

NATIONAL FOOD WASTE BASELINE

Final assessment report – Executive Summary

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Project Partners

Technical and review

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- Fight Food Waste Cooperative Research Centre
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EXECUTIVE SUMMARY

Australia generated an estimated 7.3 million tonnes (MT) of food waste in 2016/17 from across the entire supply and consumption chain. The waste was managed in a wide variety of ways depending on its characteristics and the sector that generated it. Across the supply and consumption chain, 1.2 MT was recycled, 2.9 MT was recovered and 3.2 MT was disposed.

The National Food Waste Baseline project is the first detailed quantification of food waste in Australia at the country scale and across the full food supply and consumption chain, from primary production through to consumption and disposal or recovery. It was developed in response to the National Food Waste Strategy (the Strategy) released by the Australian Government in November 2017 to contribute toward global action to reduce food waste and align with the United Nations' Sustainable Development Goal (SDG) Target 12.3¹, which aims to ensure sustainable consumption and production patterns. The Strategy also helps give effect to Australia's obligations under the United Nations Framework Convention on Climate Change to reduce greenhouse gas emissions, primarily through the diversion of food waste from disposal outcomes.

The Strategy sets the objective to halve food waste along the supply and consumption chain by 2030. The Strategy adopts a circular economy approach that takes into account the food waste hierarchy and seeks to capture food waste as a resource.

Total food waste generation of 298 kilograms per capita² (7.3MT nationally) constitutes the National Food Waste Baseline.

Generation of food waste is not evenly dispersed along the supply and consumption chain. Households and primary production are the largest waste generating sectors, together accounting for 65% of national food waste. Significant volumes are also generated in food manufacturing (24%) (Figure 1).

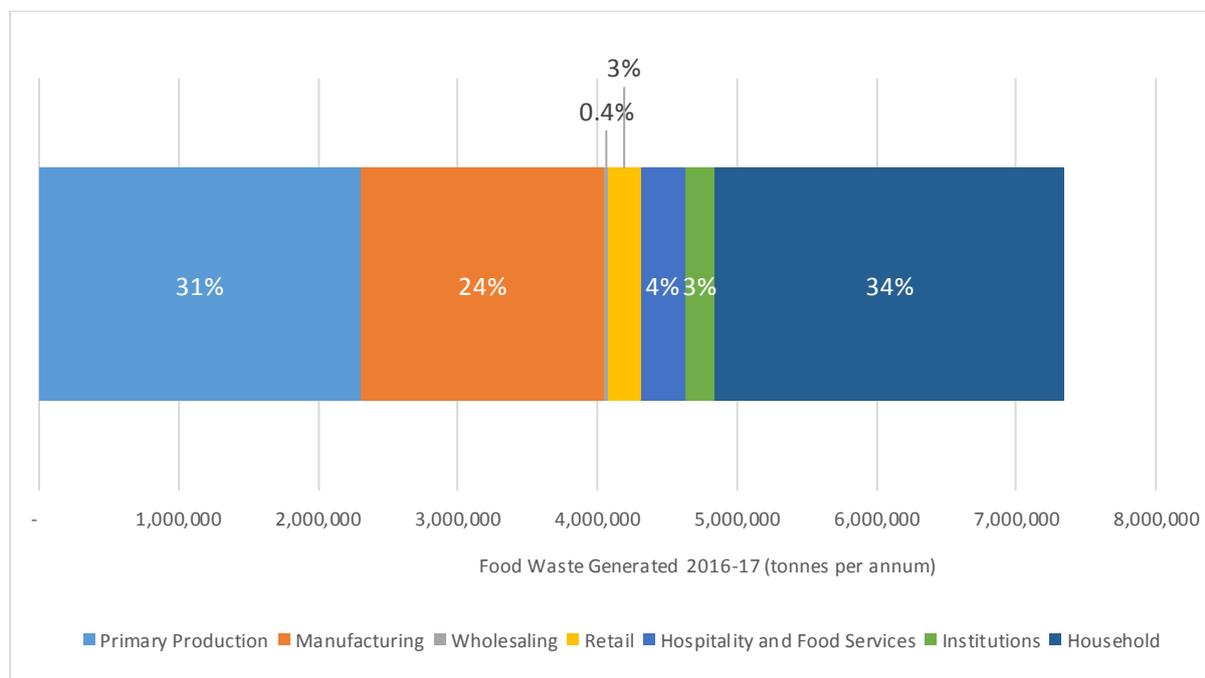


Figure 1: National food waste generation by sector, 2016/17 (Food waste from the transport sector is integrated into these quantities)

¹ Transforming our world: 2030 Agenda for Sustainable Development; www.un.org/sustainabledevelopment/development-agenda/

² Australian population on June 30, 2017 – 24.59 million (Australian Bureau of Statistics)

A critical determinant in the baseline estimate of national food waste generation is how food waste is defined in the Strategy. This is more specific than how waste is defined in the Australian Government's 2018 National Waste Policy. Waste is defined as material that has finished initial use and entered a waste stream, including material that is recycled and landfilled³. This definition supports most state and territory government waste strategies with the primary aim to divert material from landfill to any productive use.

