

## Defining Food Waste in New Zealand

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### Background

Food waste is a major issue in New Zealand. As a nation, we waste an estimated \$1.17 billion worth of food a year from households alone - enough to feed the population of Dunedin for two years.<sup>1</sup> Food waste has significant environment impacts; disposal of food and organic waste to landfills is estimated to generate 12 percent of all biogenic methane emissions in New Zealand (five percent of total emissions). This is in addition to the resources used, and emissions produced, in the production and transport of food that is ultimately not consumed. The FAO estimates that a third of all food produced is either lost or wasted (i.e. not consumed). Effective redistribution of surplus of food can have a positive impact on social outcomes including food security.

### Environment Committee Report on Food Waste

In March 2020, the Environment Select Committee released its report '*Briefing to investigate food waste in New Zealand*', authored by Dr Miranda Miroso. The report included three key recommendations, which have subsequently been adopted by the government. These recommendations were to:

- 1) Establish a national definition for food waste in New Zealand, in line with international approaches;
- 2) Develop a national food baseline as the first step in establishing a measure for food waste in New Zealand; and
- 3) Include a food waste reduction target as part of the new waste strategy for New Zealand.

The Ministry for the Environment is progressing work on these recommendations, beginning with establishing a national definition for food waste.

### Purpose

We do not currently have good data on how much food waste is occurring in New Zealand, and the levels of food waste associated with different parts of the food supply chain. While we have some data on household and retail food waste, we have very little information on food waste that occurs in other parts of the food supply chain. Getting better data on food waste is key to identifying not only the scale of the issue, but also identifying areas we can improve on to guide investment and actions to reduce food waste.

New Zealand does not currently have a food waste definition. Establishing one is a critical first step to building a common understanding of the nature and extent of food waste in New Zealand. The definition proposed in this paper is technically focused, and is **primarily intended to guide both national and organisational efforts to quantify food waste**. A food waste definition is also fundamental to the adoption of any food waste reduction targets. Aligning this definition with international approaches will allow for comparisons to be made across countries, and contribute to more accurate global/regional estimates of food waste.

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<sup>1</sup> Briefing to investigate food waste in New Zealand, Report of the Environment Committee, March 2020

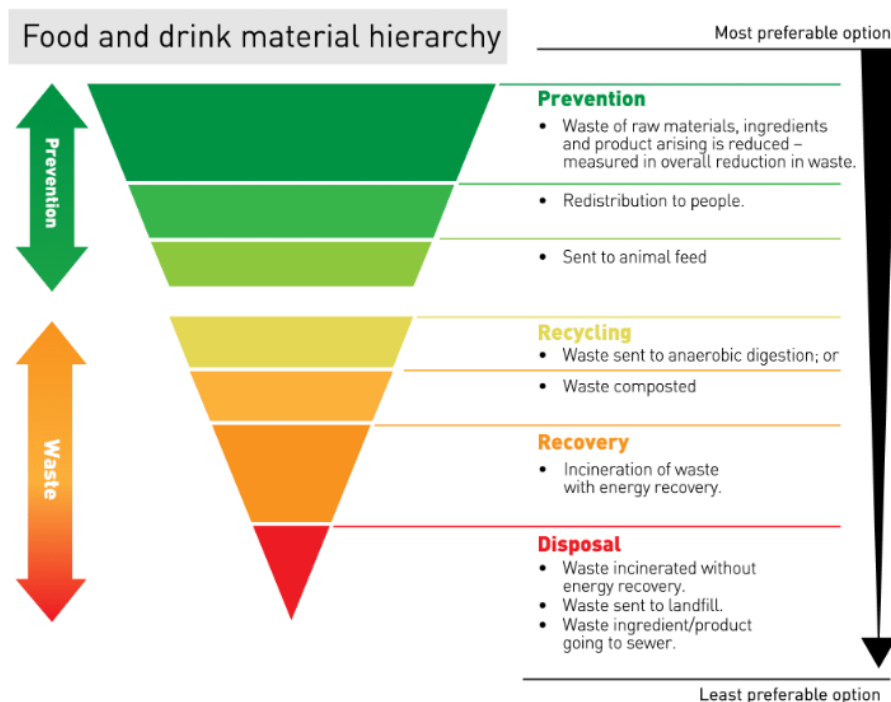
## Underpinning concepts

Establishing a definition for food waste is the first step in a **broader work programme to reduce the amount of avoidable food waste that is sent to landfills and other low-value end destinations.**

Underpinning this work are two key concepts. The first is the circular economy - that food waste is not simply disposed or discarded, but is instead used to enrich biological systems and produce additional food.



