



Food
Loss + Waste
PROTOCOL

VERSION 1.0

Food Loss and Waste Accounting and Reporting Standard

EXECUTIVE SUMMARY



ABOUT THIS DOCUMENT

This document summarizes the important features of the *Food Loss and Waste Accounting and Reporting Standard* (or *FLW Standard*) including the rationale behind it, the steps that should be followed when undertaking an FLW inventory, and the requirements that must be met for an FLW inventory to be in conformance with the standard.

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Purpose and Vision of the *FLW Standard*

The *Food Loss and Waste Accounting and Reporting Standard* (or *FLW Standard*) is a global standard that provides requirements and guidance for quantifying and reporting on the weight of food and/or associated inedible parts removed from the food supply chain—commonly referred to as “food loss and waste” (FLW). Using the standard enables countries, cities, companies, and other entities to develop inventories of how much FLW is generated and where it goes. These inventories can underpin, inform, and focus strategies for minimizing FLW. Minimizing FLW can provide economic benefits, enhance food security, improve natural resource use efficiency, and reduce environmental impacts.

The purpose of the *FLW Standard* is to facilitate the quantification of FLW (what to measure and how to measure it) and encourage consistency and transparency of the reported data. The standard enables the consistent quantification of baselines and tracking of progress toward Target 12.3¹ of the United Nations Sustainable Development Goals as well as other targets.

The standard is designed to be practical so that entities of all kinds can develop an FLW inventory based on their particular quantification goals. Using the terminology and requirements provided by the standard ensures international consistency, enables comprehensiveness, and supports transparent disclosure of FLW inventories both within and among entities. Quantifying FLW is an important foundation for reduction efforts that can deliver a diverse array of benefits—from reducing costs associated with over-purchase and disposal, to avoiding greenhouse gas emissions, or supporting efforts to eliminate hunger. Entities that prepare inventories in conformance with the *FLW Standard* will be better informed about how much FLW is generated and where it ends up, and therefore better equipped to take action.

The Need for an Accounting and Reporting Standard

A significant share of food grown for human consumption is never eaten. The Food and Agriculture Organization of the United Nations (FAO) estimates that a third, by weight, of all food produced in the world was lost or wasted in 2009.²

This level of inefficiency has significant economic, social, and environmental impacts. For example, it results in approximately US\$940 billion per year in economic losses, according to FAO estimates.³ It exacerbates food insecurity. And the amount of food lost or wasted translates into about a quarter of all water used by agriculture,⁴ requires cropland equivalent to an area the size of China,⁵ and is responsible for an estimated 8 percent of global greenhouse gas emissions.⁶

Many countries, cities, companies, and other entities currently lack sufficient insight into how much, why, and where food and/or associated inedible parts are removed from the food supply chain. This makes it difficult to develop strategies and prioritize actions to prevent FLW, and to identify the most productive use of the FLW that does arise. In short, it is challenging to manage what you do not measure. Moreover, what’s considered “food loss and waste” varies widely and, without a consistent set of definitions or an accounting and reporting framework, it is difficult to compare data within or among entities over time and draw useful conclusions.

This standard addresses these challenges by providing accounting and reporting requirements that can be used consistently by entities around the world. It also includes universally applicable definitions for describing the components of “food loss and waste” included in an inventory.

How the Standard Can be Used

The standard is voluntary and designed for users of all types and sizes, across all economic sectors, and in any country. The term “entity” is used to denote any party that might be interested in developing an FLW inventory. Entities may include intergovernmental agencies, governments (e.g., of nations, states, cities), industry associations, companies, and agricultural producers, among others.

Given this diverse audience, why and how an entity uses the *FLW Standard* will vary. Before developing an FLW inventory, an entity should clearly articulate why it wants to quantify FLW. Its rationale may focus on preventing FLW from occurring in the first place as well as diverting it to better uses where value can be created or recovered. Once an entity chooses to quantify FLW, the standard may be used for various purposes, including to:

- ▶ produce an FLW inventory to inform an entity’s own internal decision-making;
- ▶ report on results of an FLW inventory to comply with a government, industry association, or other third-party FLW-reduction effort; and/or
- ▶ inform development of an FLW policy, initiative, or program that customizes its own guidance built on the *FLW Standard*.

The standard is designed to reflect practical data and resource constraints, as well as the multiple possible reasons for quantifying FLW. As such, while the standard is firm on the definitions for describing the scope of an FLW inventory and the requirements for accounting and reporting results, it is flexible in allowing users to choose which particular scope is most appropriate for their FLW inventory. For example, users choose whether to quantify both food and associated inedible parts removed from the food supply chain, only food, or only associated inedible parts (see Box 1). The choice they make is a function of their goals for quantifying FLW.

