

Appendix B

Report prepared by Associate Professor Miranda Miroso

We have appended the report prepared by Associate Professor Miranda Miroso. It summarises the evidence we received in submissions. It also provides advice, and proposes recommendations for our findings on the briefing.

Report prepared by Associate Professor Miranda Miroso
June 2019

Contents

Summary of Recommendations 4

1. Introduction 10

 1.1 Global policy issue 10

 1.2 Where New Zealand fits in 11

 1.3 Targeted briefing process 16

2. The Food Waste Problem 17

 2.1 How much food is lost or wasted in New Zealand? 17

 2.2 What is the environmental impact of food waste? 24

 2.3 What is the economic and social impact of food loss or waste? 26

 2.4 What are the challenges associated with our food waste data? 28

3. Preventing Food Waste 31

 3.1 What are effective methods to prevent food loss or waste? 31

 3.2 What are the challenges for putting these methods in place? 45

4. Redistributing Food Waste..... 59

 4.1 What are effective methods for redistributing food waste to people? 59

 4.2 What are effective methods for converting food waste to animal feed? 64

 4.3 What are the challenges for putting these methods in place? 65

5. Conclusion.. 72

 A summary of where we are at 71

 A road map process 73

Appendices:

 Additional information requested by the committee during the briefing process 75

 Published Written Submissions (WS) 80

 Hearing of Evidence (HoE) 81

Figures

Figure 1 Organisational process chart highlighting key priorities, work groups and actions 9

Figure 2 MfE’s key legislation, policies and initiatives relating to food waste 13

Figure 3 Local government key legislation, policies and initiatives relating to food waste..... 14

Figure 4 Summary of New Zealand food waste by sector by overall tonnage 23

Figure 5 The business case for reducing food waste..... 27

Figure 6 Australia national food waste generation by sector, 2016/17 29

Figure 7 Possible approaches for reducing food loss and waste..... 31

Figure 8 A retailer’s perspective on the date labelling issue..... 34

Figure 9 Actions the New Zealand Defence Force take to reduce their food waste..... 39

Figure 10 New Zealand's Love Food Hate Waste Campaign 43

Figure 11 Food and drink use hierarchy 48

Figure 12 ReFed's Marginal Food Waste Abatement Cost Curve 52

Figure 13 The challenges for putting a Voluntary Agreement in place 56

Figure 14 Where we are at across the supply chain: What we know, don't know and need to know..... 72

Figure 15 Recommendations (R1-41) organised according to the 3-step framework 'Target, Measure & Act' 74

Summary of Recommendations

I commend the Government and the select committee for highlighting food waste as an issue of national significance. My key recommendations to the committee are that New Zealand needs:

Recommendations

A definition of food waste

1. A national definition of food waste with clear parameters and boundary conditions needs to be adopted. International best practice suggests that this should be broad and inclusive to include any food, and the inedible parts of food, removed from the food supply and consumption chain to be recovered or disposed.

A national food waste baseline

2. Collecting robust measures of food waste quantities, types and associated costs should be a key priority.
3. New Zealand needs a detailed National Food Waste Baseline in order to determine where the 'hotspots' (i.e. the most impactful areas) are.
4. In order to be able to measure progress, a budget should be set aside for the baseline to be measured again in 2025 and 2030.
5. For consistency, baseline methodology should be aligned with international approaches. This will also enable New Zealand to tap into lessons learned and benefit from advice and support from other countries. Public reporting of the baseline results is encouraged.
6. In addition to government investment in a national baseline, companies should make it a priority to collect their own specific baseline data.

Continued funding of R&D of value-added products made from food waste

7. Government, in conjunction with industry, should consider ways to continue co-funding research and the development of value-added products made from food waste.

A review of food date labelling practices

8. Given the current consumer confusion, and in light of international activity to ensure date label requirements are calibrated with food waste reduction as well as food safety considerations, a review of date labelling is needed.

9. Educational messaging that helps consumers interpret current and future labelling should be provided as a key element of any public awareness raising campaigns about food waste.

A review of packaging labelling and design practices

10. Given the apparent contradictions about the role of packaging in food waste, more research is needed on the value of packaging in reducing food waste.
11. The review would include an assessment of research being undertaken to understand the most effective packaging approaches and technologies for New Zealand food products. It will also be important to better understand how best to communicate the advantages of any packaging solutions to consumers at a time where there is negative public sentiments about packaging waste.

Education for businesses on the legality and safety of 'doggy bags' so that more customers can take away leftovers

12. More active messaging from the Ministry for Primary Industries is needed to dispel the myth that food businesses should not provide 'doggy bags' to customers.
13. More education is needed on how to package food so that it can be taken home and reheated safely.

Businesses to monitor and report their food waste data

14. Government should consider requiring large food businesses including retailers and manufacturers to regularly measure and report on food waste in their business, including in their supply chain. It is essential that an agreed upon consistent method of measuring and reporting food waste is used to enable comparisons to be made.

Consumer education about food waste in schools

15. Consideration should be given to how food waste can be incorporated into lessons and extra-curricular activities at schools.

To adopt and communicate a national food waste reduction target

16. In order to set a national target aligned with SDG Target 12.3., stakeholders should work with the World Resources Institute and the UN Food and Agriculture Organization to implement the Food Loss and Waste Reporting and Accounting Standard, which sets out definitions and recommendations for targets, milestone targets and sub-indicators.

17. Cities, local governments and businesses across the food supply chain should also consider adopting food waste reduction targets.

To develop a national level food waste reduction strategy and implementation plan

18. New Zealand needs to develop a national food waste reduction strategy to ensure a nationally coordinated approach.
19. An implementation plan should be developed that sets out short, medium and long-term actions to support reductions in food waste. The plan should also detail a monitoring and evaluation framework to measure progress towards the reduction target. Reporting of progress should be transparent to ensure that best practice is shared.
20. The food waste hierarchy should form the basis of any resulting national strategy, policy decision and engagement.
21. Government should consider requiring businesses to report on their action on food waste according to the hierarchy.
22. Given the need to understand the most cost-effective ways to reduce food waste, an economic analysis is required to identify where opportunities exist for New Zealand to reduce food waste.

A collaborative whole supply chain approach to food waste prevention

23. Given the need for cross-government engagement on food waste, models for an appropriate forum for this should be explored.
24. This cross-government group should consider developing a policy framework in order to harmonise policies impacting on food waste.
25. There is significant potential benefit to be gained for New Zealand by implementing trans-Transman and regional approaches to reducing food waste and therefore consideration should be given to building these collaborative partnerships.
26. Existing public private partnership models should be reviewed, including WRAP's Voluntary Agreement programme, and consideration should be given to implementing whatever model or approach will work best for New Zealand.
27. New Zealand should also consider strategic opportunities to join existing global voluntary alliances, e.g. Champions 12.3 and Friends of Champions 12.3.
28. Collaboration with iwi and mana whenua on any development of a national strategy or agenda for tackling food waste is key to ensure that Te Ao Māori is incorporated into this discussion and that obligations under Aotearoa's Te Tiriti o Waitangi are upheld.

Sufficient resourcing of food waste prevention initiatives

29. Programmes should be funded that tackle sector-specific food waste through targeted education and provision of 'how to' resources, e.g. 'Love Food Hate Waste' for household food waste and 'Your Business is Food' for the hospitality sector.

More New Zealand-specific research

30. Government and industry should invest in food waste research.
31. To ensure research agendas are shared to avoid duplication and to leverage findings, a cooperative research approach should be explored.

To scale up our food recovery sector

32. Both the public and private sectors should explore how food rescue organisations can best be supported in their mandate.
33. Government should consider its legislative frameworks and how these could better support food recovery. Changes could include providing incentives to donate food waste to charities such as through tax breaks, or allowing for more flexibility in donor liability law so food rescue organisations can confidently ask food donors to pay for the removal of their unwanted food.
34. In order to encourage more businesses to donate food waste, the Ministry for Primary Industries should explore ways to help raise awareness of the "Good Samaritan" clause 352 in the New Zealand Food Act 2014.
35. Given the value in taking a more collaborative approach to food recovery, a national food recovery working group should be established to provide a forum to look at practical ways to increase food redistribution; discuss and share best practice; identify barriers and opportunities etc.
36. A national food recovery working group is strongly encouraged to consider alternative business models to food recovery, e.g. where larger organisations with bulk volumes pay for surplus food pickup services.
37. A national food recovery working group is also encouraged to consider strategies for diverting and redistributing large-scale food waste from producers and manufactures, such as might occur when an export order is rejected/cancelled or a whole product line is mislabelled.
38. Retailers should further investigate the use of technologies to make it easier for charities to know what food is available.
39. Retailers should consider the development of online portals and applications that provide alternative vehicles for donating, or selling/buying, surplus food.

To convert more currently landfilled food waste into animal feed

40. Given the business and environmental case for feeding food waste to animals, further consideration should be given to how best to scale up this conversion activity in New Zealand to ensure, suitable food which is currently going to landfill is instead fed to animals. A discussion about how to do this at larger scale should include a wide range of stakeholders including meat processors, retailers and potential customers to ensure that there is minimal negative public perception of the activity.

At the conclusion of this report, these 40 recommendations are organised according to a three-step framework 'Target, Measure, Act'. To move forward, I recommend to the committee that Central Government first hold a national Roundtable or Summit to bring together key stakeholders across the food supply and consumption chain to build support and consensus on approach for a national food waste strategy that sets a target and an implementation plan for measuring waste and actions to reduce it (Figure 1).

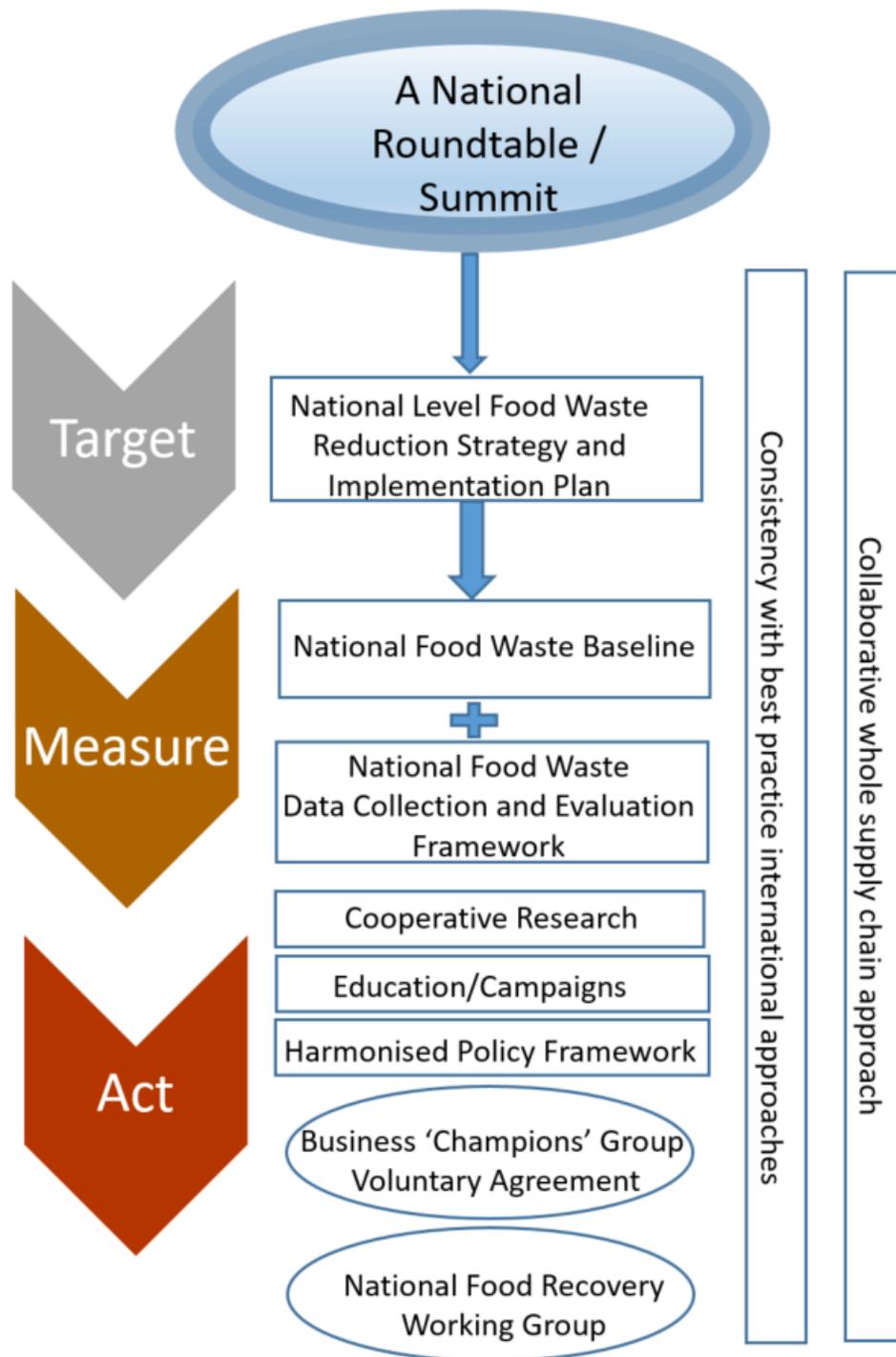


Figure 1 Organisational process chart highlighting key priorities, work groups and actions

1. Introduction

Food waste is a major issue in New Zealand. As a nation, we waste an estimated \$872 million worth of food a year. This represents 122,500 tonnes of food sent to landfills—enough to feed everyone in Dunedin for two years.¹ Members of the Environment Committee are concerned about the waste and decided to invite briefings from various organisations and individuals to find out more about the extent of the problem and investigate what can be done to reduce food waste.