The Strategy defines food waste as:

- Solid or liquid food that is intended for human consumption and is generated across the entire supply and consumption chain.
- 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).
- Food that is imported into, and disposed of, in Australia.
- Food that is produced or manufactured for export but does not leave Australia.

While many governments have committed to the United Nations' SDG Target 12.3, each country has developed its own approach to quantifying and defining food waste. The National Food Waste Baseline methodology incorporates leading international approaches – including from the United Kingdom⁴, Europe⁵ and the multi-stakeholder initiative Champions 12.3 – and the key Food Loss and Waste (FLW) Accounting and Reporting Standard developed to support SDG Target 12.3.

The centrepiece of the FLW Standard's definitional framework is a finite set of possible destinations for food material and its associated inedible parts, other than going direct to human food. Three modifications were made to the suite of destinations to suit the Australian food and waste context: the 'Other' category was divided into recovery and disposal destinations; Refuse/Litter was deleted given this data is very minimally collected for food waste in Australia; and Food Rescue has been specifically quantified as an area of particular policy and business interest in waste avoidance rather than a waste destination.

To apply the conceptual framework, the Australian Government has designated each of the modified 12 destinations as either a food outcome or a food waste outcome, based on the context of Australia's food industry and the objectives of the Strategy. All destinations have been designated as waste except for Food Rescue and Animal Feed, which in line with practice in the UK⁶ and elsewhere have been considered food outcomes as they remain within the human food system.

While all other destinations are considered waste, they are not all equal. The conventional waste hierarchy ranks waste outcomes by preference, with various tiers of resource recovery being clearly preferable to disposal. The food waste hierarchy adds another filter, with priority given to activities that avoid food waste by keeping food in the food system.

Broadly, three types of activities are recognised as avoiding food waste: reduction of food waste through efficiency and optimisation at all points of the supply and consumption chain; repurposing food waste streams into new food products; and redistributing surplus food within the food system (food rescue).

This priority focus does not devalue initiatives to move up the hierarchy any food waste that is generated. Resource recovery activities such as composting, rendering and energy conversion provide significant triple bottom line value as food waste initially destined for disposal is diverted to resource recovery or higher value activities. These activities and outcomes will also continue to be driven and measured by state and territory governments, and at a national scale by the Australian Government's National Waste Policy and the National Waste Report.

³ National Waste Policy: Less Waste More Resources, 2018

⁴ Food Surplus and Waste Measurement and Reporting, A Reference Document for Suppliers, 2018. WRAP UK

⁵ FUSIONS Definitional Framework for Food Waste, 2014

⁶ http://www.wrap.org.uk/sites/files/wrap/Animal_feed_info_sheet.pdf, accessed 05/11/2018

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The baseline project has shed light on the Australian food industry and consumer practices by identifying where food waste is being generated at the sector level across the supply and consumption chain, and by state and territory. Arcadis' confidence in the food waste estimates is moderate across the board, with lower confidence in some sectors. The data available for wholesale, retail, hospitality and some food manufacturing sub-sectors is limited, while transport has been separately reported due to data challenges isolating food waste from this sector.

The sector-by-sector analysis indicates households, primary production and manufacturing are the largest generators of food waste, which helps to identify opportunities to reduce food waste at scale (Table 1). It indicates the preferred approaches currently used by the various sectors that comprise the food chain, including households, with each sector typically favouring a small number of pathways based on its individual operating context.