Box 1 | Defining Food and Inedible Parts

Food:^a Any substance—whether processed, semi-processed, or raw—that is intended for human consumption. “Food” includes drink, and any substance that has been used in the manufacture, preparation, or treatment of food. “Food” also includes material that has spoiled and is therefore no longer fit for human consumption. It does not include cosmetics, tobacco, or substances used only as drugs. It does not include processing agents used along the food supply chain, for example, water to clean or cook raw materials in factories or at home.

Inedible parts: Components associated with a food that, in a particular food supply chain, are not intended to be consumed by humans. Examples of inedible parts associated with food could include bones, rinds, and pits/stones. “Inedible parts” do not include packaging. What is considered inedible varies among users (e.g., chicken feet are consumed in some food supply chains but not others), changes over time, and is influenced by a range of variables including culture, socio-economic factors, availability, price, technological advances, international trade, and geography.

^aAdapted from *Codex Alimentarius Commission, Procedural Manual*, 2013.

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Important Features of the *FLW Standard*

The design of the *FLW Standard* is characterized by three important features, which reflect the guiding principles underpinning its development. The standard allows for modular definitions, it allows for the use of diverse quantification methods, and it is expected to evolve over time.

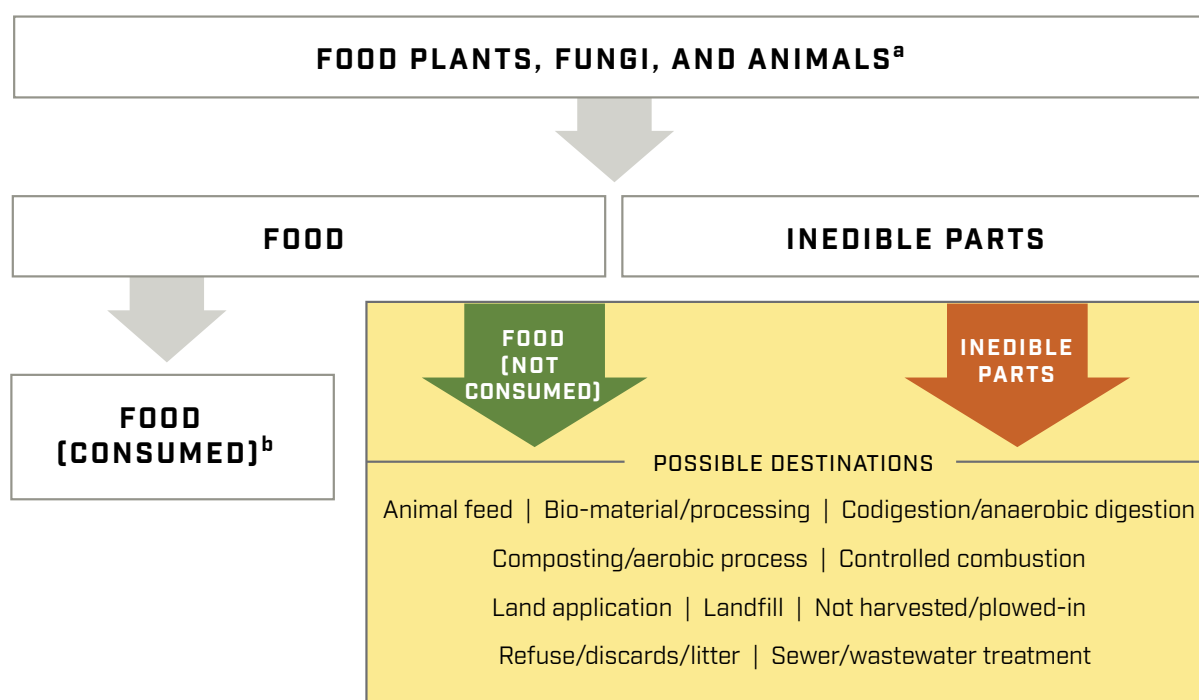
1. MODULAR DEFINITIONS OF FLW

The *FLW Standard* is designed to allow for the fact that different organizations will have different reasons for quantifying FLW. These different goals lead to (or government regulations may even explicitly state) different definitions of what constitutes FLW. The *FLW Standard*, therefore, defines the possible components of FLW in terms of

the possible material types (i.e., food and/or associated inedible parts) and destinations (where material removed from the food supply chain is directed—see Figure 1). It allows an entity to select which combination of material types and destinations it considers to be “food loss and waste,” in accordance with the entity’s stated goals.

For example, an entity that seeks to meet targets aimed at improving food security may define FLW only in terms of the food (not the associated inedible parts) that leaves a particular food supply chain, regardless of the ultimate destination. Another entity that seeks to meet targets aimed at reducing greenhouse gas emissions from waste management operations by limiting the amount of FLW that goes to landfills may define FLW as both food and associated inedible parts, but only one destination would be relevant—in this example, landfill.