Through a targeted briefing process and a cross-party approach, the committee sought to obtain a better understanding of the issues. I was appointed as a Specialist Advisor to the committee and in this draft report I summarise the evidence received by the committee and provide advice about, and recommendations for, the committee’s findings on the briefing. By understanding what the challenges are and what solutions might exist, it is hoped that the committee is better informed to recommend workable ways of preventing food waste.

This introductory chapter sets the scene with first a global (Section 1.1), and then a national look (2.2) at food waste as a policy issue. Further information about the briefing process is provided (2.3). Chapter 2 details the size and impact of the food waste problem, with chapters 3 and 4 providing an overview of current food waste prevention and redistribution actions with consideration given to the challenges associated with these. Recommendations on where New Zealand should go from here are made and include the need to set a national target, to measure food waste and to scale up waste reduction activities. Chapter 5 presents a summary of what we know, don’t know and need to know and a roadmap for action.

1.1 Global policy issue

With significant environmental, economic, and social implications, food waste is a pressing global issue. The United Nation’s Food and Agriculture Organisation (FAO) estimates that approximately a third of food produced for human consumption is lost or wasted globally. This is believed to be around 1.3 billion tonnes each year and is occurring at a time when over 800 million people are believed to suffer from chronic hunger and malnutrition. The environmental impact of this wasted food is also considerable as it generates about 8% of

¹WasteNot Consulting. (2015) New Zealand Food Waste Audits;
<https://lovefoodhatewaste.co.nz/wpcontent/uploads/2016/03/New-Zealand-Food-Waste-Bin-Audit-Report-2015.pdf>

global greenhouse gas emissions annually.² In light of such impacts, food waste reduction is now a high priority on global, national, and business agendas.

In September 2015, the United Nations General Assembly adopted a set of 17 Sustainable Development Goals (SDGs) as part of the 2030 Agenda for Sustainable Development. SDG 12 seeks to ensure sustainable consumption and production patterns. The third target (12.3) calls for halving per capita global food waste at the retail and consumer levels and reducing food losses along production and supply chains, including postharvest losses, by 2030. It has been touted as an ambitious yet achievable target which contributes to other targets such as the Zero Hunger Target and The United Nations Framework Convention on Climate Change.

To help convert Target 12.3 into reality, a global group of champions was formed with Secretariat support provided by the Government of the Netherlands and the World Resources Institute. This group called ‘Champions 12.3’, is a coalition of executives from governments, businesses, international organisations, research institutions, farmer groups, and civil society dedicated to inspiring ambition, mobilising action, and accelerating progress toward achieving SDG Target 12.3 by 2030.³ The group highlights that reducing food waste can generate a triple win: for the economy, for food security, and for the environment. They recommend a three step approach for reducing food loss and waste for governments and for companies: target, measure and act and have set out a roadmap for this⁴ and have annually measured global progress relative to this approach.⁵ The group has demonstrated that momentum toward achieving this target is growing but they have reminded the global community that only 11 years remain before the SDGs are due to be met and it is therefore important that all governments, companies, farmers, and individuals deepen their commitment and accelerate their efforts.

1.2 Where New Zealand fits in

As an export-orientated agricultural nation that relies heavily on our ‘clean green’ reputation, New Zealand has every reason to be at the forefront of efforts to reduce food waste. Our large scale primary food production sector means that a significant amount of food is likely

²FAO. 2011. Global food losses and food waste – Extent, causes and prevention. Rome. <http://www.fao.org/docrep/014/mb060e/mb060e00.pdf>

³ <https://champions123.org/about/>

⁴ Road map to achieving SDG Target 12.3 <https://champions123.org/wp-content/uploads/2017/09/champions-123-roadmap-to-achieving-sdg-target-123.pdf>

⁵ SDG Target 12.3 on Food Loss and Waste: 2016, 2017, 2018 Progress Reports. <https://champions123.org/publications/>

wasted at the production end of the supply chain, with Zespri alone for example, having self-reported wastage (as crop management) of 2.5 million trays of Kiwifruit for one year.⁶ Given that in medium and high-income countries, food is wasted mainly at the later stages in the supply chain, the prospect of a ‘double whammy’ (excess food wastage from both consumerism, and large scale primary food production) may well exist in New Zealand. Furthermore, our strong reliance on exporting has meant that New Zealand food is subject to very high international market requirements for aesthetic product perfection which is also a driver for food wastage.⁷

Culturally, New Zealand is well positioned to be taking a strong stance on food waste reduction. Te Ao Māori recognises the traditional system in which nothing was wasted – everything was able to be returned back to Papatūānuku without detriment to the whenua, awa or moana.⁸ There are a number of Māori organisations working to reduce wastage. Para Kore, for example, aims to empower and support marae, kura, kōhanga reo and organisations across Aotearoa to work towards zero waste.⁹

National waste context: Central Government

The submissions made by the Ministry for Primary Production (MPI)¹⁰ and the Ministry for the Environment (MfE)¹¹ outlined how Central Government currently interacts with the national waste landscape. MPI administers a number of regulatory systems that interact with food which are designed to, among other things, protect New Zealand from biological risk,¹² manage food safety risk to consumers,¹³ and support the sustainable use of resources.¹⁴ Figure 2 outlines key legislation, policies and initiatives that MfE are responsible for.

⁶ Radio New Zealand Rural News

⁷ WS 23 [Wellington City Council]

⁸ WS1 [Auckland Council]

⁹ WS16 [Para Kore Marae]

¹⁰ WS12 [MPI]. This submission details information on key legislation involved in these systems, provides a summary of their purpose, and identifies potential overlaps with food loss and waste.

¹¹ WS13 [MfE]

¹² Biosecurity Act 1993

¹³ Food Act 2014; Animal Products Act 1999; Wine Act 2003; Agricultural Compounds and Veterinary Medicines Act 1997; Australia New Zealand Food Standards Code.

¹⁴ Fisheries Act 1996

The Waste Minimisation Act and the Waste Disposal Levy

The Waste Minimisation Act 2008 (WMA) is the main legislation enabling the government's resource efficiency and waste portfolio. The WMA encourages a reduction in the amount of waste generated and disposed of. It also aims to reduce the environmental harm of waste and provide economic, social and cultural benefits. The waste disposal levy (the 'levy') is a key mechanism provided for under the WMA. The levy imposes a charge of \$10 per tonne on waste sent to landfill, and has a dual purpose: (1) The levy is designed to act as a deterrent to waste (including food) going to landfill; (2) it also provides for funding opportunities for waste minimisation initiatives which the Ministry distributes via the Waste Minimisation Fund.

The Waste Minimisation Fund (WMF) and food waste

The WMF funds part of total project costs, with applicants needing funding from other, non-WMF sources. The WMF has supported several projects focused on reducing food waste such as the Good Neighbour Food Rescue project¹⁵, the Love Food, Hate Waste campaign¹⁶ and several composting projects that recycle food waste into compost products.

The Climate Change Response Act 2002 (CCRA) & the New Zealand Emissions Trading Scheme (NZ ETS)

When sent to landfill, food waste releases methane because it decomposes without oxygen. The CCRA requires disposal facilities (generally landfills) to report their methane (CH₄) emissions, and in response, surrender New Zealand Units (NZUs) under the NZ ETS. The CCRA is administered by the Ministry, with the NZ ETS being the government's main tool for reducing greenhouse gas emissions. Alongside the levy, the NZ ETS represents the other key pricing mechanism to minimise waste in New Zealand. The NZ ETS price aims to reduce waste emissions, while the levy aims to reduce the volume of waste disposed to landfills.

Figure 2 MfE's key legislation, policies and initiatives relating to food waste

National waste context: Local Government

Figure 3 outlines key legislation, policies and initiatives at the local government level.¹⁷

¹⁵ Awarded funding in 2014, this initiative collects and redistributes surplus food in the Bay of Plenty.

¹⁶ Awarded funding in 2016 for a three-year term. Project administered by WasteMINZ.

¹⁷ WS13 [MfE]

In addition to central government, New Zealand territorial authorities (TAs) play a key role in waste minimisation and management at the local level. They primarily fund these activities from local rates revenue, but also receive some funding from the levy.

Each TA receives a share of total levy funds based on their population size as a proportion of the national population. Under the WMA, TAs must spend this levy funding on:

- a) Matters to promote or achieve waste minimisation; and
- b) In accordance with its Waste Management and Minimisation Plan (WMMP).

WMMPs detail the actions local authorities intend to undertake on waste minimisation, which in many cases involves initiatives related to food waste. For example, Auckland Council's WMMP 2018 contains as one of its nine key actions, "begin offering kerbside collection of food scraps". Horowhenua's WMMP 2018 includes an action to undertake detailed analysis of organic waste collection options the province could implement, including consideration of food waste collection.

As well as the collection of food scraps/food waste through kerbside services, many councils also run educational activities which cover food waste. Some councils also administer their own funding schemes (separate to the Ministry-administered WMF) that support local waste minimisation initiatives, including those addressing food waste.

Figure 3 Local government key legislation, policies and initiatives relating to food waste

New Zealand engagement with international efforts to reduce food loss and waste

As detailed in MPI's submission, New Zealand engages with international efforts to reduce food loss and waste through a number of key international fora.¹⁸ These include: Global Research Alliance on Greenhouse Gases¹⁹; United Nations Sustainable Development Goals; Food and Agriculture Organization; United Nations Environment Program; Organisation for Economic Co-operation and Development; United Nations Forum on Climate Change. Of particular note is our involvement in the APEC Policy Partnership on Food Security project 'Strengthening public-private partnerships to reduce food losses in the supply chain'. Chinese Taipei is in the concluding stages of a multi-year action plan to highlight the impact of food

¹⁸ WS12 [MPI]

¹⁹ New Zealand established a scholarship programme in partnership between the Global Research Alliance on Greenhouse Gases and the Climate Change, Agriculture and Food Security research programme. Up to 10 PhD students are funded by the US Agency for International Development in the field of food loss and waste. <https://globalresearchalliance.org/n/cliff-grads-awardees-for-2019/>

loss and waste in APEC economies. The plan aims to assist APEC member countries to achieve a 10% reduction by 2020 as part of the APEC Food Security Roadmap Towards 2020.²⁰

The Government's forward work programme for waste

This Government is committed to cutting waste. The Green-Labour confidence and supply agreement prioritises minimising waste to landfill with significant reductions in all waste classes by 2020.²¹ The MfE submission²² details the Government's forward work programme for waste as follows:

In August 2018, Associate Minister for the Environment Eugenie Sage announced a work programme to take action on New Zealand's waste through a circular economy approach. The key initiatives under this work programme are outlined on the Ministry's website.²³ A core project is applying the waste disposal level to more disposal facilities than at present, with work underway in this area. The levy expansion may result in financial costs for people and businesses to dispose of food waste (as a component of general waste), at a wider range of disposal facilities than in the past. Such costs will theoretically help to discourage food from being landfilled, and will ideally result in less food going to landfill in the future. The Government is also supportive of policies and methods that apply a 'circular economy' approach to waste and resource efficiency issues. Under this approach, there is a shift beyond waste minimisation to designing waste out of production processes. This aims to reduce the amount of waste created, and keep materials in productive use for as long as possible. MfE is undertaking a sectoral and regional analysis to identify circular economy net benefits in a range of sectors in New Zealand, including food and agriculture. This may provide some information about potential benefits of food waste reduction in these sectors. As such, looking ahead it is likely the Government will be supportive of food waste initiatives that support a circular economy approach.

The Government has also committed to combatting poverty. The Prime Minister's Child Poverty Reduction Bill is one of many measures to reduce child poverty in New Zealand.²⁴ Reducing or redistributing food waste is therefore an important area for focus, as it underpins two large commitments: reducing waste and reducing poverty. Furthermore, the New

²⁰ https://www.youtube.com/watch?v=4Ey1_I0tyYw

²¹ Labour-Green Party Confidence and Supply agreement p 4 "Healthy Environment".

²² WS13 [MfE]

²³ See <http://www.mfe.govt.nz/waste/what-government-doing>

²⁴ https://www.parliament.nz/en/pb/bills-and-laws/bills-proposed-laws/document/BILL_76267/child-poverty-reduction-bill

Zealand Government is already recognising its central role in driving progress and accountability on the SDGs, and the Ministry for Foreign Affairs and Trade (MFAT) notes on its website that ‘New Zealand government agencies are reviewing the goals and their alignment with government priorities’.²⁵

1.3 Targeted briefing process

Between October 2018 and May 2019, the committee considered the perspectives presented in written and oral submissions (listed at the end of this report). Twenty-six organisations and individuals that are involved in some way with the food sector, or with food waste, provided their views on the issues, challenges, and possible approaches by providing a broad and full range of perspectives, both from within New Zealand and internationally.

