:</p> <ul style="list-style-type: none"> <li>a) Assess existing data to determine if the data needed is already available, reliable, and for the related scope. You should identify the source and scope of the available data.</li> <li>b) If no existing data is available or available data is not adequate, you should undertake a new quantification. Describe the quantification method(s) to be used, and whether it will be a measurement or an approximation, or inference by calculation.</li> <li>c) The method selected should take into consideration:                             <ul style="list-style-type: none"> <li>• Level of accuracy desired</li> <li>• Degree of access to the food loss and waste</li> <li>• Resources available</li> <li>• Practical aspects</li> <li>• Goals of quantification beyond the determination of the amount of food loss and waste</li> </ul> </li> </ul>	<p>Part II: Main Requirements, Section 7 – Deciding how to quantify food loss and waste</p>



**TABLE 3: METHODS OF QUANTIFYING FOOD LOSS AND WASTE USING MEASUREMENT OR APPROXIMATION<sup>2</sup>**

MEASUREMENT OR APPROXIMATION	METHODS	DEFINITION
	<b>Direct weighing</b>	Using a measuring device to determine the weight of FLW.
	<b>Counting</b>	Assessing the number of items that make up FLW and using the result to determine the weight; includes using scanner data and “visual scales”. Visual scales are practical pictorial aids used in agricultural contexts, typically to help assess the different levels of damage by pests to stored crops.
	<b>Assessing volume</b>	Assessing the physical space occupied by FLW and using the result to determine the weight.
	<b>Waste composition analysis</b>	Physically separating FLW from other material to determine its weight and composition.
	<b>Records</b>	Using individual pieces of data that have been written down or saved, and that are often routinely collected for reasons other than quantifying FLW (e.g., waste transfer receipts or warehouse record books).
	<b>Diaries</b>	Maintaining a daily log of FLW and other information.
	<b>Surveys</b>	Gathering data on FLW quantities or other information (e.g., attitudes, beliefs, self-reported behaviors) from a large number of individuals or entities through a set of structured questions.

**TABLE 4: METHODS OF QUANTIFYING FOOD LOSS AND WASTE USING INFERENCE BY CALCULATION<sup>2</sup>**

INFERENCE BY CALCULATION	METHODS	DEFINITION
	<b>Mass balance</b>	Measuring inputs (e.g., ingredients at a factory site, grain going into a silo) and outputs (e.g., products made, grain shipped to market) alongside changes in levels of stock and changes to the weight of food during processing.
	<b>Modeling</b>	Using a mathematical approach based on the interaction of multiple factors that influence the generation of FLW.
	<b>Proxy data</b>	Using FLW data that are outside the scope of an entity’s FLW inventory (e.g., older data, FLW data from another country or company) to infer quantities of FLW within the scope of the entity’s inventory.

STEP	GUIDANCE/ADDITIONAL DETAIL	REFERENCE IN FLWARS <sup>2</sup>
<p><b>Gather and analyze data, and calculate inventory results</b></p>	<ul style="list-style-type: none"> <li>• An organization should gather and analyze the data, as well as establish the causes of FLW, to establish effective food loss and waste reduction strategies.</li> <li>• Considerations should be given to whether the organization will measure all the food loss and waste that occurs or whether the organization will undertake sampling and scale up the data.</li> <li>• In relation to sampling and scale-up, an organization may decide to collect data on the amount of food loss and waste from only a sample set. Thereafter, the data may be scaled up to generate an estimate of the total food loss and waste.</li> <li>• When utilizing sampling and scaling up, an organization should distinguish between the period of time when the sample data was collected and the timeframe for which the inventory results are being reported, e.g.,                         <ul style="list-style-type: none"> <li>○ Sampled six - one-week periods with specific dates, and then used this sample data and scaled it up to represent 12 months of data. In this case, the reported inventory timeframe would be 12 months.</li> </ul> </li> <li>• Factors should be considered when using the sampling and scale-up method, including accounting for the differences in food loss and waste generated over a period of time, e.g., different seasons in the year.</li> <li>• If an organization quantifies the material types separately, then it should determine the approach used to separate the materials, the specific conversion factors used, and the source of these factors.</li> </ul>	<p>Part III: Other Requirements and Recommendations Section 8 – Collecting, calculating, and analyzing data; Section 10 – Coordinating the analysis of multiple food loss and waste inventories; Appendix A, and Appendix B</p>

