



FOOD WASTE MEASUREMENT PRINCIPLES AND RESOURCES GUIDE

Developed through an engagement process with food businesses led by IGD and WRAP, this document is relevant to those involved in food production, manufacture, distribution, retail, and hospitality & food service



Publication Date: January 2018

About WRAP

WRAP is not-for-profit, working with governments, businesses and citizens to create a world in which we use resources sustainably. Our experts generate the evidence-based solutions we need to protect the environment, build stronger economies and support more sustainable societies. Our impact spans the entire life-cycle of the food we eat, the clothes we wear and the products we buy, from production to consumption and beyond.

Document reference:

WRAP, 2018, FOOD WASTE MEASUREMENT PRINCIPLES AND RESOURCES GUIDE

Written by: The content of this document was developed through engagement with a wide range of food businesses during the course of 2017, led by IGD and WRAP.

Disclaimer: While we have taken reasonable steps to ensure this report is accurate, WRAP does not accept liability for any loss, damage, cost or expense incurred or arising from reliance on this report. Readers are responsible for assessing the accuracy and conclusions of the content of this report. Quotations and case studies have been drawn from the public domain, with permissions sought where practicable. This report does not represent endorsement of the examples used and has not been endorsed by the organisations and individuals featured within it. This material is subject to copyright. You can copy it free of charge and may use excerpts from it provided they are not used in a misleading context and you must identify the source of the material and acknowledge WRAP's copyright. You must not use this report or material from it to endorse or suggest WRAP has endorsed a commercial product or service. For more details please see WRAP's terms and conditions on our website at www.wrap.org.uk

Context

In response to a discussion at the [Policy Issues Council](#) in February 2017, IGD asked WRAP to provide expert input on food waste measurement for an initiative with a wide range of UK food businesses. WRAP helped facilitate the discussion with retailers, producers, manufacturers and hospitality and food service businesses, many of whom are also [Courtauld 2025 signatories](#), and share its knowledge and experience to help identify how best to measure food waste and take action to reduce it – in line with the ambitions of [Sustainable Development Goal 12.3](#) (SDG 12.3).

The outputs from this work are a [set of principles](#) relating to food waste measurement and action to reduce food waste. These have been developed and agreed with the IGD 'task and finish' group, and align with the international standard for food waste reporting published in 2016 (the [Food Loss and Waste Accounting and Reporting Standard, FLWS](#)) and new guidance developed by the [Champions 12.3 Group](#) (a coalition of executives from governments, businesses, international organizations, research institutions, farmer groups, and civil society dedicated to inspiring ambition, mobilizing action, and accelerating progress toward achieving SDG Target 12.3 by 2030).

These principles are supported by ['signposting' resources](#) which aim to help answer key high level questions (why should I measure food waste [i.e. what's the business case], what should I measure, how should I do this, how can I take action to reduce food waste).

The group agreed that whilst the principles are an important foundation, what is critical is implementation – supporting more businesses to measure food waste in a consistent manner, and realise the benefits of taking action to reduce it. A range of challenges were identified through a series of workshops, many of which will benefit from discussions at a sector level and from wider experience of measuring food waste.

WRAP and IGD will continue to collaborate to address these challenges, in work aligned with Courtauld 2025, including through the development of more specific guidance and case studies.

This is one of the ways that WRAP, IGD and food businesses are working to ensure that Courtauld 2025 makes a major contribution to the UK achieving SDG 12.3.

Document overview

Interactive guide - Just rollover and click to navigate.

<p>The principles</p>	<p>The 3 principles of food waste measurement</p>			
<p>Global supporting resources</p>	<p>Champions 12.3 guidance</p>	<p>Food Loss and Waste Standard</p>		
<p>Signposting to further industry resources</p>	<p>What's the business case? pg. 9 -12</p>	<p>What should I measure? pg. 13-18</p>	<p>How do I measure? pg. 19</p>	<p>How do I take action? pg. 20</p>



The principles of food waste measurement

Industry leaders have agreed there are three principles of food waste measurement:

1. Food waste measurement and reduction should focus on farm to fork in pursuit of SDG Target 12.3.
2. The framework of [Target, Measure, Act](#) represents the best way to make progress on food waste measurement and prevention.
3. Consistent definitions of food, food waste and inedible parts, must be adopted by every organisation which commits to measure and reduce food waste.

Adopting a common approach to measuring food waste, in line with the [Food Loss & Waste Standard](#) and [Champions 12.3 'interpretation' document](#), is essential to make progress.

Supporting these principles consistently across our industry will enable individual companies and industry as a whole to demonstrate congruence in how food waste is being measured and managed.