Table 1: A summary of destinations for food waste and surplus, quantified by sector (kT)

Destination	Primary Production	Manufacturing	Wholesale	Retail	Hospitality	Institutions	Households	Total	Total per capita (kg)
Bio-based materials / biochemical processing	-	105	-	-	-	-	-	105	4.3
Co-digestion / anaerobic digestion	-	74	-	8	-	-	-	82	3.3
Composting / aerobic processes	-	716	14	47	17	-	198	992	40.4
Other – Recovery	-	113	-	-	-	-	-	113	4.6
Controlled combustion (energy recovery)	-	7	-	-	-	-	-	7	0.3
Land application	-	487	-	-	-	-	-	487	19.8
Not harvested / ploughed in	2,270	-	-	-	-	-	-	2,270	92.3
Other – Disposal	-	-	-	-	-	-	-	-	-
Landfill	-	62	13	177	307	209	2,302	3,070	124.8
Sewer / Wastewater treatment	-	194	-	-	-	-	-	194	7.9
Total	2,270	1,758	27	232	324	209	2,500	7,320	297.7
Animal feed	337	3,437	25	135	-	-	-	3,934	160.0
Food rescue	11	19	1	17	0.4	0	-	48	2.0

* Food waste from transport is integrated into these quantities but discussed separately.

The two largest sources of food waste nationally are household food waste to landfill and harvest-ready produce that is not harvested and / or ploughed in. Other significant streams include food manufacturing waste disposed to land application or composting and food waste from the hospitality and institution sectors.

Surplus food redistributed to food rescue or diverted to animal feed are considered to remain within the human food system. Significant quantities are sent to animal feed from early in the supply chain, where it predominantly goes to feed animals for subsequent human consumption.

It is worth noting the only specific exclusion within the National Food Waste Baseline, which is sugarcane fibre (bagasse). The bagasse left after sugar refining, which is an inedible part associated with food, accounts for around 28% (by weight) of the raw sugarcane and in 2016/17 totalled 10 MT⁷. The bagasse proportion has also been applied to harvest losses that remain in the field, totalling 1 MT of bagasse in 2016/17. This 11 MT has been excluded from the baseline quantification as it significantly skews the national food waste estimate, particularly in Queensland where the sugar industry is highly concentrated. Removing it from the dataset allows more refined analysis and comparison across the economy, and better reflects the scale of food waste generation in the rest of the food manufacturing sector.

Waste from the sugar industry is already well utilised, with mill-generated bagasse primarily combusted to generate on-site power. The waste stream is a target of various state and Commonwealth government research and grant programs⁸ and the Queensland Biofutures 10-Year Roadmap and Action Plan⁹.

Figure 2 illustrates the distribution of food waste generation across Australia, identifying states and territories for priority focus. This follows population as well as specific agricultural and manufacturing sectors concentrated within each jurisdiction.