The second concept is the food waste hierarchy, which ranks uses for food waste from most preferable (societal benefit) to least. The hierarchy moves from food waste prevention as the most preferred option; to feeding people and animals, and enhancing natural systems; with disposal to landfill considered a last resort. The aim therefore is broader than diverting food waste to landfill, but to ensure that it is either prevented in the first instance or moved higher up the waste hierarchy.



## Proposed definition of food waste

The proposed definition for food waste in New Zealand has been developed with consideration of international guidance on defining food waste. The proposed definition has notably been informed by, and is consistent with, the following international guidance on defining food waste:

- FUSIONS Definitional Framework for Food Waste (2014) – European Union;
- Guidance on interpreting Sustainable Development Goal Target 12.3 (2017) – Champions 12.3; and
- The Food Loss and Waste Accounting and Reporting Standard (2016) - Food Loss & Waste Protocol.

This definition is largely based on the FUSIONS definitional framework, which outlines resource flows and end destinations across the food supply chain (Figure 1). **We propose to adopt the FUSIONS definition of food waste, with one proposed change** to include surplus food that is used to produce bio-based materials, or for biochemical processing, as food waste. Further discussion of particular aspects of the proposed food waste definition is presented in the following sections.

### Food waste is defined as:

- Imported or domestically produced food, including inedible parts of food, that is removed from any part of the food supply chain to be recovered or disposed of in New Zealand.

### Definition of terms

**'Food'** is defined as:

- 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. Food 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.

*Food Loss and Waste Accounting and Reporting Standard, 2016.*

**'Inedible parts of food'** are defined as:

- 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. 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.

*Food Loss and Waste Accounting and Reporting Standard, 2016.*

**'Food supply chain'** is defined as:

- The connected series of activities used to produce, process, distribute and consume food, beginning from the point that crops and livestock are ready for harvest or slaughter through to the point where food is consumed by humans.