Food waste measurement signposting tree

Why should I measure food waste? What should I measure? How should I do this? How can I take action to reduce food waste? Answer the questions below and navigate to relevant resources to find out.

Interactive guide – Just rollover and click to navigate

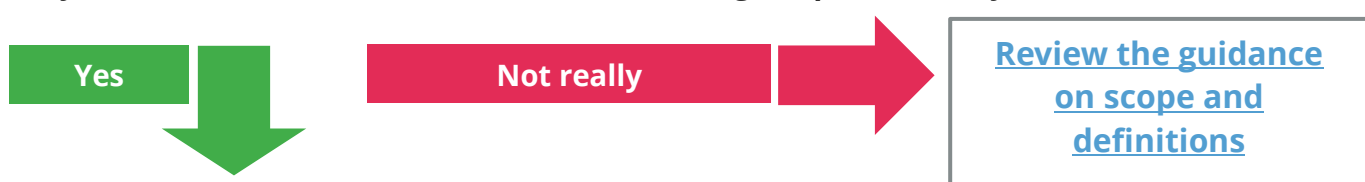
Do you have the resources to start measuring food waste?



Do you need some initial data on how much food you are wasting (to help identify hotspots and/or to target measurement)?



Are you clear about what to measure (in line with good practice for your sector)?



Do you need help with how to measure food waste in your business?



Do you need help with how to reduce food waste in your business?



Contact WRAP to discuss how you can create a case study of your work

Email: foodspecialist@wrap.org.uk

Global supporting resources – Champions 12.3 guidance

Links to the key resources:

- [Champions 12.3 guidance document](#)

Key points

The Champions 12.3 Group have recognised that there is some ambiguity in the wording of SDG 12.3, which can make it difficult to understand exactly what is covered by the target. In order to address this, the Group, in consultation with others, produced guidance which aims to remove some of the ambiguity, allowing a consistent approach to measuring progress and targeting action.

The Champions 12.3 guidance document contains an ambitious interpretation of the SDG target on food loss and waste, and proposes that:

- *The scope should cover the entire food supply chain*, from the point that crops and livestock are ready for harvest or slaughter through to the point that they are ready to be ingested by people.
- *Entities should seek to reduce food loss and waste within the boundaries they control*, and seek to help drive reductions up and down the supply chains where they have influence.
- One should interpret that *food waste applies to both “food” that is intended for human consumption and its associated “inedible parts” which leave the human food supply chain*.
- One should interpret that *waste covers a range of possible destinations for food and associated inedible parts that leave the human food supply chain, but excludes animal feed and bio-based materials/biochemical processing* (where material is converted into industrial products)
- The 50% reduction target applies to both food and associated inedible parts. **However**, if entities are able to measure and report on food and associated inedible parts separately, then they should be able to apply the 50% reduction target only to the food portion.



GUIDANCE ON INTERPRETING
SUSTAINABLE DEVELOPMENT GOAL TARGET 12.3

12 RESPONSIBLE
CONSUMPTION
AND PRODUCTION



THE OPPORTUNITY

Food intended for human consumption that is lost or wasted is a challenge of epic proportions. According to the best available global estimates compiled by the Food and Agriculture Organization of the United Nations (FAO), approximately one-third of all food produced in the world in 2009 was lost or wasted (FAO 2011).¹ This huge level of inefficiency has substantial impacts. It results in roughly \$940 billion in economic losses globally per year (FAO 2015). It contributes to food insecurity and hinders nutrition—in a world where one in nine people are undernourished (WFP 2017). In fact, food loss and waste results in a 24 percent reduction in available food calories—driven by grains—and an untold reduction in nutrients, particularly given that fruits and vegetables are the most frequently lost or wasted food group by weight (Lipinski et al. 2013). In addition, food that is harvested but ultimately lost or wasted consumes about one-quarter of all water used by agriculture each year, requires land area greater than the size of China, and generates about 8 percent of global greenhouse gas emissions annually (Kummu et al. 2012; FAO 2013; FAO 2015).