STEP	GUIDANCE/ADDITIONAL DETAIL	REFERENCE IN FLWARS <sup>2</sup>
	<div data-bbox="472 248 898 678" style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;"><b>HIGH</b></p> <ol style="list-style-type: none"> <li>1. Separating material physically</li> <li>2. Using conversion factors for individual items</li> <li>3. Applying conversion factors to undifferentiated FLW</li> </ol> <p style="text-align: center;"><b>LOW</b></p> </div> <p>Figure 3: Approaches for quantifying material type separately<sup>2</sup>.                      Weight of packaging should also be excluded from the food loss and waste calculation.</p> <div data-bbox="472 678 898 1204" style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;"><b>HIGH</b></p> <ol style="list-style-type: none"> <li>1. Remove packaging before quantification</li> <li>2. Subtract estimated packaging weight from each item</li> <li>3. Subtract estimated packaging weight from waste stream or existing data</li> </ol> <p style="text-align: center;"><b>LOW</b></p> </div> <p>Figure 4: Approaches for excluding the weight of packaging from food loss and waste<sup>2</sup>.                      An organization should also consider whether they need to analysis and coordinate food loss and waste inventory results across several inventories.</p>	

STEP	GUIDANCE/ADDITIONAL DETAIL	REFERENCE IN FLWARS <sup>2</sup>
<b>Determine causes of food loss and waste</b>	Organizations should also determine the causes of food loss and waste, and the drivers behind it. Identifying the causes and determining the drivers can assist organizations in reducing food loss and waste.	

**TABLE 5: CAUSES AND DRIVERS OF FOOD LOSS AND WASTE BY STAGE IN THE FOOD SUPPLY CHAIN<sup>2</sup>**

STAGE	CAUSES	DRIVERS
<b>PRODUCTION</b>	<ul style="list-style-type: none"> <li>• Spillage</li> <li>• Cosmetic damage</li> <li>• Damage from pests or animals</li> <li>• Not harvested</li> </ul>	<ul style="list-style-type: none"> <li>• Premature or delayed harvesting</li> <li>• Poor harvesting technique</li> <li>• Lack of access to market or processing facilities</li> <li>• Poor access to pesticides, inadequate fencing</li> <li>• Price volatility resulting in commodity price too low to cover harvest cost</li> <li>• Product specifications (e.g., size, cosmetic standards)</li> </ul>
<b>HANDLING AND STORAGE</b>	<ul style="list-style-type: none"> <li>• Spillage</li> <li>• Cosmetic damage</li> <li>• Damage from pests or animals</li> <li>• Rejected from market</li> <li>• Unable to reach market</li> <li>• Unable to sell due to quality or size</li> <li>• Spoilage</li> </ul>	<ul style="list-style-type: none"> <li>• Improper drying of grains leading to fungal infection</li> <li>• Inappropriate choice of storage containers</li> <li>• Lack of storage facilities, including lack of cold storage</li> <li>• Rough handling of products during loading and unloading</li> <li>• Poor conditions during transport</li> <li>• Delays at docks or national borders for inspection</li> </ul>
<b>PROCESSING</b>	<ul style="list-style-type: none"> <li>• Spillage</li> <li>• Trimming during processing</li> <li>• Rejected from market</li> </ul>	<ul style="list-style-type: none"> <li>• Contamination on the processing line</li> <li>• Errors in processing, resulting in defects</li> <li>• Improper packaging</li> <li>• Product specifications (e.g., size, cosmetic standards)</li> </ul>