Figure 1 | Material Types and Possible Destinations Under the *FLW Standard*



^a Intended for human consumption (i.e., excludes crops intentionally grown for bioenergy, animal feed, seed, or industrial use)

^b At some point in the food supply chain (including surplus food redistributed to people and consumed)

Notes: The green (left) and red (right) arrows represent the two possible material types in an FLW inventory. These material types go to one or more possible destinations (listed within the yellow shaded box) once they are removed from the food supply chain. The *FLW Standard* provides accounting and reporting requirements and guidance for everything within the yellow shaded box (i.e., everything removed from the food supply chain).

Source: Adapted from FAO (2014). *Definitional Framework of Food Loss*. Working paper of the Global Initiative on Food Loss and Waste Reduction. Rome, Italy: FAO.

The modular approach of the *FLW Standard*, outlined above, allows for this flexibility. That is, an entity may choose whether it quantifies both food and associated inedible parts removed from the food supply chain, only food, or only associated inedible parts, as well as which destinations will be included within its scope. The *FLW Standard* thus provides globally applicable definitions of possible FLW components, while the entity itself defines which of these components are to be included in its FLW inventory, depending on its goals and operating context (e.g., requirements of voluntary or mandatory FLW reduction targets or programs).

2. DIVERSE QUANTIFICATION OPTIONS

In many cases, an entity will face a choice regarding how to quantify FLW. Often, the options present a trade-off between accuracy and completeness on the one hand, and the cost of conducting the quantification on the other. The *FLW Standard* allows for a range of methods, with varying levels of accuracy and completeness, to meet the needs of diverse entities with varying resources (e.g., technical, financial) and data availability, rather than prescribing a single quantification method. The standard provides guidance about which methodological options are likely to result in FLW inventories with a higher degree of accuracy. Some entities will choose options

that yield more accurate data (for example, to quantify and report base year FLW and progress toward reducing FLW over time). Others will opt for methods that simply provide a general understanding of how much FLW is generated. To ensure transparency, the *FLW Standard* requires entities to report the quantification method used and describe the level of uncertainty.

A lack of “perfect” data or capacity to utilize the most advanced quantification methods should not preclude an entity from starting the process of improving understanding of its FLW and taking action. A simple spreadsheet (FLW Quantification Method Ranking Tool at www.flwprotocol.org) is available to help users consider the different quantification methods and guide decisions, based on important criteria such as desired level of accuracy and access to the physical FLW being quantified.

3. EVOLVING DESIGN

This standard is the first output of the FLW Protocol, a global multi-stakeholder partnership (see Box 2). The *FLW Standard* was developed via a multi-stakeholder process during 2014 and 2015. It is “Version 1.0” because it will continue to improve over time as quantification methods, data, and user needs evolve. Subsequent versions will incorporate these improvements.

Accounting for and reporting on FLW involves determining the scope of the FLW inventory (what will be quantified) and deciding on quantification methods (how FLW will be quantified).

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Box 2 | How the Standard Was Developed

The Food Loss & Waste Protocol (FLW Protocol) is a multi-stakeholder partnership, which has developed the global *FLW Standard* for quantifying food and/or associated inedible parts removed from the food supply chain. World Resources Institute (WRI) serves as the Secretariat of the FLW Protocol and led the drafting and review process for the standard.

A Steering Committee of expert institutions provided technical input, strategic direction, and quality control throughout the standard's development. The Steering Committee consists of The Consumer Goods Forum (CGF), Food and Agriculture Organization of the United Nations (FAO), EU-funded FUSIONS project,^a United Nations Environment Programme (UNEP), World Business Council for Sustainable Development (WBCSD), WRAP (The Waste and Resources Action Programme), and WRI.

The Secretariat and two Technical Working Groups developed the first draft of the *FLW Standard* in 2014 and early 2015. In March 2015, the draft was made available for review by an External Review Group, a suite of pilot testers, and the general public. The review and pilot testing provided feedback on the content, practicality, and usability of the standard.

In total, the Secretariat gathered feedback from more than 200 external stakeholders representing companies, national governments, intergovernmental organizations, non-governmental organizations, and academic institutions from around the world. This feedback was incorporated into a revised draft, which was reviewed by the Steering Committee for final editing and approval.

^a The FUSIONS project has received funding from the European Union's Seventh Framework Programme for Research, Technological Development and Demonstration under Grant Agreement No. 311972. <http://www.eu-fusions.org/>.

Defining the “What” and “How” of an FLW Inventory

The *FLW Standard* provides a credible, practical, transparent, and internationally consistent basis for entities to account for and report on FLW. An FLW inventory must meet a number of requirements to be in conformance with the standard; these requirements are listed in Table 3 at the end of this executive summary. The full document provides guidance on implementing these requirements, as well as additional recommendations.