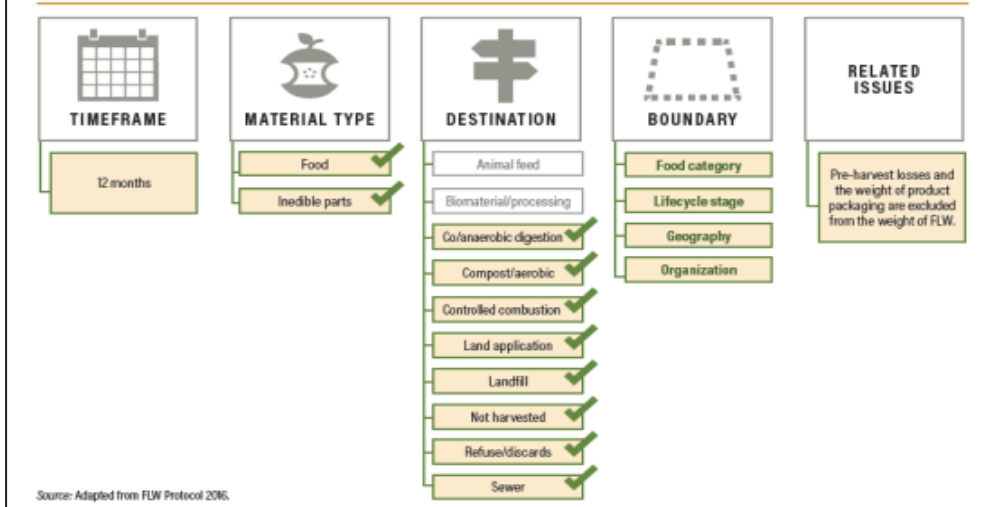
ABOUT THIS PUBLICATION

This publication provides an interpretation of Sustainable Development Goal (SDG) Target 12.3—the one addressing food loss and waste—given some ambiguity about the target. It seeks to inform decision makers in government, business, and civil society about what should be considered a “best practice” understanding of SDG Target 12.3.

AUTHORS

This publication was prepared by **Craig Hanson** of the World Resources Institute with input by a sub-group of Champions 12.3 who have a specific interest in providing best practice guidance on interpreting SDG Target 12.3.

FIGURE 2. Recommended scope for interpreting SDG Target 12.3



- [Back to the food waste measurement signposting tree](#)

Global supporting resources – Food Loss and Waste Standard

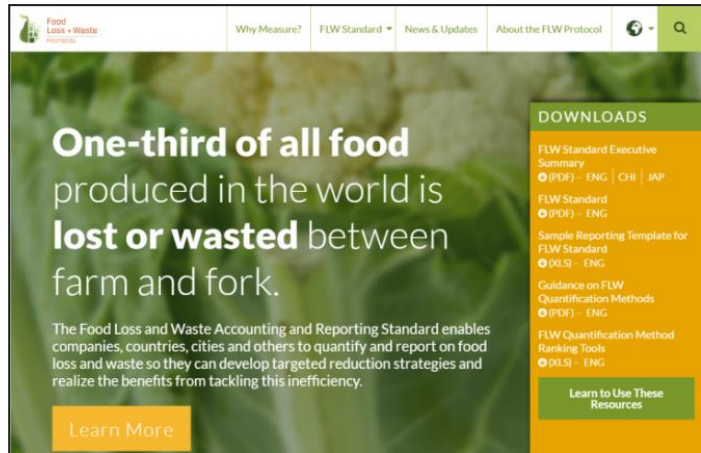
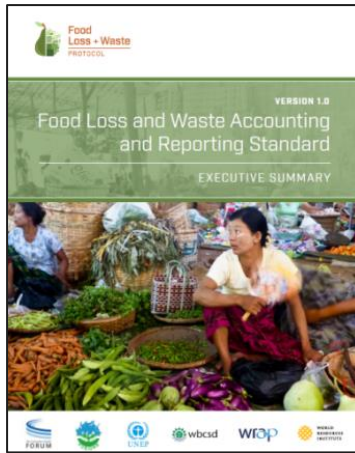
Links to the key resources

- [Food Loss and Waste Standard \(FLWS\)](#)
- [FLWS webinars and video guidance](#)

Key points

The Food Loss and Waste Accounting and Reporting Standard (FLWS) enables companies, countries, cities and others to quantify and report on food waste so they can develop targeted reduction strategies and realize the benefits from tackling this inefficiency. There are a suite of materials available:

- **FLWS (Executive Summary and Full Version).** The FLWS outlines a short list of requirements to consistently and transparently measure and report food waste and guidance to think about your choices when selecting what and how to measure.
- **Guidance on quantification methods.** You have several options for how to quantify food waste. In this companion to the FLWS, you will find guidance on 10 of the most common methods. To help you select which method may be most appropriate for your circumstances, try out the FLW Quantification Method Ranking Tool. This straight-forward tool offers suggestions based on a short set of questions.
- **Requirements in the FLW standard.** This simple document provides a summary table of the eight reporting and accounting requirements contained in the FLWS.
- **Sample reporting template.** This sample reporting form will help you record and report the results of inventories conducted using the FLWS.
- **Case studies and training materials.**
- Details for upcoming and past webinars as well as short video clips that will guide you through the business case for measuring food waste, how to describe the scope of an inventory using the FLWS, and what's included in the FLWS are available [here](#).