Terms of Reference for the briefing

The committee considered the following questions:

The food waste problem

- How much food is lost or wasted in New Zealand?
- What is the environmental impact of food waste?
- What is the economic and social impact of food loss or waste?

Preventing food waste

- What are effective methods to prevent food loss or waste in agricultural production, manufacturing, hospitality, food service sectors, retail sectors, and households?
- What are the challenges for putting these methods in place?

Redistributing food waste

- What are effective methods for redistributing food waste to people?
- What are effective methods for converting food waste to animal feed?
- What are the challenges for putting these methods in place?

All evidence received is available on the Parliamentary website.²⁶

²⁵<https://www.mfat.govt.nz/en/peace-rights-and-security/work-with-the-un-and-other-partners/newzealand-and-the-sustainable-development-goals-sdgs/>

²⁶ https://www.parliament.nz/en/pb/sc/submissions-and-advice/?custom=brf_78944

2. The Food Waste Problem

This chapter addresses the following three key questions set by the committee about the size and impact of New Zealand’s food waste problem:

- How much food is lost or wasted in New Zealand? (2.1)
- What is the environmental impact of food waste? (2.2)
- What is the economic and social impact of food loss or waste? (2.3)

The chapter ends by looking at the challenges associated with our food waste data and concludes that New Zealand needs more research into quantities and its associated costs. The recommendation is made to collect national food waste baseline data. (2.4)

2.1 How much food is lost or wasted in New Zealand?

Defining and measuring waste

In order to measure food waste it is first important to define it. The Food Loss and Waste Accounting and Reporting Standard (or FLW Standard), published in 2016, 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. The FLW Standard gives globally consistent and applicable definitions of the possible destinations for food and/or associated inedible parts removed from the food supply chain. It is users of the standard who decide what makes up the particular definition of “food loss” or “food waste” on which they report, based on their quantification goals.²⁷

The European Union (EU) FUSIONS project has been working on providing a definitional framework to harmonise the current definition within the EU28. They define food waste as 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-

²⁷ Source: The Food Loss and Waste Accounting and Reporting Standard. Washington, DC: World Resources Institute; Global Initiative on Food Loss and Waste Reduction. 2016. Definitional Framework of Food Loss and Waste. Rome: FAO. <https://www.flwprotocol.org/>. The FLW Standard has an evolving design as it continues to improve over time as quantification methods, data, and user needs evolve. Subsequent versions will incorporate these improvements.

energy production, co-generation, incineration, disposal to sewer, landfill or discarded to sea).²⁸

As an example of a country specific definition based on consideration of the FLW Standard and the FUSIONS definitional framework, Australia’s National Food Waste Strategy²⁹ adopts a broad and inclusive definition of food waste that covers:

- 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.

In adopting the above definition, food waste excludes food that is produced or manufactured in Australia and is exported and becomes waste in another country. This definition acknowledges that there are opportunities across the entire fresh and processed food systems to achieve improved environmental, economic and social outcomes.

For New Zealand’s food waste briefing, the terminology “food loss and waste” was used in the briefing note that went out to stakeholders, though these terms were not specifically defined.³⁰ For the purpose of simplicity and consistency, “food waste” is the term that is primarily used in this report. However, moving forward, it will be critical to ensure a standard definition is adopted that makes sense in our national context and is of relevance to all stakeholders.

²⁸ Drink and liquid waste, fish discarded to sea and waste of any materials that are ready for harvest, but which are not harvested, are included in FUSIONS’s definition of food waste, making its perimeter wider and broader than many other existing definitions. FUSIONS also considers inedible parts of food (e.g. skin, bones...) as food waste in order to support the development of resource efficient and sustainable food systems in the EU. <https://www.eu-fusions.org/index.php/about-food-waste/280-food-waste-definition>

²⁹ *National Food Waste Strategy: Halving Australia’s food waste by 2030*, Commonwealth of Australia 2017’. <https://www.environment.gov.au/protection/waste.../national-food-waste-strategy>

³⁰ It’s important to note that although the terms loss and waste are now often used in conjunction, in much of the international literature (especially that dating the FLW protocol in 2016 and the EU Fusions Project’s definitional framework), they have been touted as having distinct drivers and, as a result, distinct solutions. Lipinski et al, 2013, World Resource Institute. <https://www.wri.org/publication/reducing-food-loss-and-waste>

Recommendations

1. I recommend to the Committee that a national definition of food waste with clear parameters and boundary conditions is adopted. International best practice suggests that this should be broad and inclusive to include any food, and the inedible parts of food, removed from the food supply and consumption chain to be recovered or disposed.

According to the aforementioned FLW Standard,³¹ there are two different ways to measure and report food waste. They are:

1. Inference by calculation. This involves estimating the amount of food waste based on other data. It might take the form of deducing food waste from other relevant data (e.g., calculating the difference between food inputs and food outputs in a process such as food manufacturing). The amount may also be inferred by using models, which apply factors known to influence the amount of food loss and waste.

2. Measurement. This is the most direct way to quantify food waste. It involves determining the amount of food waste by using an instrument or device marked in standard units or by comparing the food waste with an object of known amount. The results of measurement are expressed in weight, unit count of items, or volume. Typically, some kind of audit is required. This involves physically sorting through food waste weighing, categorising, and in some instances estimating its value.

In addition to commissioned research on food loss and waste from governments or independent studies conducted by universities and other institutions data can also found via:

- Self-reporting. This is where organisations or individuals self-report on how much food they have wasted. This may involve completing mini audits or using sales data or may just be a best guess.
- Observer- reporting. This is where organisations or individuals report on how much food they have seen others waste.

Each method has its strengths and weaknesses and so the appropriate method for measurement depends on the context of who is doing the measuring and what information is available. For example, because inference by calculation is a mathematical operation based on material flows and proxy data, it does not require direct access to waste and thus requires

³¹ And as explained in the submission by the WasteMINZ TAO Forum (WS2)

a low level of resources. It cannot, however, track the causes and drivers of food loss and waste as can measurement methods such as direct weighing.³²

As reported in the FLW Standard, a lack of “perfect” data or capacity to utilise the most advanced quantification methods should not preclude an entity from starting the process of improving understanding of its food waste. A simple spreadsheet³³ is available to help users consider different quantification methods and guide decisions, based on important criteria such as desired level of accuracy and access to the physical FLW being quantified.

New Zealand’s food waste volumes

The total volume of food lost and wasted in New Zealand is not known. The submission made by Statistics New Zealand noted that food waste data has previously been noted as a gap within their environmental reporting, though it has not, as yet, been identified as a gap within their economic statistics.³⁴

The submission by WasteMINZ TAO Forum provides a comprehensive overview of what is known to date about the size of food waste problem in New Zealand and is summarised in brief in this section. Further details of each of the individual studies as well as more specific data can be found in their submission.³⁵

Desk-based estimates for total landfilled food (i.e. excluding diverted food waste) range from 1,315,200 tonnes in 2011 (United Nations FAO)³⁶, to 327,000 tonnes for the same time period (Academic paper, Reynolds, Miroso et al)³⁷ to 571,000 tonnes in 2016 (MfE).³⁸

³² CEC. 2019. *Why and How to Measure Food Loss and Waste: A Practical Guide*. Montreal, Canada: Commission for Environmental Cooperation.

³³ FLW Quantification Method Ranking Tool at www.flwprotocol.org

³⁴ WS19 [Statistics New Zealand]

³⁵ WS21 [WasteMINZ TAO Forum]

³⁶FAO. (2011). Global food losses and food waste – Extent, causes and prevention. <http://www.fao.org/3/mbo60e/mbo60e00.pdf>. In this report, New Zealand was grouped together with Australia, Canada and the United States purely for geographic and cultural reasons. The report estimated that total food waste in North America was 300 kg/year/ per capita and that food wasted by consumers in North America was 115 kg/year. This would give for New Zealand a total of 1,315,200 tonnes total food waste and 504,160 tonnes household food waste per annum.

³⁷ Reynolds, C. J., Miroso, M. & Clothier, B. New Zealand’s Food Waste: Estimating the Tonnes, Value, Calories and Resources Wasted Agriculture 2016, 6(1),9; <https://doi.org/10.3390/agriculture6010009>

³⁸ WS13 [MfE]

As a result, WasteMINZ, the industry body for the waste and resource recovery sector, territorial authorities and the University of Otago³⁹ partnered to form the National Food Waste Prevention Project in 2013. This project started with a goal of quantifying household food waste but has since expanded to include food waste at various stages of the supply chain. Physical audits were undertaken at households, supermarkets, and cafés and restaurants to determine how much food was wasted, what the food waste was comprised of, and how much of the food waste was avoidable.

- Research in 2014 found that households create 229,022 tonnes of food waste which is disposed of in landfill. Fifty four per cent of this waste is avoidable i.e. could have been eaten (122,000 tonnes). It is not known how much additional food waste is composted or disposed of via garbage disposal units.⁴⁰
- Research in 2017 found that supermarkets create 60,500 tonnes of food waste each year, 66% of which is avoidable. Only 23% of their food waste is sent to landfill (13,915 tonnes) as the rest is used for animal feed, donated to food rescue groups or sent for protein reprocessing.⁴¹
- Research in 2018 found that cafés and restaurants create 24,366 tonnes of food waste each year, of which 61% is avoidable. It is not known what percentage is sent to landfill as some businesses divert their food waste to compost facilities, food collections or animals.⁴²

No physical audits have been undertaken for other sectors of the supply chain.⁴³ Self-reporting measures of agricultural and horticultural food waste from the Bioresource Processing Alliance (BPA) found that 350,000 tonnes of food by-products are either going to landfill or have low value applications. Of these 350,000 tonnes, 12% (42,000 tonnes) is avoidable.⁴⁴ Self-reporting measures from food manufacturers in Auckland to the Sustainable

³⁹ Key researcher, Associate Professor Miranda Miroso, Department of Food Science

⁴⁰WasteNot Consulting. (2015) New Zealand Food Waste Audits; <https://lovefoodhatewaste.co.nz/wpcontent/uploads/2016/03/New-Zealand-Food-Waste-Bin-Audit-Report-2015.pdf>

⁴¹ Goodman-Smith, F. (2018). A quantitative and qualitative study of retail food waste in New Zealand (Thesis, Master of Science). University of Otago <https://ourarchive.otago.ac.nz/handle/10523/7972>

⁴² WasteMINZ. (2018) Food waste in the café and restaurant sector in New Zealand. <http://www.wasteminz.org.nz/wp-content/uploads/2018/10/New-Zealand-cafe-and-restaurant-food-wasteWasteMINZ-2018.pdf>;

⁴³ Though work is planned at the University of Otago to conduct physical audits of the horticultural sector in the latter half of 2019.

⁴⁴ WS2 [Bioresource Processing Alliance]

Business Network (SBN) found that 40,800 tonnes of food waste is generated per annum, of which 28% (11,424 tonnes) goes to landfill. It is not known what percentage is avoidable.⁴⁵

In addition to the above data sources, there is also as data available from other organisations. For example, EcoStock, which turn food waste into stock food, has over the last 12 years processed more than 240,000 tonnes of food waste.⁴⁶ Another example is food bank data. Of New Zealand's 15 food rescue groups operating in 2017, 14 kept records of the tonnages of food donated.⁴⁷ Food is rescued from supermarkets, manufacturers, growers and sometimes hotels and restaurants. In 2017, 2,777 tonnes of food was rescued. Observer reporting shows that cancelled export orders and crop management are causes of significant volumes of food waste in the horticultural sector.⁴⁸

Figure 4 provides a summary of key known data for New Zealand by sector of overall tonnage, presented by data source. Overall tonnage (which includes avoidable, non-avoidable and possibly avoidable food waste) is given and where possible, the avoidable tonnage is also stated.

Data of specific sectors also exists for food waste in some regions. For example, The Auckland Council Waste Assessment 2017⁴⁹ found that a total of 180,000 tonnes per annum of food waste, sourced from commercial and residential activities, ended up in landfill. Wellington region kerbside food waste audits undertaken in 2014 showed that households within the Wellington region dispose of, on average, 3.2kg of food waste per week at the kerbside. Regionally, this equates to ~30,000 tonnes of food waste to landfill annually or 35% of the total kerbside waste for the Wellington region.⁵⁰

⁴⁵ WS20 [Sustainable Business Network], Sustainable Business Network. (2017) Industrial food waste research – Auckland.

⁴⁶ WS5 [EcoStock]

⁴⁷ WS21 [WasteMINZ TAO Forum].

⁴⁸ See WS.21 [WasteMINZ TAO Forum] for anecdotal evidence of large wastage from Kiwifruit growers and an onion composting facility.