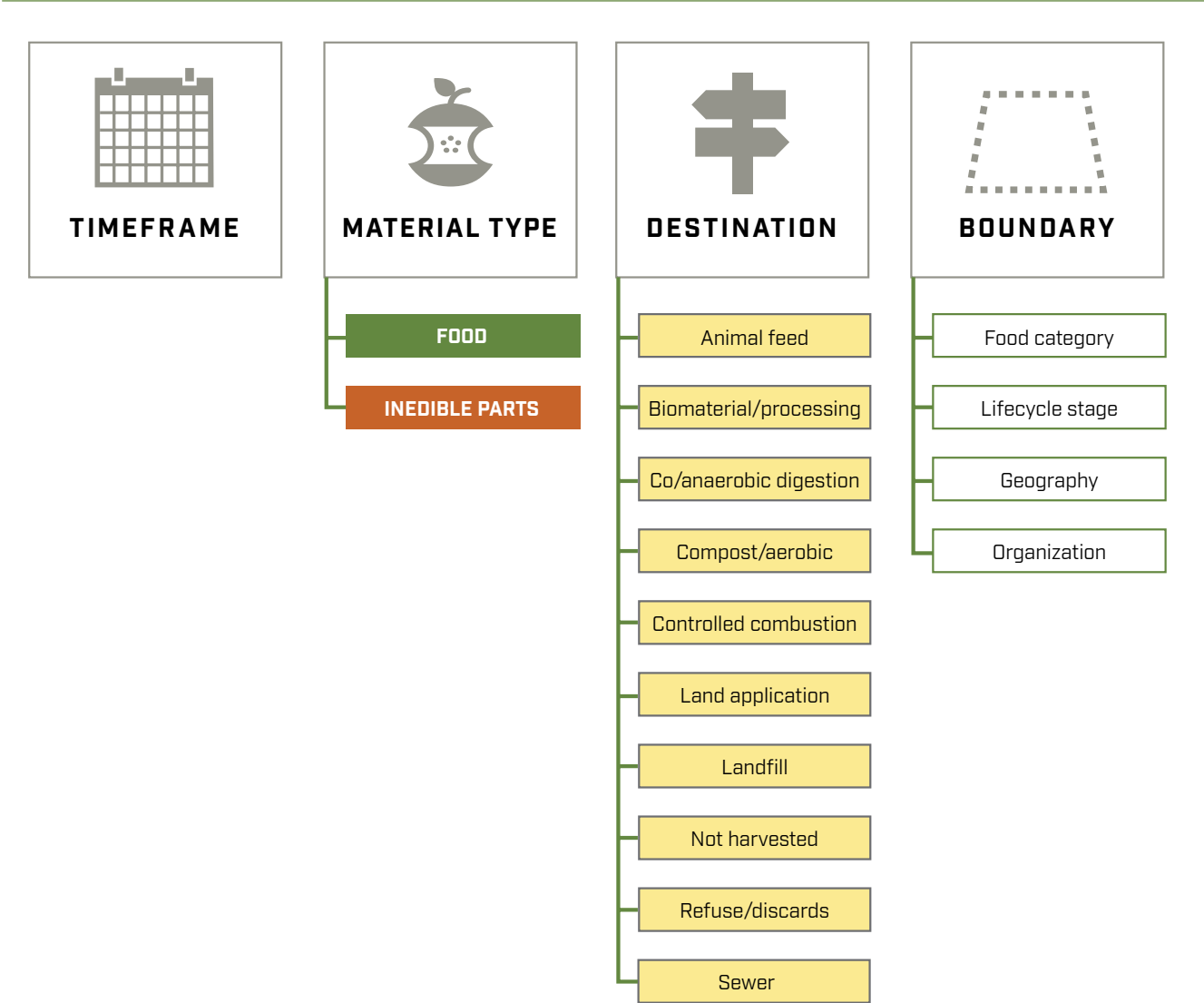
Accounting for and reporting on FLW involves determining the scope of the FLW inventory (what will be quantified) and deciding on quantification methods (how FLW will be quantified).

“WHAT”—THE SCOPE OF AN FLW INVENTORY

Regardless of the particular scope selected, the *FLW Standard* requires an entity to report on four components (Figure 2):

- ▶ **Timeframe:** the period of time for which the inventory results are being reported
- ▶ **Material type:** the materials that are included in the inventory (food only, inedible parts only, or both) (Box 1)
- ▶ **Destination:** where FLW goes when removed from the food supply chain (Table 1)
- ▶ **Boundary:** the food category, lifecycle stage, geography, and organization (Table 2)

Figure 2 | Scope of an FLW Inventory



“HOW”—THE QUANTIFICATION METHOD AND RELATED DETAILS

There are many ways in which an entity can quantify FLW. The *FLW Standard* provides guidance on 10 possible quantification methods, including but not limited to weighing, waste composition analysis, mass-balance calculation, and surveying. The *FLW Standard* also lays out requirements for reporting key assumptions (e.g., about sampling, scaling up data, and assessing uncertainty).

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About Destinations and Boundary

Establishing the scope of an FLW inventory includes selecting the destination and boundary. The following pages provide additional detail about these two components.