- [Back to the food waste measurement signposting tree](#)

Business case for reducing food waste – big picture

Links to the key resources

- [Food and Agriculture Organization of the United Nations - Food loss and waste reduction](#)
- [Courtauld Commitment 2025](#)
- [Sustainable Development Goals - 17 Goals to transform our world](#)

Key points

In addition to the potential direct and significant business benefits of reducing food waste in your own operations (see pages 10 and 11), the scale and implications of the amount of food ending up as waste globally and nationally means this is seen as a priority for action by international organisations, Governments, NGOs and citizens. There is an expectation that businesses will take responsibility for the part they can play in tackling this major economic, environmental and social problem:

- 1.3 billion tonnes food waste/year globally (equivalent to a third of what is produced).
- Huge environmental, financial and social implications.
- Increasing political priority.
 - UN Sustainable Development Goal.
 - EU Circular Economy Package.
 - A series of ambitious UK targets (Courtauld 2025; Scottish and Welsh Government).
- Increasing customer concern.

- [Back to the food waste measurement signposting tree](#)

Business case for reducing food waste – benefit: cost data

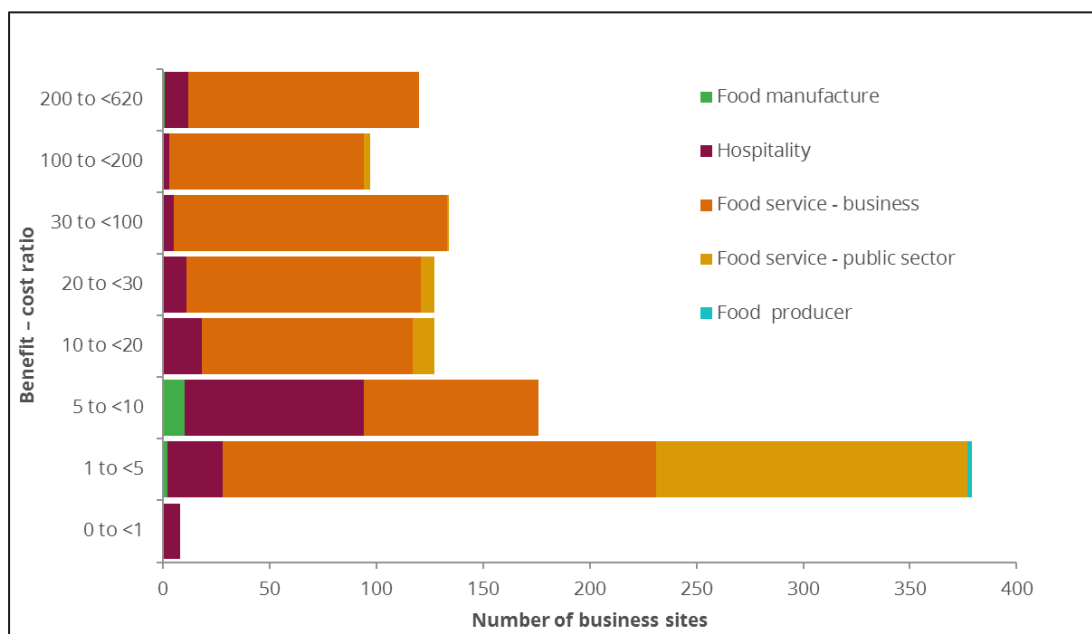
Links to the key resources

- [Champions 12.3 business case report](#)

Key points

Work by WRI and WRAP revealed that one of the barriers to taking action to reduce food waste in businesses was a lack of transparency around the costs of food being wasted, and the benefits of addressing this. In order to help address this data was analysed from a large number of businesses to illustrate the potential returns on investment that can be realised through interventions to reduce food waste.

- WRI/WRAP analysed nearly 1,200 business sites across 17 countries and more than 700 companies, representing a range of sectors including food manufacturing, food retail, hospitality and food service.
- 99% of the sites earned a positive return on investment. The median benefit-cost ratio was 14:1. In other words, half of the business sites earned greater than a 14-fold financial return on investment.
- Company sites with the highest returns tended to be restaurants. Hotels, food service companies, and food retailers tended to have ratios between 5:1 and 10:1.