STAGE	CAUSES	DRIVERS
<b>DISTRIBUTION AND MARKET</b>	<ul style="list-style-type: none"> <li>• Product recall</li> <li>• Cooked improperly</li> <li>• Food cooked but not eaten</li> <li>• Cosmetic damage</li> <li>• Spoilage</li> <li>• Past use/sell-by date</li> </ul>	<ul style="list-style-type: none"> <li>• Regular replenishment of stocks, leading consumers to select most recent products</li> <li>• Food prepared but not served</li> <li>• Portion/package sizes too large</li> <li>• Failure in demand forecasting</li> <li>• Lack of system for food donation</li> </ul>
<b>CONSUMPTION</b>	<ul style="list-style-type: none"> <li>• Product recall</li> <li>• Cooked improperly</li> <li>• Food cooked but not eaten</li> <li>• Cosmetic damage</li> <li>• Spoilage</li> <li>• Past use/sell-by date</li> </ul>	<ul style="list-style-type: none"> <li>• Large pack sizes containing more than the consumer uses</li> <li>• Inadequate planning before shopping</li> <li>• Confusion over date labels on packaging</li> <li>• Lack of cooking knowledge</li> <li>• Inadequate storage</li> <li>• Sub-optimal storage of food</li> </ul>
STEP	GUIDANCE/ADDITIONAL DETAIL	REFERENCE IN FLWARS <sup>2</sup>
<b>Assess uncertainty</b>	Organizations should assess and report on the degree of uncertainty in respect of the food loss and waste calculated. The degree of uncertainty describes the likely difference between the estimated food loss and waste quantified and the actual true amount of food loss and waste.	Part III: Other Requirements and Recommendations, Section 9 – Assessing uncertainty
<b>Perform review to verify the accuracy and consistency of the results</b>	An organization should perform a review to provide assurance of the results prior to reporting on food loss and waste publicly. This may include undertaking a peer review, establishing verification procedures, undertaking validation, implementing quality assurance and quality control procedures, and conducting an audit. This review may be undertaken internally, or externally by competent third parties. The assurers should be independent of the food loss and waste inventory and reporting process and have no conflicts of interest.	Part III: Other Requirements and Recommendations, Section 12 – Review and Assurance

STEP	GUIDANCE/ADDITIONAL DETAIL	REFERENCE IN FLWARS <sup>2</sup>
<b>Report FLW inventory</b>	Table 5 describes the items to be included in the food loss and waste inventory report.	Part III: Other Requirements and Recommendations, Section 13 – Reporting

**TABLE 6: SUMMARY OF ITEMS TO BE INCLUDED IN THE FLW INVENTORY REPORT<sup>2</sup>**

REPORTING SECTION	ITEMS TO BE INCLUDED
<b>General Information</b>	<ul style="list-style-type: none"> <li>• Name of entity about which information is being reported</li> <li>• Contact information</li> <li>• The unit of quantification (expressed as weight)</li> <li>• Date inventory prepared</li> <li>• For subsequent inventories, a link to previous inventory reports and description of any methodological changes.</li> </ul>
<b>Scope</b>	<ul style="list-style-type: none"> <li>• Timeframe (including start and end date)</li> <li>• Material type (food, associated inedible parts, or both)                             <ul style="list-style-type: none"> <li>○ If food or associated inedible parts removed from the food supply chain are accounted for separately:                                     <ul style="list-style-type: none"> <li>▪ Sources or frameworks used to categorize a material as food or as inedible parts (including assumptions used to define whether or not material was “intended” for human consumption)</li> <li>▪ Approach used to calculate the separate amounts and, if applicable, all conversion factors used and their sources</li> </ul> </li> </ul> </li> <li>• Destination(s) and path(s) (paths only required if destination is unknown)</li> <li>• Boundary, namely food category(ies), lifecycle stage(s), geography, organization (including source of classification used)</li> </ul> <p>Confirmation of the following:</p> <ul style="list-style-type: none"> <li>• Exclusion of packaging and any other non-FLW material (and its weight);</li> <li>• Reported weight of FLW reflecting the state in which it was generated, that is, before water was added or before the intrinsic water weight of FLW was reduced;</li> <li>• Exclusion of pre-harvest losses.</li> </ul>