⁴⁹ Auckland's Waste Assessment 2017: <https://www.aucklandcouncil.govt.nz/plans-projects-policies-reportsbylaws/our-plans-strategies/topic-based-plans-strategies/environmental-plansstrategies/docswastemanagementplan/waste-assessment-2017.pdf>

⁵⁰ WS23 [Wellington City Council]

Sector	Inferred by Calculation	Measured	Self-reported	
Agriculture and Horticulture	Overall: 571,000 tonnes (MfE, 2016)	Overall: 103,000 tonnes (Reynolds <i>et al.</i> 2016 - noting data was for 2011)	Overall: 350,000 tonnes <i>Avoidable:</i> 42,000 tonnes (BPA, 2017)	
Manufacturing	Overall: 811,040 tonnes		Overall: 40,800 tonnes (SBN, 2017)	
Supermarkets	(United Nations FAO, 2011)		Overall: 60,500 tonnes (Goodman-Smith, 2017)	Overall: 30,360 tonnes (Foodstuffs - data reflects 12 months to July 2018)
Cafés and Restaurants			Overall: 24,366 tonnes <i>Avoidable:</i> 14,863 tonnes (WasteMINZ, 2018)	
Other Food Service, e.g. Hotels, Quick-service				
Not-for-Profit Sector e.g. Hospitals, prisons				
Households	Overall: 504,160 tonnes (United Nations FAO, 2011) Overall: 224,000 tonnes (Reynolds <i>et al.</i> , 2016)	Overall: 228,000 tonnes <i>Avoidable:</i> 122,547 tonnes (WasteNot Consulting, 2015)		

Figure 4 Summary of New Zealand food waste by sector by overall tonnage

2.2 What is the environmental impact of food waste?

As pointed out in the submission by Feedback⁵¹, a London-based NGO campaigning to regenerate nature by transforming our food system, addressing food waste is often cited as an essential ingredient in meeting the emissions gap between current emissions pathways and the reductions needed to meet the UN Framework Convention on Climate Change ambition of limiting climate change to 1.5 degrees Celsius by the end of this century. A paper published in Nature reported that reducing food loss and waste by 50% could reduce environmental pressures by up to 16%.⁵²

The MfE's submission⁵³ details greenhouse gas emissions created at disposal or end-of-life as well as those created along the entire lifecycle of food as described below.

Carbon emissions disposal or end-of-life

When food ends up in a landfill, it decomposes without oxygen and releases methane, a strong greenhouse gas. Many landfills in New Zealand capture the methane released, thereby preventing it from entering the atmosphere and contributing to climate change. However, it should be noted that not all of the methane is captured. The Ministry estimates that about 71% of methane was captured from levied landfill sites in 2016. This is based on a combination of knowing which sites have methane capture systems, as well as the estimated efficiency of each system. This means that for every tonne of food disposed of to landfill, almost 0.33 tonnes of CO₂-equivalent greenhouse gases will be generated. Therefore the 571,000 tonnes of food waste deposited in landfills in 2016 will generate about 187 thousand tonnes CO₂-equivalent of emissions. In addition to landfills, there are other forms of disposal which also create emissions. For example, MfE reported emissions from composting about 150,000 t waste with an emission factor of about 0.1 t CO₂-e per t waste (compost covers all kinds of compost waste including but not limited to food and garden waste).⁵⁴

⁵¹ WS7 [Feedback]

⁵² Springmann, M. et al. 2018. 'Options for keeping the food system within environmental limits'. Nature: https://www.nature.com/articles/s41586-018-0594-0?WT.feed_name=subjects_sustainability

⁵³ WS 13 [Ministry for the Environment]

⁵⁴ New Zealand's Greenhouse Gas Inventory 1990-2017 (Ministry for the Environment, 2019) <https://www.mfe.govt.nz/publications/climate-change/new-zealands-greenhouse-gas-inventory-1990-2017>

Using a 'whole of lifecycle' approach

Looking more broadly at the entire lifecycle of food, there are also greenhouse gas emissions from food production, processing and distribution, and consumption (in addition to emissions created at disposal or end-of-life). When food is wasted, all of the resources that went into growing, transporting and preparing that food are also wasted.

WasteMINZ has estimated that in the New Zealand context, there are approximately 2.66 tonnes of CO₂-equivalent greenhouse gases generated over the lifecycle of food, for every tonne of food waste produced. This figure is substantially higher than the estimated emissions from disposal figure of 0.33 tonnes CO₂-equivalent, indicating the substantive contribution to emissions made by lifecycle stages other than food waste disposal. As an example of how this calculation has been employing at a regional level, the total emissions (full life cycle accounting) from food waste in the Wellington region can be estimated as 40,000T x 2.66 (CO₂-e) = 106,400T CO₂-e.⁵⁵

The submissions from the Wellington City Council and WasteMINZ TAO Form describe how, beyond carbon emissions, food waste also represents wastage of water, carbon and nutrients. As depicted by the FAO's 'Food Waste Iceberg'⁵⁶, the global food system has significant cost impacts we don't see, such as: water use/quality, ecological degradation, deforestation, soil depletion/erosion, atmospheric pollution, environmental toxicity from pesticides, and so on. As an example, agriculture alone accounts for 70% of fresh water used throughout the world.⁵⁷ In the decade to 2010, NZ's consented freshwater extraction (excluding that for hydro generation) nearly doubled, mainly due to irrigated land. Thus excessive food wastage is also wasting fresh water resources nationally and internationally. Similar examples can be made for all of the other environmental indicators and increasingly, the externalities of the food system can no longer be ignored and need to be accounted for nationally and internationally. The degree of environmental impact is related to which stage in the life cycle wastage occurs; that is, the later food is wasted in the life cycle, the greater the impact. These environmental costs will increase as more food is required to feed a growing global population with the current inefficient system.⁵⁸

⁵⁵ WS23 [Wellington City Council]

⁵⁶ <https://www.facebook.com/UNFAO/videos/food-waste-iceberg/10154607835448586/>

⁵⁷ FAO 2107, UN FAO Report: Water for Sustainable Food and Agriculture. www.fao.org/3/a-i7959e.pdf

⁵⁸ WS24 [Wrap]

Other submitters also commented on number of other environmental issues relating to food waste disposal. For example, some food waste is spread on land, which creates leaching problems for the soil and rivers, whilst other by-products are disposed of via waste water treatment plants which can end up in waterways.⁵⁹ Furthermore, food waste disposed of incorrectly can result in contamination of other recyclables such as cardboard, plastics, metals and glass.⁶⁰

2.3 What is the economic and social impact of food loss or waste?

Economic Impacts

Globally, the approximately one-third of all food produced in the world intended for human consumption that is lost or wasted amounts to economic losses of \$940 billion per year.⁶¹ The main economic costs of food waste include:

- Costs to households (from purchased food not consumed). The avoidable food waste from New Zealand households is equivalent to \$872 million per annum⁶²;
- Costs at other stages of the supply chain. For example, if New Zealand supermarket food waste is costed at a proxy of \$398 per tonne, then potentially supermarkets' wasted food costs \$24 million per annum⁶³;
- Costs to local authorities and waste management companies; when required to collect, transport and dispose of waste that includes food waste. Note that the true cost of waste is estimated to be around 10 times that of disposal because of the embedded costs in the products.⁶⁴

Internationally, a report prepared on behalf of Champions 12.3, The Business Case for Reducing Food Loss and Waste⁶⁵, analyses the financial impacts of historical food loss and waste reduction efforts conducted by a country, a city, and numerous companies. The results

⁵⁹ WS2 [Bioresource Processing Alliance]

⁶⁰ WS5 [EcoStock]

⁶¹ FAO. 2015. Food Wastage Footprint & Climate Change. Rome: UN FAO.

⁶² WasteNot Consulting. (2015) New Zealand Food Waste Audits; <https://lovefoodhatewaste.co.nz/wp-content/uploads/2016/03/New-Zealand-Food-Waste-Bin-Audit-Report-2015.pdf>

⁶³ WS21 [WasteMINZ TAO Forum]. Calculation based on published figures from Foodstuffs.

⁶⁴ WS24 [Wrap]

⁶⁵ https://champions123.org/wp-content/uploads/2017/03/report_-_business-case-for-reducing-food-loss-and-waste.pdf

show that the financial benefits of taking action often significantly outweighed the costs. This publication also identifies a number of complementary strategic benefits of reducing food loss and waste. Key findings about financial returns on investments in food waste reduction initiatives are outlined in Figure 5. Subsequent deep dives into the hotel⁶⁶ and catering⁶⁷ sectors have identified a return of investment of 7:1 and 6:1 respectively.

Our analysis of historical data indicates that there is a robust business case for countries, cities, and companies to reduce food loss and waste. Consider the UK. In 2007, the country launched a nationwide initiative to reduce household food waste. By 2012, it had achieved an astounding 21 percent reduction in household food waste relative to 2007 levels. The ratio of purely financial benefits to financial costs attributable to the UK initiative was more than 250:1 (250 to 1), a very substantial return on investment. In other words, every £1 invested in efforts to catalyze household food waste reduction resulted in savings of £250.

Cities also can realize high returns on their investment in food waste reduction. In 2012–13, six London boroughs implemented an initiative to reduce household food waste. The initiative resulted in a 15 percent reduction, with a benefit-cost ratio of 8:1 when considering just the financial savings to the borough councils. In other words, for every £1 invested in the effort, £8 was saved.

For companies, the return on investment also can be high. We analyzed nearly 1,200 business sites across 17 countries and more than 700 companies, representing a range of sectors including food manufacturing, food retail (e.g., grocery stores), hospitality (e.g., hotels, leisure), and food service (e.g., canteens, restaurants). We found that 99 percent of the sites earned a positive return on investment. The median benefit-cost ratio—where half of the sites achieved a higher ratio while half achieved a lower ratio—was 14:1. In other words, half of the business sites earned greater than a 14-fold financial return on investment. Thus, for every \$1 (or relevant currency) invested in reduction, the median company site realized a \$14 return.

Figure 5 The business case for reducing food waste

Social Impacts

Globally, one in nine people remains undernourished while more than a billion tons of food never gets consumed each year.⁶⁸ As outlined in the submission by the MfE, the main social

⁶⁶ <http://www.wrap.org.uk/content/business-case-reducing-food-loss-and-waste-hotels>

⁶⁷ http://www.wrap.org.uk/sites/files/wrap/Champions123_BusinessCase_Catering_o.pdf

⁶⁸ World Food Programme. 2016. “Hunger Statistics.” Accessible at: <https://www.wfp.org/hunger/stats>.

impact of food waste is that it represents a lost opportunity for distributing food to those in need. This is an important consideration given that food insecurity is said to impact upon 11% of New Zealand children below 15 years of age.⁶⁹

2.4 What are the challenges associated with our food waste data?

Establishing base-year data: New Zealand needs a National Food Waste Baseline

It is evident that food waste prevention represents a tremendous opportunity for New Zealand to reduce its emissions profile while at the same time addressing food security. However, New Zealand-specific food waste research is lacking and with the available data scattered and dated,⁷⁰ the total volume and associated costs (environmental, economic and social) of food lost and wasted in New Zealand is not accurately known. Without robust measures of food waste quantities, it is also difficult to set credible goals or targets, design effective interventions or monitor progress.

Recommendations

2. I recommend to the Committee that collecting robust measures of food waste quantities, types and associated costs should be a key priority.
3. New Zealand needs a detailed National Food Waste Baseline in order to determine where the 'hotspots' (i.e. the most impactful areas) are.
4. In order to be able to measure progress, a budget should be set aside for the baseline to be measured again in 2025 and 2030.

A few governments have been early movers in measuring national-levels of food waste.⁷¹ These include the United Kingdom, the United States, and Japan. Australia has just launched its 2019 National Food Waste Baseline Project,⁷² which was supported with funding from the Australian Government's National Environmental Science Program. Results from this Australian study (in Figure 6) show total food waste generation of 298 kilograms per capita

⁶⁹ Statistic taken from web article, 'UNICEF Report Indicates We Need to Do Better for Children', June 2017. The report cited in this article ('Innocenti report Card 14') defines "food insecurity" as "lack of secure access to sufficient, safe and nutritious food that can ensure normal growth and development, as well as an active and healthy lifestyle".

⁷⁰ Much of this was conducted before the international Food Waste and Loss Accounting Protocols were developed in 2016.

⁷¹ The percentage of countries measuring will increase significantly following new obligations introduced in EU waste legislation in May 2018 that require EU member states to monitor food waste levels at each stage of the food supply chain from 2020. WS3. [Champions 12.3]

⁷² <https://www.environment.gov.au/.../national-food-waste-baseline-final-assessment.pdf>

(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%). Significant volumes are also generated in food manufacturing (24%).



Figure 6 Australia national food waste generation by sector, 2016/17

Like Australia’s measurement project, a New Zealand food waste baseline methodology will need to incorporate leading international approaches – including from the United Kingdom⁷³, Europe⁷⁴ and the multi-stakeholder initiative Champions 12.3 – and the key Food Loss and Waste Accounting and Reporting Standard developed to support SDG Target 12.3.⁷⁵

⁷³ Food Surplus and Waste Measurement and Reporting, A Reference Document for Suppliers, 2018. WRAP UK

⁷⁴ FUSIONS Definitional Framework for Food Waste, 2014

⁷⁵ <https://www.flwprotocol.org/>

Recommendations

5. I recommend to the Committee that for consistency, baseline methodology should be aligned with international approaches. This will also enable New Zealand to tap into lessons learned and benefit from advice and support from other countries. Public reporting of the baseline results is encouraged.
6. In addition to government investment in a national baseline, companies should make it a priority to measure and publicly report (e.g. on the Food Waste Atlas) their food loss and waste data.