- [Back to the food waste measurement signposting tree](#)

Business case for reducing food waste – Case studies

Links to the key resources

- [Food Loss Waste Standard \(FLWS\) - Case studies](#)
- [The Consumer Goods Forum – Case studies](#)
- [Your Business is Food; don't throw it away – Hospitality and food service case studies \(Manufacturing coming soon\)](#)

A variety of case studies illustrate the practicalities of measuring food waste, and the potential benefits.



- [Back to the food waste measurement signposting tree](#)

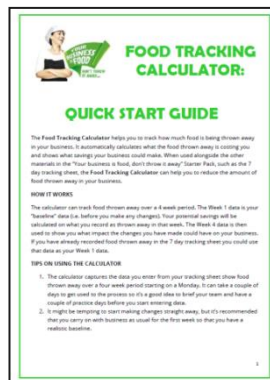
Business case for reducing food waste – *Your Business is Food; don't throw it away*

Links to the key resources

- [Your Business is Food; don't throw it away Hospitality and Food Service](#)
- [Your Business is Food; don't throw it away Manufacturers](#)

Key points

- **'Your Business is Food'** is a suite of resources that aims to help identify where food waste might be arising at a site level and within smaller businesses.
- This can help direct action to reduce food waste, and provide valuable information to make the case for greater investment in food waste measurement and prevention.
- Resources are tailored to:
 - Hospitality and Food Service businesses; and
 - Food manufacturing businesses.



- [Back to the food waste measurement signposting tree](#)

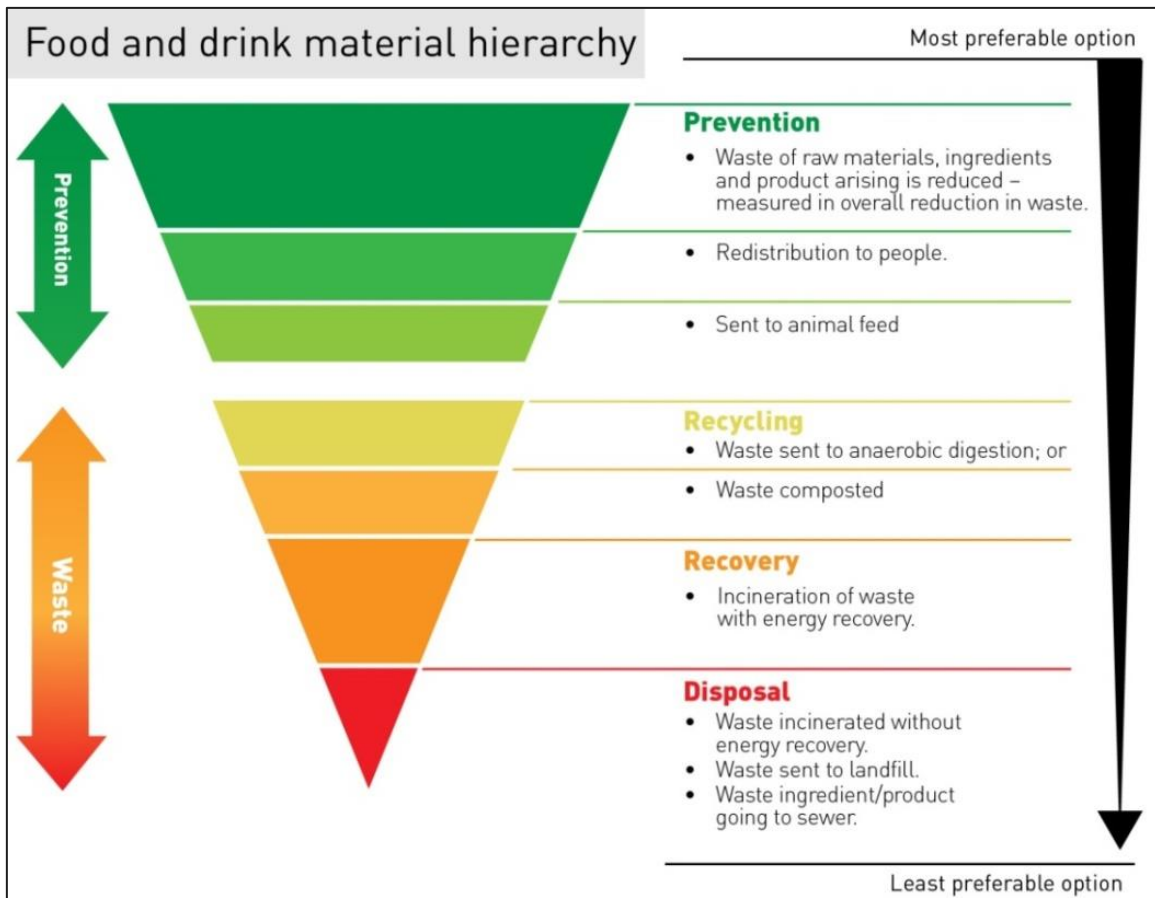
What should I measure in my organisation?