There is a range of possible **destinations** for food and/or associated inedible parts removed from the food supply chain. These destinations differ significantly. Some result in no valorization of the FLW (i.e., they represent final disposal) while others result in outputs with value. Table 1 lists the 10 destinations used by the *FLW Standard* in alphabetical order, along with their definitions.

Table 1 | Definition of Destinations Used in the *FLW Standard*

DESTINATION	DEFINITION
Animal feed	Diverting material from the food supply chain ^a (directly or after processing) to animals
Bio-based materials/biochemical processing	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
Codigestion/anaerobic digestion	Breaking down material via bacteria in the absence of oxygen. This process generates biogas and nutrient-rich matter. Codigestion 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)
Composting/aerobic processes	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
Controlled combustion	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)
Land application	Spreading, spraying, injecting, or incorporating organic material onto or below the surface of the land to enhance soil quality
Landfill	Sending material to an area of land or an excavated site that is specifically designed and built to receive wastes
Not harvested/plowed-in	Leaving crops that were ready for harvest in the field or tilling them into the soil
Refuse/discards/litter	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)
Sewer/wastewater treatment	Sending material down the sewer (with or without prior treatment), including that which may go to a facility designed to treat wastewater
Other	Sending material to a destination that is different from the 10 listed above. This destination should be described

^a Excludes crops intentionally grown for bioenergy, animal feed, seed, or industrial use

Entities vary greatly in their knowledge about the destination of their FLW. The *FLW Standard* therefore requires users to account for and report as much as they currently know about the destination(s).

If the destination is unknown, users of the *FLW Standard* are required, at a minimum, to report the initial path(s)—how FLW gets to the destination. Over time, more data on FLW by destination will become available, as the benefits of quantifying FLW are broadly recognized, knowledge is expanded about opportunities to extract value from FLW, and actions are taken to meet targets for reducing FLW.

The standard delineates three types of paths:

- 1. On-site removal or use of FLW.** Examples include any situation in which the FLW is used at the place where it was generated.
- 2. Other entity collects/hauls FLW off site.** Examples include a waste management company or others taking FLW from where it was generated.
- 3. Other paths, typically informal.** Examples include food abandoned on the side of the road, or food and associated inedible parts remaining in a public space after a festival.

If the destination is known, users are required to indicate which of the 10 destinations are included in their inventory. (An entity may also report the path though is not required to do so.) If users can account for the amount of FLW that went to a particular destination, they are required to report the weight of FLW by destination.

Where the destination is known, the standard strongly recommends that in order to enhance the comparability and transparency of an inventory, an entity understand the extent to which FLW is valorized by the facility that receives its FLW. For five of the destinations (codigestion/anaerobic digestion, composting/aerobic processes, controlled combustion, landfill, and sewer/wastewater treatment), the types of facilities accepting the FLW can differ greatly, which influences the degree to which FLW is valorized. For example, some controlled combustion facilities or wastewater treatment facilities are designed to recover energy, while others dispose of the FLW with no valorization. (For the other five destinations—animal feed, bio-based materials/biochemical processing, land application, not harvested/plowed-in, refuse/discards/litter—FLW is generally valorized or not.)

Given that, for the first five destinations listed above, the extent to which FLW is valorized—and which resources (i.e., energy, solid materials, liquids) are recovered—the *FLW Standard* recommends an entity include relevant information in its FLW inventory report, if available. This should include whether the FLW is valorized, the proportion of FLW valorized, and what resources are recovered. If an entity does not know what happens to the FLW once delivered to the destination, the standard recommends it ask whether the FLW is valorized and what resources are recovered.

The **boundary** of an FLW inventory is determined by the food category, lifecycle stage, geography, and organizational unit. The *FLW Standard* strongly recommends that, where possible, entities use the classification sources listed in Table 2 to improve transparency and comparability among FLW inventories.

There is a range of possible destinations for food and/or associated inedible parts removed from the food supply chain.

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Table 2 | Boundary Definitions and Sources for Reporting