3. Preventing Food Waste

This chapter addresses two key questions:

- What are effective methods to prevent food loss or waste in agricultural production, manufacturing, hospitality, food service sectors, retail sectors, and households? (3.1)
- What are the challenges for putting these methods in place? (3.2)

3.1 What are effective methods to prevent food loss or waste?

There are many international examples of actions to prevent food waste, some of which are presented in Figure 7.

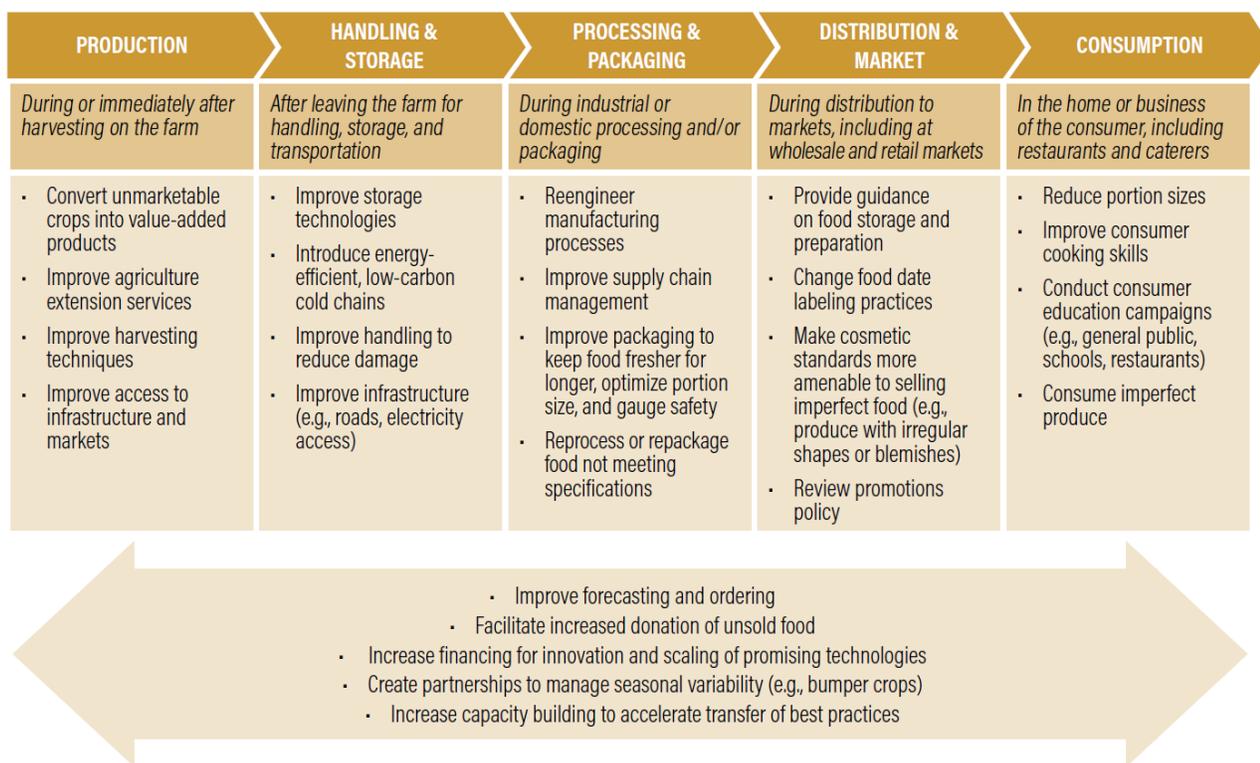


Figure 7 Possible approaches for reducing food loss and waste⁷⁶

⁷⁶ WS3 [Champions 12.3]. Based on Lipinski et al. 2016.

Note that these approaches are by no means exhaustive and more examples can be found elsewhere such as at the Rethink Food Waste Through Economics and Data (ReFED) innovator database,⁷⁷ the Refresh Community of Experts,⁷⁸ FurtherwithFood.org, and The Community of Practice on Food Loss Reduction.⁷⁹

There has been an increasing number of initiatives addressing food waste reduction over the past few years in New Zealand and the remainder of this section highlights some of the key preventative actions and issues associated with these at different parts of the supply chain.

Primary production

Incentivising ‘gleaning’

The New Zealand Community Fruit Harvesting Movement, which traditionally has picked surplus fruit from people’s gardens and distributed them to food banks and schools, has in some parts of the country also been given permission to “glean”. This is where farms and orchards give permission for the crop remnants, perhaps left due to cosmetic standards, to be harvested and redistributed.⁸⁰

Sales closer to consumers

Selling farm crops closer to consumers (e.g., farmers markets and farm shops) without having to pass the strict quality standards set up by supermarkets on weight, size and appearance can help to reduce the amount of rejected crops.⁸¹

Communication and cooperation between growers

Cooperation among growers could reduce the risk of overproduction by allowing surplus crops from one farm to solve a shortage of crops on another.⁸²

⁷⁷ www.refed.com/tools/innovator-database/.

⁷⁸ www.eu-refresh.org/refresh-community-experts.

⁷⁹ www.fao.org/food-lossreduction/forum/en/.

⁸⁰ WS21 [WasteMINZ TAO Forum]. The Auckland branch has picked or collected 26 tonnes of fruit in 2017. In 2018 they also rescued an additional 15 tonnes of kiwifruit from an export pack house. Community Fruit Harvesting turns fruit into jams which can then be donated throughout the year. In 2017 the Auckland branch donated 7,621 jars of jam to foodbanks. <http://www.pickfruit.co.nz/images/Documents/FruitHarvest%20Stats%202017.pdf>

⁸¹ WS10 [KiwiHarvest]

⁸² WS10 [KiwiHarvest]

Convert unmarketable crops into value-added products

The Bioresource Processing Alliance (BPA, <https://bioresourceprocessing.co.nz/>) was a six year, \$15m programme funded by the Ministry for Business, Innovation and Employment (MBIE). It was a collaborative R&D programme involving Callaghan Innovation, AgResearch, Plant and Food Research, Scion and universities with the goal of converting primary sector biological by-products into high value products for export. Its goal was to help generate another \$100m pa in export revenue by 2020 whilst reducing the amount of by-product going to landfill or to low value/no value opportunities. They did this by working with companies that commercialise the products that the BPA helps develop. To date, they have conducted 147 research projects, have had ten products enter the market, which have generated over \$2.7m in revenue for companies and have diverted over 2,500T of material into higher value uses.⁸³ Funding for this programme has now ceased due to policy and programme funding changes at the Ministry. The result of stopping the programme may be that companies will be less unlikely to undertake the necessary R&D to create these products alone.⁸⁴

Recommendations

7. I recommend to the Committee that government in conjunction with industry consider ways to continue co-funding research and the development of value-added products made from food waste.

Processing and Manufacturing

Food date labelling practices

There appears to be some consumer confusion in New Zealand between the "use by" and "best before" dates.⁸⁵ The former is set for health and safety reasons, and the latter is set to

⁸³ WS2. [Bioresource Processing Alliance]. Some of the solutions the BPA has helped generated to date include: Increasing the yield for a kiwifruit processing company through engineering solutions; Utilising low value meat processing by-products in high value supplement and nutraceutical applications; Quantifying seafood companies' volumes of low value species and recommending product solutions; Animal feed from dairy sector and horticultural food waste; Premium pet food products from low value fisheries secondary streams; Developing high value supplements from seconds fruit streams; Nutritious, low sugar, high fibre 'flours' from fruit and vegetable processing waste; An avocado powder for cosmetic and food use from avocado pulp; Ingredients and functional foods from onion by-products; Oils and extracts from a variety of vegetable seeds; Methane and fertiliser from a range of food waste; High quality potato-based products from low value secondary streams; Food ingredients from shellfish by-products; Pet treats from the brewing industry's spent grains.

⁸⁴ WS21 [WasteMINZ TAO Forum]

⁸⁵ A 2018 survey conducted for the National Food Waste Prevent Study (n= 1005 NZ consumers) showed that only 60% of people correctly understood the 'use by' dates on food packaging to mean that foods must be eaten or thrown away by this

provide information about food quality (although quality may be diminished, food can still be safe to eat after this date). Consumers can often waste food that is fit for consumption through a lack of knowledge of what these labels signify.⁸⁶

The submission from Progressive Enterprises details their perspective on the issue (Figure 8):

Recently much has been made in the media of Tesco (UK) deciding to remove ‘best before’ dates on fruit and vegetables in a bid to reduce food waste. While in New Zealand dates on packaged food are not optional as they’re part of the Food Standards Code, we are open to moves which can further educate consumers about using what they buy, and ultimately, reducing waste. This is an area we’d need government support to progress. At the moment we operate under a food safety programme approved by the MPI, which includes not selling food past its best before date except on rare occasions, and never selling past a use by date. In New Zealand pre-packaged fruit and veges are much less common than overseas - here you will rarely find use by or expiry dates on fresh fruit and veges as the vast majority of this is sold loose. Where fruit and veges are packaged, "packed on", “best before” or “use by” dates will vary depending on the product and the supplier. Some date labels may be set as a guide for customers to know when something was picked or cut (e.g. packed on); some may be related to when a product is best consumed (e.g. best before) but can still be eaten afterwards, and some may be related to food safety (e.g. use by, although these are not common in fresh fruit and veg). We take our shelf life guidance from suppliers and growers; any changes to the legal requirements for date labels in New Zealand would need to be worked on collaboratively with MPI and FSANZ. We’d be very happy to be part of these discussions.

Figure 8 A retailer’s perspective on the date labelling issue

Recommendations

8. I recommend to the Committee that given the current consumer confusion, and in light of international activity to ensure date label requirements are calibrated with food waste reduction as well as food safety considerations, a review of date labelling is needed.

A wide array of stakeholders would need to be engaged in any discussion about changes to date labels. Among those are international organisations such as ReFED in the US and the

date. Nine per cent of people said that if a food product has passed its ‘best before’ date they would throw it into the rubbish straight away. <https://lovefoodhatewaste.co.nz/food-waste/resources/research/>

⁸⁶ WS12 [MPI]

Waste and Resources Action Programme (WRAP) in the UK who have produced date labelling guidance⁸⁷; government agencies MPI and Food Standards Australia New Zealand (FSANZ)⁸⁸, retailers and industry organisations including New Zealand Food and Grocery Council.

In addition to static date labels, there are new smart packaging labelling technologies that help consumers and businesses determine the freshness of packaged foods and whether it is safe to eat. These technologies have the potential to significantly change the date labelling landscape and any thinking on date labelling in New Zealand must take into consideration these technologies and the impact these will have on consumer behaviour.

Recommendations

9. I recommend to the Committee that educational messaging that helps consumers interpret current and future labelling should be provided as a key element of any public awareness raising campaigns about food waste.

Improved packaging labelling and design

Packaging can be used to inform consumers about how to store and prepare food. For example, the UK Government's Department for Environment, Food and Rural Affairs, the UK Food Standards Agency, and WRAP have worked together to produce a set of guidelines on storage which include recommendations, such as using a "Snowflake" icon to indicate that a product can be frozen, and a "Little Blue Fridge" icon that indicates that a product would benefit from being stored in the fridge.⁸⁹

Another important role for food packaging is to retain and optimise the value of food that has already been produced. Adjustments can be made to packaging size and design to ensure complete consumption by consumers and to avoid residual container waste. In addition to passive technologies that can help reduce food waste (e.g. size split packs and re-sealable packets), smart (i.e. active and intelligent) packaging can prevent food spoilage and extend shelf-life through the use of chemical or biological agents. In addition to the considerable technical work to reduce food waste by improving packaging innovations that is happening

⁸⁷ ReFED Date Labeling Standardization Tool, ReFED 2017; Labelling Guidance: Best practice on food date labelling and storage advice; and WRAP, Food Standards Agency, Department for Environment Food & Rural Affairs (DEFRA), 2017.

⁸⁸ Noting that any potential changes to date labelling will require trans-Tasman agreement because of the joint food system.

⁸⁹ WRAP. 2017. <http://www.wrap.org.uk/content/wrap-calls-time-confusingdate-labels-and-introduces-little-blue-fridge>.

in New Zealand, research is also looking at understanding consumers' willingness to adopt such packaging technologies.⁹⁰

Recent research identifies a strong correlation between foods with the highest percentage of wastage and the least amount of packaging.⁹¹ On the other hand, research also reveals that throwaway plastics is failing to solve the food waste problem.⁹²

Recommendations

10. I recommend to the Committee that given the apparent contradictions about the role of packaging in food waste, more research is needed on the value of packaging in reducing food waste.
11. The review would include an assessment of research being undertaken to understand the most effective packaging approaches and technologies for New Zealand food products. It will also be important to better understand how best to communicate the advantages of any packaging solutions to consumers at a time where there is negative public sentiments about packaging waste.