*Adapted from FUSIONS Definitional Framework for Food Waste, 2014.*

Figure 1: FUSIONS definitional framework for food waste

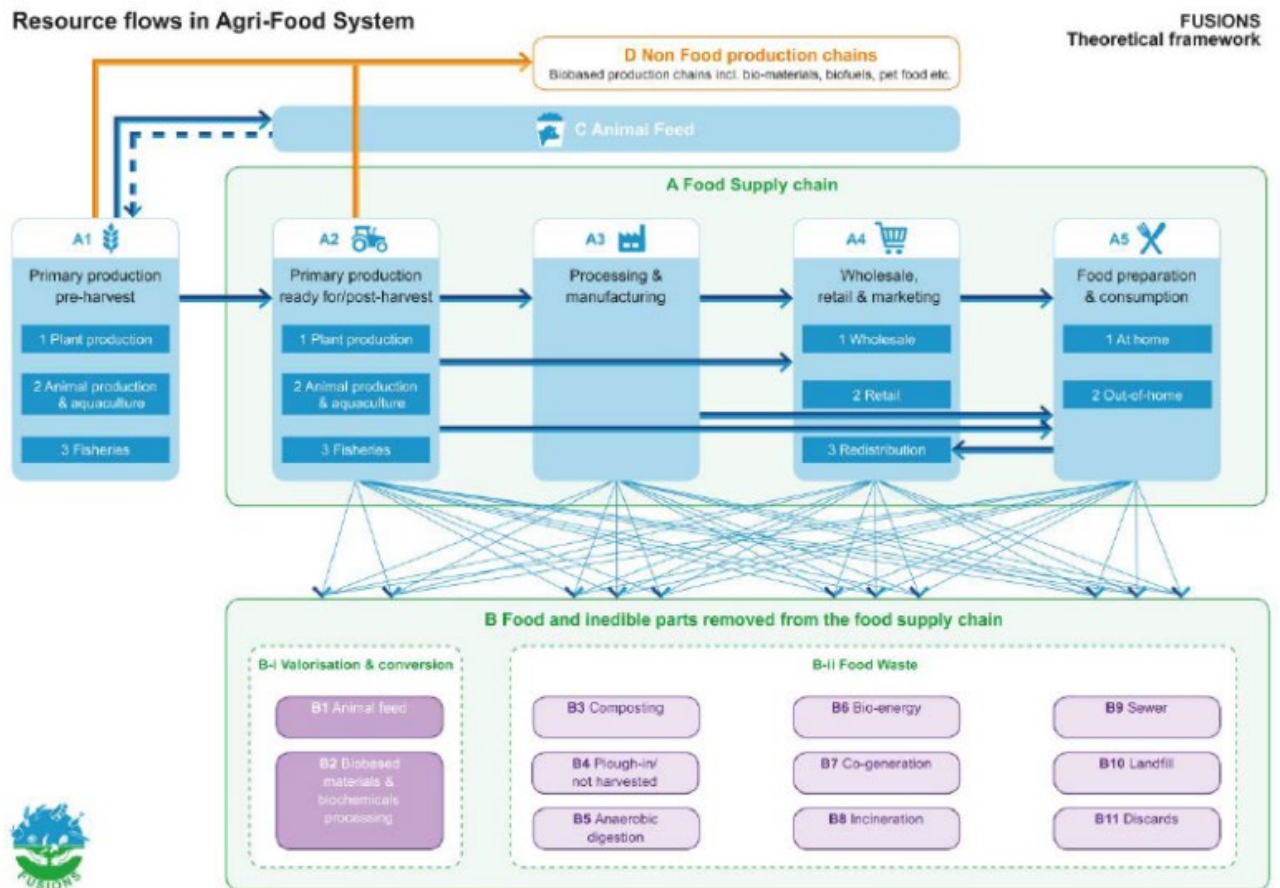


Table 1: Comparison of selected food waste definitions

	New Zealand (Proposed)	EU (FUSIONS)	Australia
Food waste definition	<p>Imported or domestically produced food, including inedible parts of food, that is removed from any part of the food supply chain to be recovered or disposed of in New Zealand.</p> <p><i>*Food, inedible and food supply chain are defined separately.</i></p>	<p>Any food, and inedible parts of food, removed from the food supply chain to be recovered or disposed (including composted, crops ploughed in/not harvested, anaerobic digestion, bio-energy production, co-generation, incineration, disposal to sewer, landfill or discarded to sea).</p>	<p>Solid or liquid food that is intended for human consumption [including] food that does not reach the consumer or reaches the consumer but is thrown away. This includes edible food, the parts of food that can be consumed but are disposed of, and inedible food, the parts of food that are not consumed because they are either unable to be consumed or are considered undesirable (such as seeds, bones, coffee grounds, skins, or peels).</p> <p>[Includes] food that is imported into, and disposed of, in Australia</p>

			[as well as] food that is produced or manufactured for export but does not leave Australia.
<b>Key differences</b>		Bio-based materials and biochemical processing excluded.	

## Components of the proposed food waste definition

### Food loss and waste

Food loss is defined by the FAO as the decrease in the quantity or quality of food that occurs in the production or manufacturing stages of the food supply chain. Similarly, food waste is defined as the decrease in the quantity or quality of food that occurs at the retail or consumer stage.

The proposed food waste definition encompasses both food loss and food waste. This is consistent with international approaches and guidance (with FAO being an outlier), which typically support adopting a wider scope when defining food waste. Incorporating both food loss and waste within a single definition provides a whole-of-supply chain perspective, while still allowing for food loss and waste from specific parts of the food supply chain to be viewed in isolation. Including food loss within a wider food waste definition makes sense as food loss exhibits the same problems of resource inefficiency that food waste does. For instance, Champions 12.3 guidance for interpreting SDG 12.3 suggests that targets for the reduction of food waste should equally apply to food loss.

### Edible and inedible food

The proposed definition includes both edible and inedible parts of food (such as bones, rinds, and pits/stones). This makes sense from both a resource efficiency perspective, where we are concerned with the total resources lost (whether this presents as edible or inedible), as well as a practicality standpoint when measuring and reporting food waste. It is worth noting that what is considered 'inedible' is often context-specific and may be open to some small measure of interpretation.

While edible and inedible food are both considered within the proposed food waste definition, measuring and reporting on avoidable and unavoidable food waste is still best practice - particularly for household food waste. This is something that falls out of the scope of a definition, but can be communicated through guidance.