BOUNDARY DIMENSION	DEFINITION	CLASSIFICATION SOURCE TO USE	SELECTED EXAMPLES
Food category	The type(s) of food included in reported FLW ^a	<ul style="list-style-type: none"> ▶ Select one or more categories from <i>either</i> the Codex General Standard for Food Additives (GSFA) system <i>or</i> United Nations Central Production Classification (CPC) system ▶ If more detailed information is used, include appropriate codes from more granular sources including: <ul style="list-style-type: none"> ▶ Global Product Category (GPC) codes (online, or download an Excel, Word or XML copy) ▶ United Nations Standard Products and Services Code (UNSPSC) 	<ul style="list-style-type: none"> ▶ All food (GSFA 01.0 –16.0) <i>or</i> (CPC2.1 Divisions 21–24) ▶ Dairy products (GSFA 01.0) <i>or</i> (CPC2.1 Group 221 & 222) ▶ Fresh fruits and vegetables (GSFA 04.1 & 04.2.1) <i>or</i> (CPC2.1 Group 012 & 013) ▶ Chicken (GSFA 08.1.1 {Fresh meat, poultry, and game, whole pieces or cuts}; GPC Brick 10005769) <i>or</i> (CPC2.1 Subclass 21121)
Lifecycle stage	The stage(s) in the food supply chain or food lifecycle within which reported FLW occurs	<ul style="list-style-type: none"> ▶ Select one or more United Nations International Standard Industrial Classifications of All Economic Activities (ISIC) codes (At the time of publication, the latest version is “Rev.4”) ▶ Regional and national classification systems may be used as well, most of which are derived from the ISIC (e.g., NACE for Europe). The UN Statistics Division lists national classification systems ▶ If no code exists, write in the lifecycle stage 	<ul style="list-style-type: none"> ▶ Entire food supply chain (select relevant group of ISIC codes) ▶ Two stages: manufacture of dairy products (ISIC Group: 105) and retail of food and beverage (ISIC Class: 4721) ▶ At home (ISIC Class: 9820)
Geography	Geographic borders within which reported FLW occurs	<ul style="list-style-type: none"> ▶ Select one or more UN regions or country codes ▶ Write in description for narrower geographic scope. Where available, use a national classification system (e.g., U.S. Census) 	<ul style="list-style-type: none"> ▶ World/all countries (UN code 001) ▶ Eastern Asia (UN code 030) ▶ Ghana (UN code 288) ▶ Nova Scotia, Canada ▶ Lima, Peru
Organization	Organizational unit(s) within which reported FLW occurs	Write in number and type of unit(s) and any additional descriptive detail (see guidance in <i>FLW Standard</i>)	<ul style="list-style-type: none"> ▶ All sectors in country ▶ Entire company ▶ Two business units ▶ All 1,000 stores ▶ 100 households

^a“Food category” differs from “material type,” which refers only to whether FLW is composed of “food” and/or “associated inedible parts” removed from the food supply chain

Implementing the Standard

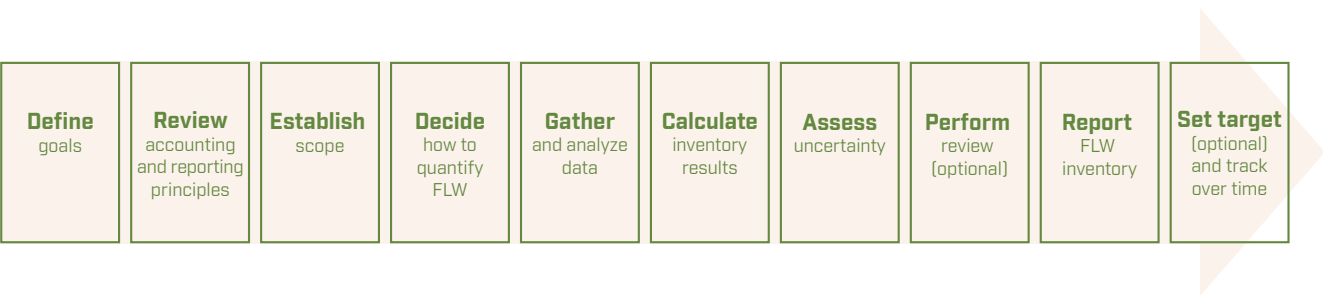
The *FLW Standard* is organized according to the steps an entity should follow when developing and reporting an FLW inventory (Figure 3). Detailed guidance for each step is provided in the full document.⁷

- 1. **Define goals.** An entity should determine why it is quantifying FLW in order to determine what to quantify and how to undertake the quantification. Goals may relate to food security, economic performance, environmental impact, or some combination of the three.
- 2. **Review accounting and reporting principles.** An entity quantifying and reporting FLW should adhere to five basic principles for accounting and reporting: relevance, completeness, consistency, transparency, and accuracy. These principles are intended to guide the implementation of the standard, especially in situations that are not directly covered by the standard.
- 3. **Establish scope.** This step involves determining the timeframe, material type(s), destination(s), and boundary that will be covered by the FLW inventory.
- 4. **Decide how to quantify FLW.** An entity decides whether to undertake a new calculation and/or use existing data, and chooses the quantification

method(s) to use in developing the FLW inventory. The method(s) chosen will be influenced by an entity’s particular goals, established scope, and other circumstances such as resource availability (e.g., human, financial) and whether it has direct access to the physical FLW.