Increasing the cost of landfilling food waste

The key challenge for change in this sector is the low cost of landfilling food waste. If the waste levy increases, this will make options for diversion from landfill more competitive.⁹³ Note that the Government (via the MfE) is already considering extending the waste levy out to more landfill types, and up from the relatively low \$10 per tonne it has been set at since 2009 (detailed in the Government's forward work programme section in the introductory chapter of this report).

⁹⁰ Miroso *et al.* University of Otago. Understanding the importance of smart packaging for consumer confidence, food safety and an improved supply chain, New Zealand-China Strategic Research Alliance Joint Research (2018-21).

⁹¹ Quantifying the Value of Packaging – As a strategy to prevent food waste in America, Ameripen 2018; and The Value of Flexible Packaging in Extending Shelf Life and Reducing Food Waste, prepared by McEwen Associates for the Flexible Packaging Association.

⁹² A rise in plastic food packaging is failing to reduce Europe's growing food waste problem, and in some cases may even be fueling it, according to this study prepared by the Institute for European Environmental Policy for Friends of the Earth Europe and Zero Waste Europe. <http://www.foeeurope.org/unwrapped-throwaway-plastic-food-waste>

⁹³ WS21 [WasteMINZ TAO Forum]

Hospitality and food service

Provide doggy bags so customers can take away their leftovers

As we heard from the WasteMINZ TAO Forum submission, some restaurants believe that in order to comply with the New Zealand Food Act 2014 they should not provide ‘doggy bags’ to customers.⁹⁴ Research from the University of Otago found that 1 in 5 people who had asked for a doggy bag had been refused.⁹⁵ Internationally there are a number of successful programs which could be replicated in New Zealand. In New South Wales and the United Kingdom the Your Business is Food program provides resources for the hospitality sector and raises awareness. In Scotland they have run a successful Good to Go doggy bag campaign encouraging businesses to provide doggy bags for unfinished meals.⁹⁶ All these programs have been developed by WasteMINZ’s international food waste partners.⁹⁷ It is important that industry bodies are proactive in educating and upskilling their members and also showcasing examples of members who have reduced their food waste and how they have done this.

Recommendations

12. I recommend to the Committee that more active messaging from the MPI is needed to dispel the myth that food businesses should not provide ‘doggy bags’ to customers.
13. More education is needed on how to package food so that it can be taken home and reheated safely.

⁹⁴ https://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11722737

⁹⁵ Miroso, Liu & Miroso (2018) Consumers’ Behaviors and Attitudes toward Doggy Bags: Identifying Barriers and Benefits to Promoting Behavior Change <https://doi.org/10.1080/10454446.2018.1472699>

⁹⁶ WS26 [Zero Waste Scotland]. Zero Waste Scotland’s ‘Good to Go’ doggy bags scheme has been developed to change the culture around leftovers and save food from the bin by giving customers an easy way to take uneaten food home. Zero Waste Scotland research showed that food waste from diners’ plates fell by an average of 42% per restaurant during the ‘Good to Go’ pilot, carried out in 2016, and there was also evidence that the focus on leftovers during the pilot led to some restaurants reconsidering their menu options. If restaurants across Scotland routinely offered doggy bags to customers, it could save the equivalent of almost 800,000 full meals going in the bin*. But a key value of this intervention may not be the volume of food (which is relatively small) but the positive awareness raising step that this very popular intervention can have with both staff and customers. *<https://www.zerowastescotland.org.uk/sites/default/files/Good%20to%20Go%20Pilot%20Report.pdf>

⁹⁷ WasteMINZ is part of an international working group which shares learnings and research on how to reduce food waste.

Measurement of food waste (Waste Tracking and Analytics)

Being conscious of where in the foodservice industry wasteful practices are happening and having strong data to support this is essential to inform behaviour and operational changes.⁹⁸ There are a number of smart meters available to measure waste in commercial kitchens (e.g. Winnow⁹⁹ or Leanpath¹⁰⁰). The New Zealand Defence Force is currently piloting the Winnow technology at two locations to quantify food wastage (includes plate waste as well as other forms of food loss) and they reported that this has provided baselines for wastage volumes and successfully raised awareness.¹⁰¹ We also heard from one of our international submitters of the initial success that one of their pilot businesses had in using electronic weighing technology to track their waste.¹⁰²

Other actions

While there are a couple of studies that investigate specific New Zealand foodservice sites (e.g. hospitals¹⁰³ and an airline catering kitchen¹⁰⁴), little is known more generally about how New Zealand schools, hospitals, and other large organisations with daily food waste deal with their waste. International case studies show that common examples of other actions that foodservice operators take to reduce waste include offering smaller plates, eliminating tray dining in all-you-can-eat dining establishments, cooking using the whole ingredient, providing clarity on which sides come automatically with orders, and working with suppliers to include

⁹⁸ WS26. [Zero Waste Scotland]. Their submission details how an initial barrier to waste reduction was a poor awareness of the amount of wasted food in a business. This has been somewhat reduced in Scotland by the introduction of a regulatory requirement for businesses and organisations producing more than 5kg of food waste per week to have a facility to separately collect waste (which can help make it more visible in many contexts).

⁹⁹ <https://www.winnowsolutions.com/>

¹⁰⁰ <https://www.leanpath.com/>

¹⁰¹ WS14 [NZ Defense force]

¹⁰² WS26 [Zero Waste Scotland]. One pilot used electronic weighing technology to track waste and enabled the business to work out how to manage food better to avoid it. The restaurant reducing buffet food waste costs by 43% and weight per cover by 31% in 8 weeks. If sustained, this will equate to annual savings of around 11.5 tonnes of food and financial savings exceeding £50,000

¹⁰³ Goonan, S., Miroso, M., & Spence, H. (2014). Getting a taste for food waste: a mixed methods ethnographic study into hospital food waste before patient consumption conducted at three New Zealand foodservice facilities. *Journal of the Academy of Nutrition and Dietetics*, 114(1), 63-71. <https://doi.org/10.1016/j.jand.2013.09.022>

¹⁰⁴ Ross, J. (2015). Food Waste in an Airline Caterer's Production Kitchen (Thesis, Master of Dietetics). University of Otago. <http://hdl.handle.net/10523/5486>

surplus food into menus.¹⁰⁵ A less commonly discussed but certainly interesting idea is increasing out of home food consumption to reduce waste.¹⁰⁶ A number of other possible actions are outlined in the Defense Force’s submission (Figure 9).¹⁰⁷

<ul style="list-style-type: none"> • control portions via plate size limits • control portions in some operations for some items (usually protein) • produce quality checks upon delivery • be careful with menu design and flexibility • forecasting accurately • use of part-prepared items , e.g. pre-peeled vegetables 	<ul style="list-style-type: none"> • including food wastage as something to be measured in outsourced contracts • developing a catering waste management policy • set a reduction target, e.g. Compass Group's Sustainable Development Goal of 50% reduction in food waste by 2030
--	---

Figure 9 Actions the New Zealand Defence Force take to reduce their food waste

Targets and policy for food waste reduction

A corporate policy on food waste which covers reduction targets and how the organisation aims to achieve them is a key element of reducing food waste. Progressive Enterprises have publicly stated their goal: Zero food waste to landfill by 2020, and have actively worked to reduce food waste since 2011.¹⁰⁸ In the UK, supermarkets such as Tesco and Aldi have explicitly

¹⁰⁵ More than 130 chefs from 38 countries launched the “Chef’s Manifesto Action Plan” in June 2018. The action plan is a practical guide designed to outline simple actions that chefs can take in their kitchens, classrooms, and communities to create a better food system. One of the key thematic areas of the plan is to tackle food waste, and there is an online database of recipes that are in line with the thematic areas of the manifesto (SDG2 Advocacy Hub 2018). <http://www.sdg2advocacyhub.org/chefmanifesto>.

¹⁰⁶ WS11 [Dr Reynolds]. The UK hospitality and retail sector has the potential to be more efficient at feeding people than households as it has a greater efficiency of food preparation and supply chain management and is driven by cost factors (Parfitt et al. 2013). In Australian modelling we found that at the national level, the hospitality and retail sectors produced less food waste per dollar spent, and were better at recycling the waste produced than households (Reynolds et al. 2014; C. J. Reynolds et al. 2015). In addition, the hospitality and retail sector is better placed to safely redistribute edible food waste to food rescue organisations than individuals. See submission for further discussion on this idea.

¹⁰⁷ WS14 [NZ Defense force]

¹⁰⁸ WS17 [Progressive Enterprises]

signed up to the more ambitious global SDG target of halving food waste from farm to fork by 2030, with many others signing up to the less ambitious Courtauld Commitment.¹⁰⁹

Monitoring and reporting of food waste data

Accurate and transparent data is key to being able to track progress towards any stated food waste reduction goal. In New Zealand, measurement of retail food waste data is voluntary and there is no requirement for this data to be shared. Internationally, there are many countries where this is not the case. For example, in the UK all supermarkets report in-store food waste data to WRAP under the Courtauld Commitment. Many food waste advocates, however, consider this to be at best a minimum standard as the data reported is not audited and when published by WRAP or the British Retail Consortium it is aggregated and anonymised and as such it cannot provide detail on which supermarkets are successfully reducing waste.¹¹⁰ As Feedback report in their submission which draws on the UK's experience implementing food waste goals,¹¹¹ progress has generally been made when the food industry has been required to be open about the food waste it creates, rather than relying on 'closed shop' industry agreements or working groups.¹¹² An example of a laudable initiative is Tesco, the first supermarket to publish third party audited food waste data and who committed to extending transparency to include measurement of food waste in its supply chain.

Recommendations

14. I recommend to the committee that Government should consider requiring large food businesses including retailers and manufacturers to regularly measure and report on food waste in their business, including in their supply

¹⁰⁹Through this agreement, signatories commit to collaborate to achieve a 20 percent reduction in food waste and greenhouse gas emissions by 2025, compared to 2015. This target builds on previous UK voluntary agreements, and analysis by the WRAP suggests that achieving the Courtauld 2025 food waste target would result in a 40 percent reduction of food waste by 2025, as covered by SDG 12.3, compared to 2007, putting the UK on track to deliver a 50 percent reduction by 2030. Currently over 156 signatories are involved, covering 95 percent of the UK food retail market. <http://www.wrap.org.uk/food-drink/business-food-waste/courtauld-2025>

¹¹⁰ Feedback: https://feedbackglobal.org/wp-content/.../06/Supermarket-scorecard_136_fv-1.pdf

¹¹¹ WS7 [Feedback]

¹¹² WS7 [Feedback]. The EU REFRESH research project (a research project working towards SDG 12.3 with 26 partners from 12 European countries and China) notes that the presence of Unfair Trading Practices in a supply chain limits the extent to which voluntary industry initiatives can be effective. <https://eu-refresh.org/unfairtrading-practice-regulation-and-voluntary-agreements-targeting-food-waste>

chain. It is essential that an agreed upon consistent method of measuring and reporting food waste is used to enable comparisons to be made.

Reducing food waste in store

The WasteMINZ TAO Forum submission highlighted bread and bakery waste as a key area of focus for the retail sector.¹¹³ In particular, they suggested that the current industry practise of bread companies taking back any unsold bread at the end of the day should be eliminated as it leads to unnecessary wastage of perfectly edible bread. Tesco in the UK has managed to significantly reduce waste in their in-store bakeries and the learnings have been published for other supermarket chains to use.¹¹⁴ Other options for reducing food waste in store include discounting food at the end of day or as it nears its use by date which is a common practice in Countdown and some New World Stores but less common in other supermarkets.

Reducing food waste in supply chains

A supermarkets' business practices can drive waste in their supply chains.¹¹⁵ Actions that retailers could take include working to help suppliers reduce food waste through initiatives such as marketing seasonal produce, creating a food waste hotline for suppliers and whole crop purchasing. Retailers can also make cosmetic standards more amenable to selling imperfect food (e.g., produce with irregular shapes or blemishes). Countdown has already begun to implement this via their Odd Bunch range of products,¹¹⁶ however further work should be done in this space. For example, international waste advocacy groups such as Feedback have stated that while introducing explicit imperfect product lines is a useful first step in engaging consumers with non-uniform products, retailers should normalise this type of food by also including imperfect produce into existing economy lines of produce.¹¹⁷

¹¹³ WS21 [WasteMINZ TAO Forum]

¹¹⁴ http://www.wrap.org.uk/sites/files/wrap/Tesco%20Bakery%20Case%20study_o.pdf

¹¹⁵ For example, trading practices, including order cancellations, last minute changes to forecasts, retrospective changes to supply agreements and the use of cosmetic specifications to reject produce, all cause food to be wasted. Feedback: https://feedbackglobal.org/wp-content/.../06/Supermarket-scorecard_136_fv-1.pdf

¹¹⁶ WS17 [Progressive Enterprises]. In the first initiative of its kind in NZ, The Odd Bunch takes 'ugly' produce that may not have typically made it to supermarket shelves due to small imperfections or cosmetic damage, and makes this available to customers at a reduced price. It plays a role not only to reduce food waste at source, but it also support growers by taking more of their crop, and helps to make healthy food more affordable for our customers. A key part of the initiative is being able to take more fruit and veges direct from growers that they would otherwise throw away.