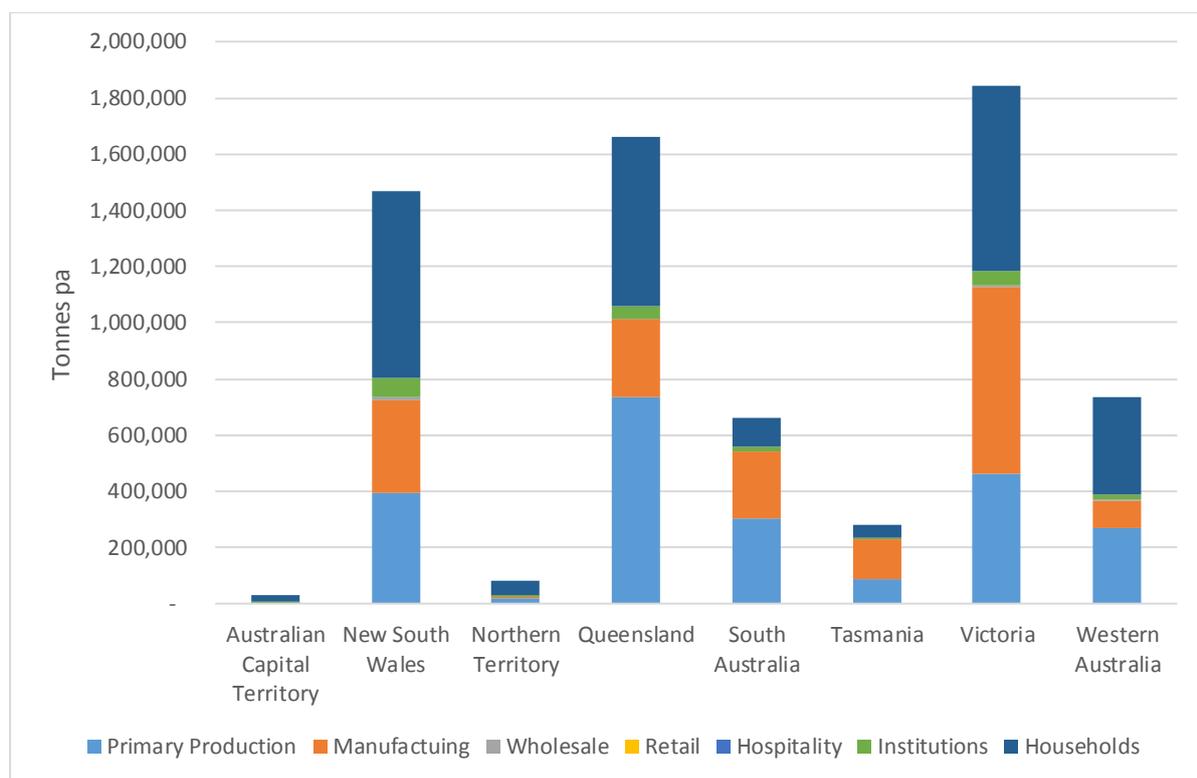


Figure 2: A breakdown of food waste generation by jurisdiction (excluding bagasse)

The National Food Waste Baseline provides a benchmark for measuring national performance in implementing activities to avoid and recover food waste, by establishing a consistent framework to quantify food waste generation and to track progress towards the target of halving food waste.

National food waste figures, however, are not particularly useful for international comparison. There are two reasons for this. Firstly, food waste generation is a function of multiple factors unique to each country, including business and consumer practices, economic mix and scale, systems of government, food culture, social demographics, infrastructure, geography and climate. The Australian

⁷ Estimate by the Sugar Cane Milling Council

⁸ www.daf.qld.gov.au/business-priorities/plants/field-crops-and-pastures/sugar/funding-bodies

⁹ www.statedevelopment.qld.gov.au/industry-development/biofutures.html

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agricultural base and food context is distinct from cold climate Canada, the compact UK and the food tastes of Asia.

Secondly, country figures cannot be directly compared due to differences in the way food waste is defined, even where similar overall food waste accounting frameworks have been applied, and in the scope of data and the collection methodologies. These differences can be overt, such as the UK excluding primary production or the key US analysis by ReFED defining food waste exclusively as that sent to landfill. Differences can also be hidden in the detail, such as the critical designation of destinations as food or waste, and the position on whether to include the inedible parts of food, which represent a significant proportion of food waste.

Data quality and coverage is also highly variable, all of which inject significant uncertainty into any comparison of food waste performance between countries.

The United Nations SDG Target 12.3 is *by 2030, to 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*¹⁰. Each country is at liberty to choose how to define their individual baseline estimates based on an internally consistent methodology and recognising the data available within the country and its context. Australia has adopted a broad approach, both to the definition of food waste and the scope of the food supply and consumption chain.

As the first detailed attempt to quantify total food waste generated in Australia, the baseline project has been informed by a large number of data sources and via consultation with a wide range of stakeholders, including:

- Industry groups, which in most cases had limited data on industry-wide generation or typical loss factors, but were useful in setting context and helping engage their sector
- Research organisations, including Commonwealth Scientific and Industrial Research Organisation (CSIRO), Research and Development Corporations (RDCs), Cooperative Research Centres (CRCs) and universities
- State and local government agencies and departments, including variously environment, waste, agriculture and industry, and public sector operating entities such as health, aged care, education and corrections
- Australian Government departments, including environment, defence and agriculture
- The Steering Committee of the National Food Waste Strategy.

The limited prior attention to food waste in Australia and commercial confidentiality constraints resulted in mixed results on data acquisition. Many organisations do not have reporting frameworks in place to track their food waste by volume or economic value. The data collected can be highly variable, with uncertain protocols on data management, food waste definition and transparency on end destinations.

The approach to data collection and modelling was designed to address these issues to the fullest extent possible, including verifying the approach with experienced food waste practitioners in Australia and the UK, assessment of best practice internationally and direct consultation with local stakeholders to gather data and validate assumptions.

More than 300 organisations were engaged through a structured consultation between March and June 2018, based on written survey templates across the community and direct interviews with key stakeholders. Of these, 91 submitted some level of data, while others provided anecdotal and contextual information or informal estimates to help sanity check the results. Analysis of the available waste and industry profile data for each sector informed a “best fit” approach to modelling in order to scale up the data to national level. In some cases, the reliance on indicative waste factors and assumptions was relatively high.

There are opportunities to refine the National Food Waste Baseline assessment in future iterations as more data becomes accessible. Over time, targeted research and industry engagement, such as through the work of the Fight Food Waste Cooperative Research Centre and the implementation

¹⁰ <http://www.fao.org/sustainable-development-goals/indicators/1231/en/>

phase of the National Food Waste Strategy by Food Innovation Australia Limited are expected to support and improve the reach and rigour of food waste datasets and strengthen the reporting framework and its capacity to accurately track performance and identify further opportunities to reduce food waste.