- 5. **Gather and analyze data.** An entity begins assembling the data necessary for FLW quantification. The standard provides detailed guidance on a number of approaches to gathering, calculating, and analyzing data related to FLW. The standard also covers approaches to recording the causes of FLW, an option that is recommended for identifying effective FLW reduction strategies.
- 6. **Calculate inventory results.** Once data have been gathered and analyzed, inventory results can be calculated. The standard provides guidance on performing the necessary calculations. The standard requires accounting for the physical amount of FLW, expressed as weight. Entities may also express FLW in other terms or units of measurement (to convey environmental impacts, nutritional content, or financial implications), or use a normalization factor to generate a metric such as FLW per capita.
- 7. **Assess uncertainty.** In this step, an entity goes through the process of identifying and documenting sources of uncertainty that may arise in the calculation of an FLW inventory. The standard provides suggestions as to how specific forms of uncertainty can be anticipated and minimized.

Figure 3 | Overview of Steps in FLW Accounting and Reporting



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8. **Perform review.** In this optional step, an entity undertakes either an internal or external assurance process to ensure the accuracy and consistency of the FLW inventory.
9. **Report FLW inventory.** Having completed the prior steps, an entity should report its FLW. The standard provides guidance on reporting the required information as well as the recommended elements that may be added to the inventory report.
10. **Set target and track over time.** An entity may wish to set targets for FLW reduction and use the standard to track progress toward those targets over time. The standard provides guidance on setting an FLW reduction target and tracking it, including information on selecting a base year, monitoring performance, and making adjustments to the base year calculation as needed.

Summary of Requirements

Table 3 lists all the requirements that must be followed by an entity when accounting for and reporting on FLW in conformance with the *FLW Standard*. Five of the requirements (1, 2, 3, 4, and 6) apply to all entities regardless of their situation. Three of them (5, 7, and 8) are conditional, meaning that they apply only in certain situations. When they do apply, an entity shall follow the details of those requirements.

The table also lists the chapters of the *FLW Standard* in which users can find additional details about implementing the requirements.

Additional Details

The full *FLW Standard* contains additional guidance, resources, and examples to assist in its use. It builds on the summary information provided in this document with further instructions about how to develop and prepare an FLW inventory.

The standard is divided into three parts. Part I (Chapters 1–5) covers: the purpose and intended use of the *FLW Standard* (1), definition of terms and applications (2), the possible goals of quantifying FLW (3), steps to guide preparation of an FLW inventory and a summary of the standard’s requirements (4), and principles underlying accounting and reporting (5).

Parts II and III (Chapters 6–14) provide more detail about the requirements in the standard and guidance on implementing them. More specifically:

- Part II (Chapters 6 and 7) provides detailed guidance on requirements to account for and define “what” is being quantified (the scope of the FLW inventory), and “how” it is being quantified (the method).
- Part III (Chapters 8–14) provides guidance about additional requirements of the standard as well as recommendations. It covers: collecting, calculating, and analyzing data (8), assessing uncertainty (9), coordinating the analysis of multiple FLW inventories (10), recording the causes of FLW (11), review and assurance processes (12), reporting (13), and target setting (14).

A set of Appendices provides further information on details related to analyzing and managing data. An important companion to the standard is the *Guidance on FLW Quantification Methods*, which is available online at www.flwprotocol.org. This document offers entities guidance on 10 methods for quantifying FLW (i.e., the way in which an entity may obtain, record, and analyze data for the FLW inventory). For each method, it provides an overview, then summarizes advantages and disadvantages, level of expertise required, cost, and guidance on implementing the method. A sample reporting template, as well as an FLW Quantification Method Ranking Tool, are also available online at www.flwprotocol.org.

Table 3 | Requirements in the *FLW Standard*

REQUIREMENT	CHAPTER IN FLW STANDARD
1. Base FLW accounting and reporting on the principles of relevance, completeness, consistency, transparency, and accuracy	Chapter 5
2. Account for and report the physical amount of FLW expressed as weight (e.g., pounds, kilograms, tons, metric tons)	Chapter 7
3. Define and report on the scope of the FLW inventory	Chapter 6
<p>a. Timeframe. Report the timeframe for which the inventory results are being reported (including starting and ending date)</p> <p>b. Material type. Account for and report the material type(s) included in the FLW inventory (i.e., food only, inedible parts only, or food and associated inedible parts). <i>See Box 1 for definitions</i></p> <p>If food or associated inedible parts removed from the food supply chain are accounted for separately in the inventory:</p> <ul style="list-style-type: none"> ▶ Describe the sources or frameworks used to categorize a material as food or as inedible parts. This includes stating any assumptions that were used to define whether or not material was “intended” for human consumption ▶ Describe the approach used to calculate the separate amounts. If applicable, describe all conversion factors used and their sources <p>c. Destination. Account for and report the destinations included in the FLW inventory (i.e., where material removed from the food supply chain is directed). If the destination is unknown, then report the initial path(s) at a minimum. <i>Table 1 outlines the options</i></p> <p>d. Boundary. Report the boundary of the FLW inventory in terms of the food category, lifecycle stage, geography, and organization (including the sources used to classify them). <i>See Table 2</i></p> <p>e. Related issues.</p> <p><i>Packaging and other non-FLW material.</i> Exclude from the FLW inventory any material (and its weight) that is not food or associated inedible parts removed from the food supply chain (i.e., FLW). If a calculation is needed to separate the weight of FLW from non-FLW materials (e.g., subtracting the weight of packaging), describe the approach and calculation used</p> <p><i>Water added/removed from FLW.</i> Account for and report the weight of FLW that reflects the state in which it was generated before water was added, or before the intrinsic water weight of FLW was reduced. If a calculation is made to estimate the original weight of FLW, describe the approach and calculation used</p> <p><i>Pre-harvest losses.</i> Exclude pre-harvest losses from the scope of the FLW inventory. Users may quantify such losses but shall keep data separate from the FLW inventory results</p>	
4. Describe the quantification method(s) used. If existing studies or data are used, identify the source and scope	Chapter 7
5. If sampling and scaling of data are undertaken, describe the approach and calculation used, as well as the period of time over which sample data are collected (including starting and ending dates)	Chapter 8
6. Provide a qualitative description and/or quantitative assessment of the uncertainty around FLW inventory results	Chapter 9
7. If assurance of the FLW inventory is undertaken (which may include peer review, verification, validation, quality assurance, quality control, and audit), create an assurance statement	Chapter 12
8. If tracking the amount of FLW and/or setting an FLW reduction target, select a base year, identify the scope of the target, and recalculate the base year FLW inventory when necessary	Chapter 14