¹¹⁷ House of Commons Food waste in England inquiry <https://www.parliament.uk/business/committees/committees-a-z/commons-select/environment-food-and-rural-affairs-committee/inquiries/parliament-2015/food-waste-inquiry-16-17/>

Helping consumers reduce their waste at home

Retailers should consider changing practices which can encourage over-purchasing and food waste in the home.¹¹⁸ These can include: removing buy one get one free offers; phasing out products which are known to be the subject of high levels of waste, such as bagged salad; experimenting with a policy of ‘running out’ rather than continual restocking; and switching from pre-packaged to loose produce.¹¹⁹ An example of a local initiative to encourage consumers to reduce food waste generation at home is Foodstuffs nationwide promotion to enable New World customers to collect food Pods which can be used to preserve left-over food for later consumption.¹²⁰

Households

Since consumers are responsible for so much of the food that is wasted, consumer education and behaviour change initiatives are crucial. Consumer education can happen at many different levels and we heard witnesses discuss the importance of public education as a way of educating young New Zealanders about food waste.

Recommendations

15. I recommend to the Committee that consideration should be given to how food waste can be incorporated into lessons and extra-curricular activities at schools.

The submission made by the Zero Waste Network details a range of social enterprises working to reduce waste, such as the Community Business and Environment Centre that delivers waste minimisation programmes to schools, businesses, community groups, local Maraes, galas and festivals in an effort to divert all kinds of waste from going to landfill.¹²¹ Another example of a community education group is Para Kore, a group who are working toward normalising zero

¹¹⁸ House of Lords, Counting the Cost of Food Waste: EU Food Waste Prevention (2014): ‘It is clear that retailers must assume a far greater responsibility for the prevention of food waste in the home. Retailers must ensure that incentives and promotions offered to consumers do not transfer waste from the store to the household.’

¹¹⁹ WS7 [Feedback]

¹²⁰ WS8 [Foodstuffs]. The PODs are a set of four different-sized vacuum-sealed food preservation containers which customers collected stickers to redeem. Over the six-week campaign period, New World handed out more than 750,000 POD containers to its customers. Foodstuffs partnered with the Love Food Hate Waste campaign to undertake in-store promotion of the PODs initiative. This included instore teams talking with customers about how to look after their fresh produce. In-store activity was supplemented by on-line resources giving consumers ideas and tips for using food leftovers, including recipes for leftover food.

¹²¹ WS25 [Zero Waste Network]

waste behaviours, values and attitudes within Māori society.¹²² The most prominent New Zealand consumer education campaign to date has been Love Food Hate Waste, summarised in Figure 10 and detailed in more depth in the WasteMINZ submission.¹²³

Love Food Hate Waste is a not-for-profit communications campaign aimed at helping Kiwis to reduce how much food they waste. The focus of the campaign is solely on reducing household food waste, as opposed to supermarket or hospitality food waste. Love Food Hate Waste is jointly funded by Central Government, through the Waste Minimisation Fund, and 61 city, district and regional councils. The campaign is funded for three years – it began on 1 February 2016 and will end on 31 January 2019. The campaign received \$460,000 of Central Government funding for the three-year campaign.

Love Food Hate Waste is based on the campaign of the same name that began in the UK in 2007 which is run by WRAP. It is also being run in 7 different locations around the world by individual cities such as Brisbane; state governments such as Victoria and New South Wales and central governments such as Canada and Scotland. The participating agencies share research, resources and international best practise.

At a regional level, the 60 participating councils have delivered more than 400 events to engage with their community in a hands-on way. This includes events such as workshops, stands at markets and local festivals, film screenings and cooking demonstrations.

Awareness and education are key to preventing household food waste. People need to understand why food waste is an issue and learn the different strategies that they can do to keep their food out of the bin.

There are 7 main strategies which research has shown can have a significant impact on reducing household food waste: planning meals, shopping with a list, appropriate portion sizes, correct storage, eating leftovers, knowledge of expiry dates and preserving techniques.

Figure 10 New Zealand's Love Food Hate Waste Campaign

An evaluation of the Love Food Hate Waste three-year campaign was released in early 2019 which clearly demonstrated the significant impact it was having. Results showed that New Zealand households are far more aware of the issue of food waste than they were three years

¹²² WS16 [Para Kore Marae]. Among their activities, they deliver waste minimisation education to prevent food waste such as supporting marae to plan meals where leftovers from one meals are utilised in the next meal; changing the process of serving meals to ensure less leftovers left on the plate; ensuring that members take ice-cream containers for example to their marae, so that leftovers can be taken home after a hui; sharing information about storing food options that minimise wastage of food through optimum storage systems; and providing information to caterers, school parents, school camps, events, marae, about how to prevent food wastage.

¹²³ WS22 [WasteMINZ LoveFoodHate Waste]

ago and many households are taking actions to reduce their food waste. Households that had heard of the Love Food Hate Waste campaign and engaged more deeply with food waste were able to make significant reductions to the amount of food they were throwing away.¹²⁴ Beyond individuals, the campaign contributed to an increased awareness of the issue of food waste in New Zealand that helped initiate a range of community and business initiatives which are tackling food waste. The funding for this campaign has now run out and there is no indication from Government that the programme will receive further funding.

As stated by the Wellington city council in their submission, given the level of central government funding for Love Food Hate Waste in overseas countries has been in the many millions of dollars/pounds by country, and that thus far, the New Zealand Government's contribution has been only ~\$400,000 over three years, there is an important role for government to play in continuing to support this solution.¹²⁵

Household food waste collection services

Just as a poor awareness of the amount of wasted food in a business can be an initial barrier to waste reduction, this too can be the case for individuals. The evidence on the extent to which household collections make waste more visible and thus encourage prevention is less proven, though most practitioners believe there is scope to leverage this effect.¹²⁶ A number of councils in New Zealand already offer this service and Auckland Council is in the process of introducing a kerbside domestic food scraps collection service across the region to divert domestic food waste from the landfill.¹²⁷

¹²⁴<https://lovefoodhatewaste.co.nz/wp-content/uploads/2019/02/Love-Food-Hate-Waste-Research-Results-Summary-February-2019.pdf>. Audit results show that where people have engaged with the campaign, we have been able to reduce food waste by 27%. This means that at least 14,000 tonnes of food waste have been diverted directly as a result of the campaign.

¹²⁵ WS23 [Wellington City Council]. Noting the scale of the issue in New Zealand is costing households \$872 million per annum. The Love Food Hate Waste campaign that has become the back bone of many other countries strategies for reducing food waste.

¹²⁶ WS26 [Zero Waste Scotland]. See WRAP, 2011, Literature Review - Relationship between Household Food Waste Collection and Food Waste Prevention, http://www.wrap.org.uk/sites/files/wrap/Impact_of_collection_on_prevention_FINAL_v2_17_8_11.33a4f2do.11159.pdf, for a formal review of this question. It has since been revisited, but with no definitive answer. However, advice on how to leverage the effect has been developed, for example WRAP Cymru, Food waste messages for maximum impact – how to engage your residents in prevention and collections, <http://www.wrapcymru.org.uk/content/food-waste-messagesmaximum-impact-cymru>

¹²⁷ WS1 [Auckland Council]

3.2 What are the challenges for putting these methods in place?

As the last section has outlined, there are already a number of fantastic initiatives in place helping to reduce food waste in New Zealand businesses and homes. There are also many other technical, legal and economic interventions that can be used at each stage of the supply chain to prevent food waste, currently being used elsewhere in the world, which could be applied to New Zealand. Given the size of the food waste issue, New Zealand now needs to work in a more coordinated, joined-up approach in order to scale up current reduction activities. However, there are currently a number of challenges to doing this. New Zealand does not have a national food waste reduction target, nor a food waste reduction strategy, nor a prioritisation implementation plan identifying where investment in food waste reduction should be targeted. There is currently no national level coordination of a collaborative whole supply chain approach to food waste prevention, nor sufficient resourcing of waste reduction initiatives, nor a cooperative research approach. This section deals with each of these challenges in turn.

New Zealand needs to adopt and communicate a national food waste reduction target

New Zealand does not have a national food waste reduction target. Many countries do.¹²⁸ Setting a national target aligned with SDG Target 12.3 would demonstrate strong government commitment to this issue and motivate action by sending a strong signal to industry. New Zealand should consider what target would work best for us. While countries including the Netherlands and Norway are working to halve food waste across the entire value chain, other countries are taking a narrower reading of the SDG 12.3, limiting the 50% reduction target to retail and consumer segments of the food value chain.¹²⁹

¹²⁸ Countries or regional blocs that have set specific food loss and waste reduction targets aligned with SDG Target 12.3 currently represent 30 percent of the world's population. These regions include the African Union, European Union, Australia, Japan, and United States. WS3. [Champions 12.3]

¹²⁹ WS7 [Feedback]. Champions 12.3, a project run by the World Resources Institute (WRI), provides a useful guidance for interpreting goal 12.3, which clarifies that despite some ambiguity in the wording of the SDG, the target should be interpreted as covering the whole 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'. Hanson, C. 2017. 'Guidance on interpreting sustainable development goal 12.3'. Champions 12.3. <https://champs123blog.files.wordpress.com/2017/10/champions-12-3-guidance-on-interpreting-sdg-target-12-3.pdf>. Another area of confusion in some interpretations of the target is what destinations 'count' in terms of progress towards the goal: we support the guidance that converting food waste to energy through anaerobic digestion or other processes does not 'count' towards reduction, while use as animal feed or for redistribution does. This is an important distinction as some industry-led targets, for example the target adopted by the Consumer Goods Forum includes sending food to Anaerobic Digestion as reduction towards the target. <https://www.theconsumergoodsforum.com/initiatives/environmental-sustainability/key-projects/food-solid-waste/>

In addition to a national target, cities and local governments around the world are also setting goals in line with SDG Target 12.3. London, for example, recently committed to a target of 50 percent reduction in food waste by 2030, in addition to a ban on biodegradable waste going to landfills by 2026.¹³⁰ Businesses across the food supply chain should adopt targets aligned with SDG Target 12.3.¹³¹

Recommendations

16. I recommend to the Committee that in order to set a national target aligned with SDG Target 12.3., stakeholders should work with the WRI and the UN FAO to implement the FLW Standard, which sets out definitions and recommendations for targets, milestone targets and sub-indicators.
17. Cities, local governments and businesses across the food supply chain should also consider adopting food waste reduction targets.

New Zealand needs a national level food waste reduction strategy and an implementation plan

A major challenge for improving food waste reduction in New Zealand is the current fragmented food waste landscape. A coordinated and collaborative approach to managing food waste will be much more effective and advantageous to a broad range of stakeholders and is the approach taken by many countries. Action is needed to address this. We heard from one of our international witnesses how Zero Waste Scotland is currently working with the Scottish Government to develop Scotland's first Food Waste Action Plan. As another example, the Government of Australia recently published its National Food Waste Strategy, which provides a framework to support action toward a target of halving Australia's food waste by 2030.¹³² Outlined in the strategy is the Government's commitment of AUD\$1.37 million over 24 months toward this goal, with funding going toward a voluntary commitment program that will engage businesses and industries to commit to actions that reduce food waste, and the

¹³⁰ WS3 [Champions 12.3]

¹³¹ Nearly 2/3 of the world's 50 largest food companies participate in programs that have a food loss and waste reduction target. <https://champions123.org/2018-progress-report/>

¹³² *National Food Waste Strategy: Halving Australia's food waste by 2030*, Commonwealth of Australia 2017. <https://www.environment.gov.au/protection/waste.../national-food-waste-strategy>

development of a monitoring and evaluation framework to track progress toward the goal, supported by a national steering committee.¹³³

A national food waste reduction strategy is needed in New Zealand to build on and progress the work already happening in this space. A strategy must be accompanied by an implementation plan.

Recommendations

18. I recommend to the Committee that New Zealand needs to develop a national food waste reduction strategy to ensure a nationally coordinated approach.
19. An implementation plan should be developed that sets out short, medium and long-term actions to support reductions in food waste. The plan should also detail a monitoring and evaluation framework to measure progress towards the reduction target. Reporting of progress should be transparent to ensure that best practice is shared.

The strategy must adopt a circular economy approach that seeks to capture food waste as a resource. Action on food waste should be prioritised according to the internationally recognised food use hierarchy (Figure 11).¹³⁴ The food and drink material hierarchy sets out steps for dealing with waste to minimise its impact on the environment. The most preferable option is to prevent waste in the first place. The impact of any surplus food that is still produced can be reduced by redistributing for human consumption or by sending it for animal feed. In the UK and EU a version of the food use hierarchy is enshrined in law under the Waste Framework Directive and the UK Waste Regulations. However, following the hierarchy is not legally binding and many businesses are unaware of it or ignore it.¹³⁵

The Wellington City Council submission explained that the more traditional waste hierarchy is already embedded in the New Zealand Waste Strategy, the Waste Minimisation Act (2008), and through legislative requirement, in the Territorial Authority Waste Management and Minimisation Planning and community engagement processes that Councils must undertake at least every six years. The concept is therefore familiar, except that it has been adapted to

¹³³ Food Innovation Australia Ltd (FIAL), a not-for-profit organisation, funded by the Australian Government, has been tasked with delivering the National Food Waste Strategy.