Links to the key resources

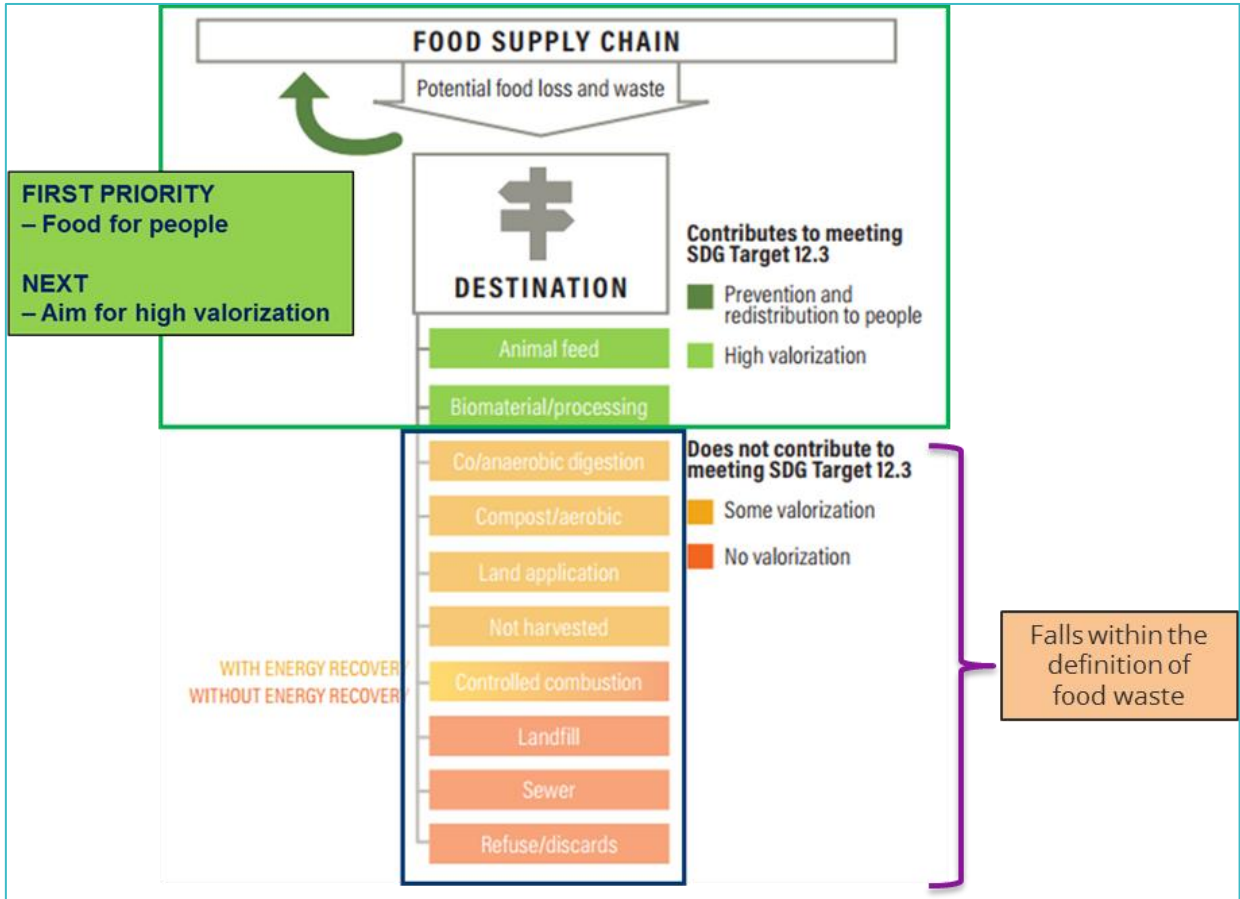
- [Waste hierarchy](#)
- [Champions 12.3 guidance](#)
- [Surplus food redistribution](#)
- [Surplus food in animal feed production](#)

Key points

- These resources will help you identify what material streams should be tracked and which of these should be included in an estimate of food waste.
- The scope of what should be measured has been represented in a number of ways, for example in the two examples shown below from WRAP and the Champions 12.3 Group. While the terminology around the destinations differ these examples are both consistent in what they classify as food waste.
- Surplus food redistributed to people, or surplus food / inedible parts diverted to animal feed or used in bio-material processing should be measured, but is **not** classed as food waste (as defined by WRAP and the Champions 12.3 'interpretation' document).
- If you can't measure food waste disposed of via all routes, then measure what is practical and record what routes have been included/excluded.