### Only food recovered or disposed in New Zealand considered

Food waste includes waste from both food produced domestically and food that is imported. Food waste that occurs from the export of food produced in New Zealand is not considered food waste. This recognises that food waste is only considered within the context of where food is recovered or disposed, and prevents double counting of food waste internationally.

### Packaging excluded

As food packaging in general is not intended for human consumption, it is not considered food waste. The *Food Loss and Waste Accounting and Reporting Standard* provides guidance on ways to exclude the weight of packaging when measuring food waste.

### Pre-harvest food loss

Consistent with the FUSIONS framework, the proposed definition for food waste in New Zealand begins when food enters the food supply chain, i.e. is ready for harvest/slaughter. This means that food losses prior to this point are out of scope. This includes:

- unutilised potentially edible resources – i.e. by-products of the production process not intended to be consumed e.g., culling of bobby calves;
- unutilised raw materials – e.g., removal of livestock or crops before maturity due to pest/disease/ weather events; as well as
- inefficiencies in food production systems that may mean less food than optimal is produced.<sup>2</sup>

Food that reaches harvest maturity but is subsequently removed from the supply chain or does not enter the supply chain due to cosmetic or market-based reasons (e.g. produce that is too small) is still considered waste.

Preventing and reducing food waste is only one part of increasing the sustainability of the food supply chain and food system as a whole. While ultimately outside of the scope of the proposed food waste definition, reducing the loss of resources pre-harvest is an important part of improving how efficiently we produce food, and use resources generally.

As the problem of food and resource loss pre-harvest is somewhat different to that of food waste post-harvest (e.g., consider crop loss due to adverse weather), it may be appropriate to consider these two issues separately. For instance, solutions to improving the resource efficiency of food production systems are likely to look different than solutions to reducing the amount of supermarket food disposed of in landfills. We note that the Ministry for Primary Industries did embark on a work programme to reduce food loss in the primary sector, which was subsequently paused. This may be an area for further exploration in future.

### Food that is 'ready for harvest' in scope

Defining the point at which crops or livestock become ready for harvest/slaughter is a complex task that is often driven as much by commercial/market considerations as by crop/animal physiology and edibility.<sup>3</sup> It may therefore be difficult to distinguish what is considered ready for harvest (and therefore potentially food waste) from food that has not yet reached harvest maturity.

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<sup>2</sup> FUSIONS Definitional Framework for Food Waste (2014) – European Union

<sup>3</sup> Exploring how farmers can be supported to collaborate in measuring food surplus and waste and identifying production efficiencies (2018) - WRAP

In general, crops that are purposefully not harvested due to factors such as unfavourable market conditions are considered food waste. However, crops that are ploughed-in or otherwise removed from the food supply chain before they reach harvest maturity are not considered food waste. While this distinction may not always be clear cut, this is a useful starting point to consider. This issue will be further explored in conjunction with the Ministry for Primary Industries, potentially as part of its work on reducing food loss in the primary sector.

There is international support for including food that is ready for harvest within the definition of food waste.<sup>4</sup> This is because food that is ready for harvest is both intended for and fit for human consumption, and the removal of this food from the food supply chain represents a significant loss of resources. While there are challenges with collecting data on crops that are ready for harvest, but are not ultimately harvested, international guidance suggests that including these crops within a food waste definition will provide motivation for collecting this data and inspire innovations to reduce this type of food waste.<sup>5</sup>

## **Destinations**

The proposed definition of food waste encompasses all destinations of food outside the food supply chain (e.g. landfill, compost etc.), but excludes food that is redistributed or used for animal feed. This is discussed further below. This interpretation includes the following destinations outlined by the Food Loss & Waste Protocol (further defined in Appendix One):

- Bio-based material/biochemical processing;
- Co/anaerobic digestion;
- Compost/aerobic;
- Ploughed-in/not harvested;
- Land application;
- Controlled combustion;
- Landfill;
- Sewer; and
- Refuse/discards

### Food redistribution not in scope

Food redistribution, including food recovery, is out of scope of the proposed definition of food waste. This is because when food is redistributed, it is retained within the food supply chain. Redistributed food moves from producers and retailers to humans for consumption whether this is at home (e.g. traditional food bank) or out-of-home (e.g. Everybody Eats). Food that is redistributed but subsequently disposed of is considered food waste. This is consistent with the FUSIONS framework and international approaches and guidance.