ENDNOTES

1. Target 12.3 of the United Nations Sustainable Development Goals states, “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.”
2. FAO (Food and Agriculture Organization of the United Nations). 2011. *Global Food Losses and Food Waste: Extent, Causes and Prevention*. Rome, Italy: FAO.
3. FAO. 2013. “Food Wastage Footprint: Impacts on Natural Resources.” <http://www.fao.org/docrep/018/i3347e/i3347e.pdf>.
4. Kumm, M., H. de Moel, M. Porkka, S. Siebert, O. Varis, and P.J. Ward. 2012. “Lost Food, Wasted Resources: Global Food Supply Chain Losses and their Impacts on Freshwater, Cropland, and Fertiliser Use.” *Science of the Total Environment* 438: 477–489.
5. Kumm, M., H. de Moel, M. Porkka, S. Siebert, O. Varis, and P.J. Ward. 2012. “Lost Food, Wasted Resources: Global Food Supply Chain Losses and their Impacts on Freshwater, Cropland, and Fertiliser Use.” *Science of the Total Environment* 438: 477–489.
6. FAO. 2015. “Food Wastage Footprint and Climate Change.” Rome, Italy: FAO.
7. Food Loss & Waste Protocol. 2016. *Food Loss and Waste Accounting and Reporting Standard*. www.flwprotocol.org.

ABOUT THE CONSUMER GOODS FORUM (CGF)

CGF is a global, parity-based industry network that brings together the CEOs and senior management of some 400 retailers, manufacturers, service providers, and other stakeholders across 70 countries.

ABOUT FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO)

An intergovernmental organization, FAO has 194 Member Nations, two associate members and one member organization, the European Union. Achieving food security for all is at the heart of FAO’s efforts—to make sure people have regular access to enough high-quality food to lead active, healthy lives.

ABOUT EU-FUNDED FUSIONS PROJECT

FUSIONS is working towards a more resource efficient Europe by significantly reducing food waste. FUSIONS has 21 project partners from 13 countries, bringing together universities, knowledge institutes, consumer organisations and businesses.

ABOUT UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP)

UNEP sets the global environmental agenda, promotes the coherent implementation of sustainable development within the United Nations system and serves as an authoritative advocate for the global environment.

ABOUT THE WORLD BUSINESS COUNCIL FOR SUSTAINABLE DEVELOPMENT (WBCSD)

The WBCSD is a CEO-led organization of forward-thinking companies that galvanizes the global business community to create a sustainable future for business, society and the environment.

ABOUT WRAP (THE WASTE AND RESOURCES ACTION PROGRAMME)

WRAP is a charity based in the UK. Its mission is to accelerate the move to a sustainable resource-efficient economy through re-inventing how we design, produce and sell products; rethinking how we use and consume products; and re-defining what is possible through re-use and recycling.

ABOUT WORLD RESOURCES INSTITUTE (WRI)

WRI is a global research organization that spans more than 50 countries, with offices in Brazil, China, Europe, India, Indonesia, and the United States. WRI’s more than 450 experts and staff work closely with leaders to turn big ideas into action to sustain our natural resources—the foundation of economic opportunity and human well-being.

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The Food Loss & Waste Protocol (FLW Protocol) is a multi-stakeholder partnership, which has developed the global *Food Loss and Waste Accounting and Reporting Standard* (or *FLW Standard*) for quantifying food and/or associated inedible parts removed from the food supply chain—commonly referred to as “food loss and waste” (FLW).

www.flwprotocol.org



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