REPORTING SECTION	ITEMS TO BE INCLUDED
	Describe approaches used if calculations were needed to separate the weight of FLW from non-FLW materials, or to estimate the original weight of FLW.
<b>Inventory Results</b>	Total amount of production (in a defined quantification unit) Total amount of FLW (in a defined quantification unit) The amount broken down by: <ul style="list-style-type: none"> <li>• Material type (total of “food and associated inedible parts,” or separately by material type)</li> <li>• Destination (if known) or total FLW by path if destination unknown.</li> </ul>
<b>Deciding how to quantify FLW</b>	Describe the quantification method(s) used. If existing studies or data are used, identify the source and scope.
<b>Data collection, calculation, and analysis</b>	If sampling and scaling of data are undertaken, describe the approach and calculations used as well as the period of time over which sample data was collected (including start and end dates).
<b>Assessing uncertainty</b>	Provide a qualitative description and/or quantitative assessment of the uncertainty around FLW inventory results.
<b>If assurance is undertaken</b>	Create an assurance statement including: <ul style="list-style-type: none"> <li>• Whether the assurance was first or third party</li> <li>• The assurance opinion</li> <li>• A summary of the assurance process</li> <li>• The relevant competencies of the assurance providers</li> <li>• An explanation of any potential conflicts of interest</li> </ul>

REPORTING SECTION	ITEMS TO BE INCLUDED	
<p><b>If the amount of FLW is tracked over time and a reduction target set</b></p>	<ul style="list-style-type: none"> <li>• Base year</li> <li>• Scope of the target (where relevant, include reduction target and completion date) and whether all or only some of the FLW inventory results will be tracked over time. If only some of the inventory results are being tracked, explain why.</li> <li>• Recalculation of the base FLW inventory when significant changes in the quantification method or assumptions occur.</li> </ul>	
STEP	GUIDANCE/ADDITIONAL DETAIL	REFERENCE IN FLWARS <sup>2</sup>
<p><b>Set target and track over time</b></p>	<p>An organization should select a base year, monitor performance, and make adjustments to the base year calculation as needed.</p> <ul style="list-style-type: none"> <li>• Now that the organization has determined their food loss and waste inventory, an organization can set a reduction target (objective) for food loss and waste. In order to set this target, the organization should:                             <ul style="list-style-type: none"> <li>○ Select a base year. The amount of food loss and waste generated in the base year can be compared with the amount generated at the end of the target period to determine whether the target has been achieved or not.</li> <li>○ Identify the scope of the target (preferably aligned with the scope of the inventory).</li> <li>○ Choose a target. When deciding on a target the following should be considered:                                     <ul style="list-style-type: none"> <li>▪ Target type: absolute target (specific amount e.g., reduce FLW by 15 000 tons from 2024 to 2030) vs relative targets (comparison with another metric e.g., a national government sets a target of reducing FLW by 50 % per capita from 2023 levels by 2030).</li> <li>▪ Target completion date: The date should be expressed in the same unit of time as was used to set the base year e.g., 12-month period. An organization should have both short term and long-term targets.</li> <li>▪ Target level: Either set internally or by an external party such as National Government or industry association.</li> </ul> </li> <li>○ Monitoring performance against targets: An organization should develop a FLW monitoring plan. The following should be taken into consideration:</li> </ul> </li> </ul>	<p>Part III: Other Requirements and Recommendations, Section 14 – Setting targets and tracking changes over time</p>



STEP	GUIDANCE/ADDITIONAL DETAIL	REFERENCE IN FLWARS <sup>2</sup>
	<ul style="list-style-type: none"> <li>▪ Quantification frequency: Minimum at the start and end of the target period.</li> <li>▪ Ensuring consistency of scope and reducing uncertainty by choosing a quantification method that provides a high degree of accuracy, using a robust sampling approach to minimize uncertainties.</li> <li>▪ Ensuring consistency of the quantification method.</li> <li>○ Recalculating base year food loss and waste when significant changes occur such as structural changes to the organization e.g., mergers; changes to the scope of the inventory; changes in calculation methodologies, significant errors identified; changes in boundaries; and changes in conversion factors. An organization can also establish their most recent years results as their base year if it is not in conflict with their reduction goals or targets.</li> </ul>	
<p><b>Quantifying and reporting the weight of food rescued<sup>2</sup></b></p> <p>Although the Food Loss and Waste Accounting and Reporting Standard focuses on material no longer in the food supply chain, and therefore food rescued or transferred from one part of the food supply chain to another is outside the scope of this Standard, the Standard still includes guidelines for quantifying and reporting the weight of food rescued. Refer to Appendix E of the Food Loss and Waste Accounting and Reporting Standard for further guidance<sup>2</sup>.</p>		