### Animal feed not in scope

Surplus food that is used for animal feed is excluded from our definition of food waste. This is because animal feed is primarily used as an input in the production of animal products, and therefore reintroduced into the food supply chain. In this aspect, surplus food used as animal feed can be considered as fulfilling its intended purpose of human consumption, albeit in an indirect way. In addition to the FUSIONS framework, excluding animal feed from the food waste definition is consistent with guidance from Champions 12.3, WRAP and the FAO.

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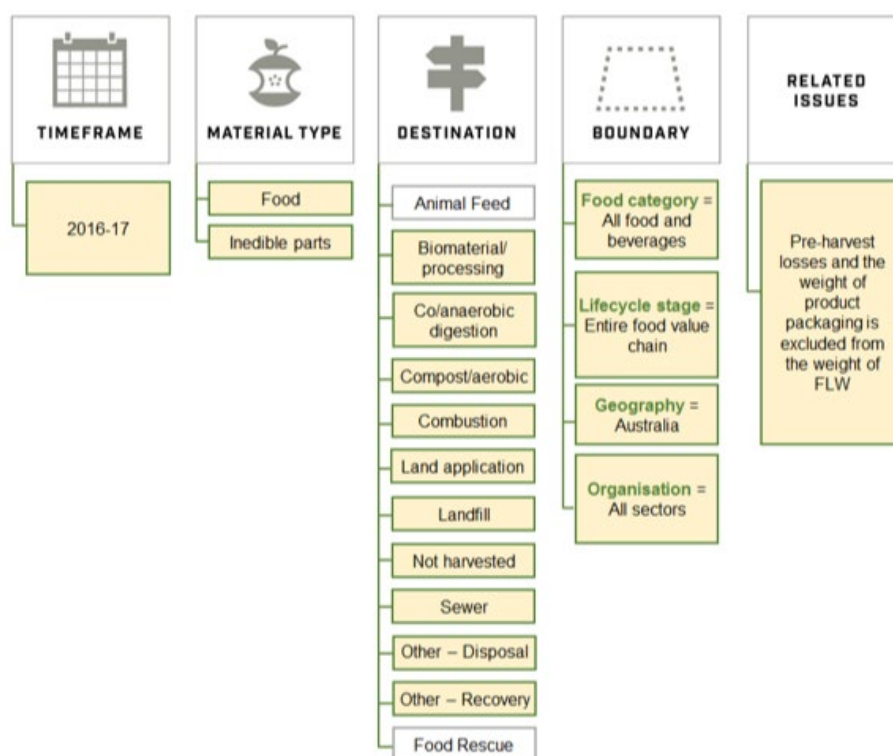
<sup>4</sup> Including FUSIONS, Waste & Resources Action Plan (WRAP) and Champions 12.3

<sup>5</sup> Guidance on interpreting Sustainable Development Goal Target 12.3 (2017) – Champions 12.3

## Bio-based materials/ biochemical processing in scope

The key difference between the proposed definition of food waste and the FUSIONS definition, is that surplus food that is used in the production of bio-based materials and for biochemical processing is included in our definition of food waste. This is because surplus food that is used to produce bio-based materials and for biochemical processing leaves the food supply chain and is not necessarily re-introduced. Under this interpretation, biomaterial and biochemical production are considered food waste destinations with high-valorisation potential. This places biomaterial and biochemical production at the top of the food waste hierarchy destinations which remain in scope of the definition. While at odds with the FUSIONS framework and Champions 12.3 guidance, including bio-based materials and biochemical processing within the scope of our definition is consistent with the approach taken in Australia to quantify food waste.

**Figure 2 – Boundaries of Australian Food Waste Baseline Assessment**



## Visibility of key waste streams outside of the definition

One risk of excluding animal feed and food redistribution from the definition of food waste is that any measuring or reporting standards attached to the definition will not apply. It is, however, important to understand where food being diverted from waste is going, and to retain visibility over the amount of food being redistributed or converted to animal feed. This issue can be resolved by providing guidance on the continued measurement and reporting of these waste streams as part of any efforts to quantify food waste in New Zealand.

## Appendix One: FLW Protocol description of destinations

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FLW DESTINATION	DEFINITION
<b>Animal feed</b>	Diverting material from the food supply chain <sup>a</sup> (directly or after processing) to animals
<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>Codigestion/anaerobic digestion</b>	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)
<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

<sup>a</sup> Excludes crops intentionally grown for bioenergy, animal feed, seed, or industrial use