[Developed by WRAP, see for example [‘Estimates of Food Surplus and Waste Arisings in the UK’](#)]



[Adapted from WRI resources on the FLWS website, for example see [here](#)]

- [Back to the food waste measurement signposting tree](#)

Definitions

The following pages provide a definition for food waste and related materials such as food itself, inedible parts and by-products.

- **Food:** 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 geography¹.

Unlike food, there is no legal or universally accepted definition of food waste.

The FLWS is designed to allow for the fact that different organisations will have different reasons for quantifying food waste. These different goals can lead to (or government regulations may even explicitly state) different definitions of what constitutes food waste. The FLWS, therefore, defines what the components of food waste *could be* 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). It does not specify a definition of food waste, but allows the user to select components to measure based on its own requirements.

¹ The definitions of food and inedible parts are taken from the [FLWS](#)

In the context of SDG 12.3, the Champions 12.3 Group, in consultation with experts, have published an [interpretation document](#) which allows a definition of food waste (relevant to the SDG 12.3) to be created, allowing a consistent approach to measuring progress and targeting action²:

- **Food waste:** Food* and the inedible parts of food removed from the food supply chain to be recovered or disposed of (including - composted, crops ploughed in/not harvested, anaerobic digestion, bioenergy production, co-generation, incineration, disposal to sewer, landfill or discarded to sea). This definition excludes waste prevention activities, namely where surplus food is redistributed for human consumption, or surplus food / inedible parts are diverted to produce animal feed, or used for bio-based materials/biochemical processing (where material is converted into industrial products)

* Food (i.e. product intended for human consumption) includes that which is still suitable for consumption when it is disposed of (i.e. would be regarded as 'edible') and that which may no longer be suitable for consumption at the point of disposal (i.e. would be regarded as no longer edible or 'non-edible', for example due to it passing a 'use by' date or being spoiled).

Due to the potential (and observed) confusion that can arise from referring to 'edible' and 'inedible' fractions of food waste it is recommended that the following is used when explaining the definition of the term "food waste":

- **Food waste explanation** – "Food waste" consists of any food that could have been eaten (even if it is no longer suitable to be eaten when it's thrown away) together with the inedible parts associated with food such as bones, rinds, pits/stones, and egg/seafood shells.

It is recommended that the term 'inedible' refer to just the *parts of* food and not to the food waste – i.e. it is best not to use 'inedible food waste' or 'the inedible fraction of food waste'.

- **Redistribution** is the process whereby food that would otherwise have ended up as waste is instead provided for people to eat. This excludes food donated by companies that was not at risk of ending up as waste (i.e. given to charities as part of wider Corporate Social Responsibility objectives) or purchased by customers and added to front of store donation boxes. Food redistribution may take place through formal programs or informal efforts (that may also be referred to as food rescue, recovery, or donation), and received by both charitable organisations (such as FareShare, Food Cycle) and commercial ones (such as Company Shop, Approved Foods). Redistribution may take place at any point along the food supply chain, such as at the farm (e.g., field gleaning), the food processing facility, or the food outlet (e.g., supermarket, restaurant).

² The FUSIONS project, through extensive consultation, published a food waste '[definitional framework](#)' and definition which is largely consistent with this definition, in terms of covering both food and inedible parts and the relevant destinations.

- **Food by-products:** A by-product is an output from a production process that is not the main intended product but which has a value as an input to other food, feed or non-food markets. To qualify as a by-product the material must meet certain [criteria](#) (e.g., have value and be certain to find a market)³. Examples include grain leftover from brewing sent for animal feed and whey created during the production of dairy products and sold for protein production. Neither of these examples would be considered food waste based on the interpretation of the scope for SDG 12.3.

There is often confusion about how food by-products should be treated when developing estimates of food waste. What is important to remember is that the key consideration for determining whether to include by-products (or any material) in an estimate of food waste is where the material goes when leaving the food supply chain (i.e., its destination). If a by-product's destination is included in the scope of what's defined as food waste, then that product is considered food waste.

If there is a need to separately track the amount of "food" and "inedible parts" leaving the food supply chain, in many cases a by-product will be considered an associated "inedible part" of food. This distinction only matters if, for the purpose of a food waste reduction target, a business decides to focus on just reducing the amount of "food" that becomes waste.

- **Food loss:** The term food loss is used by some to represent a proportion of food that ends up being removed from the food supply chain. It is often differentiated from 'food waste' on the basis of the stage in the supply chain where the food is lost (e.g. on farm) or the reasons why the food is lost (e.g. due to 'unintentional' events such as disease or weather). Determining the difference between what may be defined as food loss versus food waste consistently can be difficult. The term 'food waste' as defined in this document is intended to cover all stages of the supply chain.

- [Back to the food waste measurement signposting tree](#)

³ "Animal By-products" (ABP) are subject to a specific legal definition and requirements associated with their handling and use (see <https://www.food.gov.uk/business-industry/guidancenotes/meatregsguid/coproductbyproductguide>). ABPs, like other by-products, may be classified as food waste depending on their destination.

How do I measure food waste in my organisation?

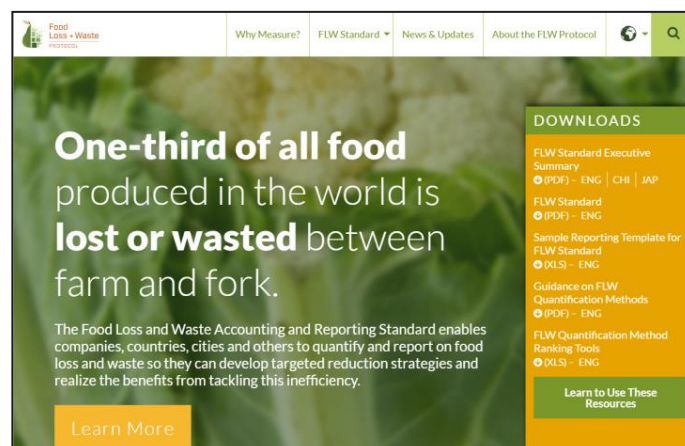
The Food Loss and Waste Standard

Links to the key resources:

- [Food Loss and Waste Standard \(FLWS\)](#) (downloads from the right hand side of web page)
- [FLWS – Executive summary](#)
- [FLWS – The principles](#)
- [FLWS – Supplementary detail and methods](#)
- [FLWS - Methods ranking tool](#)
- [FLWS - Case studies](#)

Key points

- See this [Executive Summary](#) for an overview, and the [FLWS](#) for the principles of how to quantify and report food waste.
- More detail on methods is available [here](#).
- The methods ranking tool on the [FLWS homepage](#) also provides valuable guidance on methods of measurement.
- There are an increasing number of case studies [here](#) from businesses that have made use of the FLWS in their food waste measurement.



- [Back to the food waste measurement signposting tree](#)

How do I take action on food waste reduction in my organisation?

Use the following resources for help in taking action on food waste reduction.

Links to the key resources:

- [Driving out waste in food & drink manufacturing and retailing](#)
- [Supporting resources for the Hospitality and Food Service sector](#)
- NEW: [Operational guidance for the Hospitality and Food Service Sector](#)
- [‘Your business is food; don’t throw it away’ HaFS starter guide, calculator and case studies](#)
- NEW: [‘Your Business is Food; don’t throw it away’ manufacturers starter guide and resources](#)
- [Getting more value from waste and surplus food & drink](#)
- [Surplus food redistribution](#)
- [Using surplus food in animal feed](#)
- [Case studies 1](#) (retail and manufacture - WRAP)
- [Case studies 2](#) (retail, manufacture, hospitality and food service – Consumer Goods Forum)
- [Case studies 3](#) (hospitality and food service – Your Business is Food; don’t throw it away)

Further resources, including sector-specific guidance, will be developed and added to this document through 2018. If you are not already signed up to Food WRAP Newsletter you can do so [here](#), to be notified when these are published.

There is a need for more case studies showing how different businesses have undertaken food waste measurement and taken action to reduce this. If you are interested in developing a case study please contact WRAP at foodspecialist@wrap.org.uk.

- [Back to the food waste measurement signposting tree](#)

WRAP's vision is a world in which resources are used sustainably.

Our mission is to accelerate the move to a sustainable resource-efficient economy through re-inventing how we design, produce and sell products; re-thinking how we use and consume products; and re-defining what is possible through re-use and recycling.

Find out more at www.wrap.org.uk

WRAP

wrap.org.uk

[@WRAP_UK](https://twitter.com/WRAP_UK)

Company Registration No: 4125764 and Charity No: 1159512