¹³⁴ WRAP: <http://www.wrap.org.uk/content/why-take-action-legalpolicy-case>

¹³⁵ WS7 [Feedback]

the food waste stream specifically and provides a more appropriate lens through which to consider what is a specific yet many faceted problem.¹³⁶

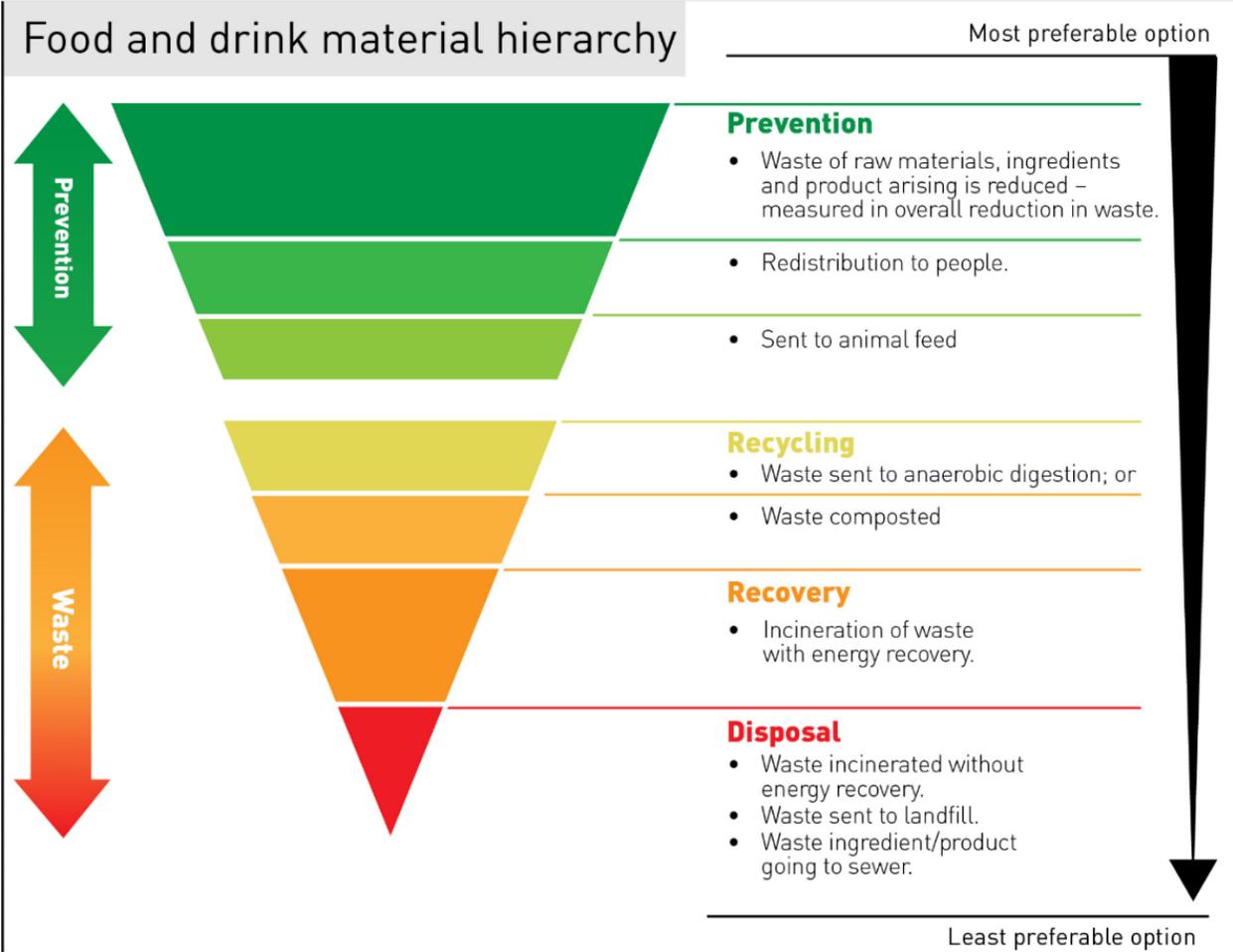


Figure 11 Food and drink use hierarchy

One of our submitters¹³⁷ suggested that declaring food waste as a priority product under the Waste Minimisation Act 2008 (WMA), and/or banning food waste to landfill would help prioritise the waste hierarchy by forcing effort and resources into reduction, reuse and recycling, rather than recovery (e.g. the collection of methane from landfills). Landfill bans may help stimulate better collection systems and economies of scale, underpinning infrastructure investment. A number of places have already put statutory requirements in

¹³⁶ WS23 [Wellington City Council]

¹³⁷ WS 25 [Zero Waste Network]

place that prevent food to land waste, including Scotland, Austria, Germany, Finland, Norway, Sweden, the Netherlands, and several US and Canadian states. In some instances there is a total ban on all residential and commercial food going to landfill. For example, the South Korean Government banned sending food to landfills in 2005 and, in 2013, also prohibited the dumping of garbage juice (leftover water squeezed from food waste) into the sea. In other places, policies have been enacted that ban some generators of food waste from landfilling food. France, for example, in 2016 declared it illegal for its supermarkets to send food to landfill. In many cases, such laws are relatively new and so data about their effectiveness isn't yet widely available. There is some evidence, however, that show these policy solutions are making headway. The World Economic Forum has reported that South Korea now has 95 percent of their food waste recycled — a remarkable leap from less than 2 percent in 1995.¹³⁸ A pair of reports from Massachusetts and Vermont were released in 2016 that show food waste landfill bans have been successful in boosting food donation and creating economic activity.¹³⁹ There appears to be increasing momentum on food waste landfill bans, with a number of campaigns and organisations promoting this. For example, in the UK there is a national campaign, ReFood Vision 2020, whose main aim is to bring about a change in government strategy to ban food waste from landfill and instead see it recycled.¹⁴⁰ In North America, the Commission for Environmental Cooperation's 2018 White Paper on the 'Characterization and Management of Organic Waste in North America' considered the issue of organic waste in Canada, Mexico and the United States and recommended a ban on organic

¹³⁸ <https://www.weforum.org/agenda/2019/04/south-korea-recycling-food-waste/>

¹³⁹ <https://sustainableamerica.org/blog/are-food-waste-bans-working/>

Effective 2014, Massachusetts made it illegal for businesses and institutions to dispose of more than 1 ton or more of "commercial organic material" in the trash per week. A survey of haulers, processors and food rescue organizations commissioned by the Massachusetts Department of Environmental Protection found that the tonnage collected by the respondents has increased in 2016 to more than 270,000 tons from a baseline of 100,000 tons in 2010. Massachusetts's food waste ban has also generated \$175 million in economic activity with \$50.5 million in capital investments planned for 2017. The 3 groups surveyed all reported adding employees between 2010 and 2016 and projected additional job growth for 2017. Vermont's Universal Recycling Law, which went into effect in 2014, bans individuals, businesses, municipalities and other entities from disposing a certain amount of food scraps per year. In 2016, that threshold was 26 tons; 2017 it went down to 18 tons per year. Entities that are more than 20 miles from an organics processing facility are exempt until 2020. By 2020, food scraps will be completely banned from landfill. A report from the Vermont Department of Environmental Conservation found that overall trash disposal in the state decreased 5% from 2014 to 2015 and that recycling and composting increased by 2%. As a result of this law, all of Vermont's towns and solid waste districts have adopted pay-as-you-throw pricing, meaning residents pay according to the amount of trash they produce, rather than a flat fee. One of the greatest successes of Vermont's law so far is the boost it's giving to fresh food donation. The Vermont Food Bank reported a 25-30% increase in food donation in 2015 and another 40% increase in 2016. Much of that increase is in healthier, fresher foods rather than canned goods. This has brought food costs per meal for the Salvation Army of Greater Burlington Area to under \$0.07 from \$1.47 just two years ago. One of the consequences of legislation like this is that it helps to assure potential investors in food donation and recycling infrastructure that there will be a ready supply of organic materials for new projects.

¹⁴⁰ <https://www.vision2020.info/ban-food-waste/>

material from landfills.¹⁴¹ The UK-based organisation WRAP conducted a feasibility study in 2012 of landfill bans and the analysis showed that for food waste, the outcome in terms of the costs to society varies depending on the technology chosen, though an average of the technologies indicates a net cost to society would be the likely outcome.¹⁴² Banning food from landfill would be a major change to current practice in New Zealand and adequate infrastructure would need to be put in place to handle the diverted food waste. Further review and input of local authority and industry experts is needed to explore the feasibility of banning food waste in New Zealand landfills.

Recommendations

20. I recommend to the Committee that the food waste hierarchy should form the basis of any resulting national strategy, policy decision and engagement.
21. Government should consider requiring businesses to report on their action on food waste according to the hierarchy.

We need to identify where investment in food waste reduction should be targeted

Before investment in food waste reduction activities is made, it is important to understand which strategies will create the most impact and which are the most scalable. Noting the importance of this activity, the delivery of Australia's National Food Waste Strategy includes funding a return on investment study to answer such questions (findings not yet released).¹⁴³ Return on investments studies have been done for individual entities such as countries, cities, and company sites. The most well-known study to date is that prepared on behalf of Champions 12.3, The Business Case for Reducing Food Loss and Waste, which analyses the financial impacts of historical food loss and waste reduction efforts. Key findings for return on investment were presented in the economic impact section in chapter 2 of this report (2.2). The methodology for quantifying the benefit-cost ratios is presented in detail in the report.¹⁴⁴

¹⁴¹ CEC. 2017. Characterization and Management of Organic Waste in North America—White Paper. Montreal, Canada: Commission for Environmental Cooperation www3.cec.org/fw/organic-waste-reports.

¹⁴² WRAP. 2012. Landfill Bans: Feasibility Research <http://www.wrap.org.uk/sites/files/wrap/Landfill%20Bans%20Feasibility%20Research%20Final%20Report%20Updated.pdf>

¹⁴³ <https://www.environment.gov.au/protection/waste-resource-recovery/food-waste>

¹⁴⁴ WS3 [Champions 12.3] <https://champions123.org/the-business-case-for-reducing-food-loss-and-waste/>

Return on investments studies have also been conducted for potential food waste reduction solutions. The most well-known of these is the economic analysis conducted by ReFED.¹⁴⁵ Starting with a set of more than 50 potential solutions, ReFED applied four screening criteria to yield the highest priority solutions detailed in the Roadmap.¹⁴⁶ The results of their work are presented in the following text¹⁴⁷ and shown pictorially in the Figure 12: Prevention measures were found to yield the highest overall economic impact, relying primarily on changing behaviours. With almost half of all wasted food coming from households and a substantial fraction generated by consumers in restaurants and food service, influencing consumers will have the biggest payoff. While a lack of customer social license has previously inhibited efforts to introduce imperfect produce and reduce package and plate sizes, Consumer Education Campaigns that target these and other issues can annually reduce nearly 584,000 tons and save consumers \$2.7 billion. Simply eliminating confusion through Standardisation of Date Labels can divert nearly 400,000 tons annually with a \$1.8 billion benefit annually to consumers. Every wasted ton of food that occurs up the supply chain imposes \$1,000 to \$2,000 of wholesale costs to businesses (calculation excludes farmers and retail purchases). Improved Waste Tracking & Analytics, which has the potential to divert 570,000 tons of wasted food annually generating an estimated \$1.3 billion in gross business cost savings, is the most economically favorable solution targeted to food businesses. Other top solutions include Packaging Adjustments, annually yielding \$715 million in total Economic Value and saving 200,000 tons, and Produce Specifications to accept an estimated 266,000 tons of “ugly produce” and unlocking \$277 million of value.

Recommendations

22. I recommend to the Committee that given the need to understand the most cost-effective ways to reduce food waste, an economic analysis is required to identify where opportunities exist for New Zealand to reduce food waste.

¹⁴⁵ Rethink Food Waste Through Economics and Data (ReFED), founded in 2015 as a collaboration of more than 50 businesses, nonprofit, foundation and government leaders committed to reducing food waste in the United States. ReFED takes a data-driven approach, using economic analysis to identify opportunities to cut food waste across the supply chain to reach the national 50% reduction goal by 2030. <https://www.refed.com/analysis?sort=economic-value-per-ton>

¹⁴⁶ Screening criteria are: Supporting Data: Is there sufficient data from one or more credible sources to support the assessment?; Cost-Effectiveness: Can the solution offer a positive, or near break-even Economic Value to society?; Scaling Potential: Is the solution limited to specific applications or niches, or does it have significant potential to scale?; and Feasibility: Can specific stakeholders implement the solution today without major changes to technology or policy?

¹⁴⁷ Note all monetary figures are in USD

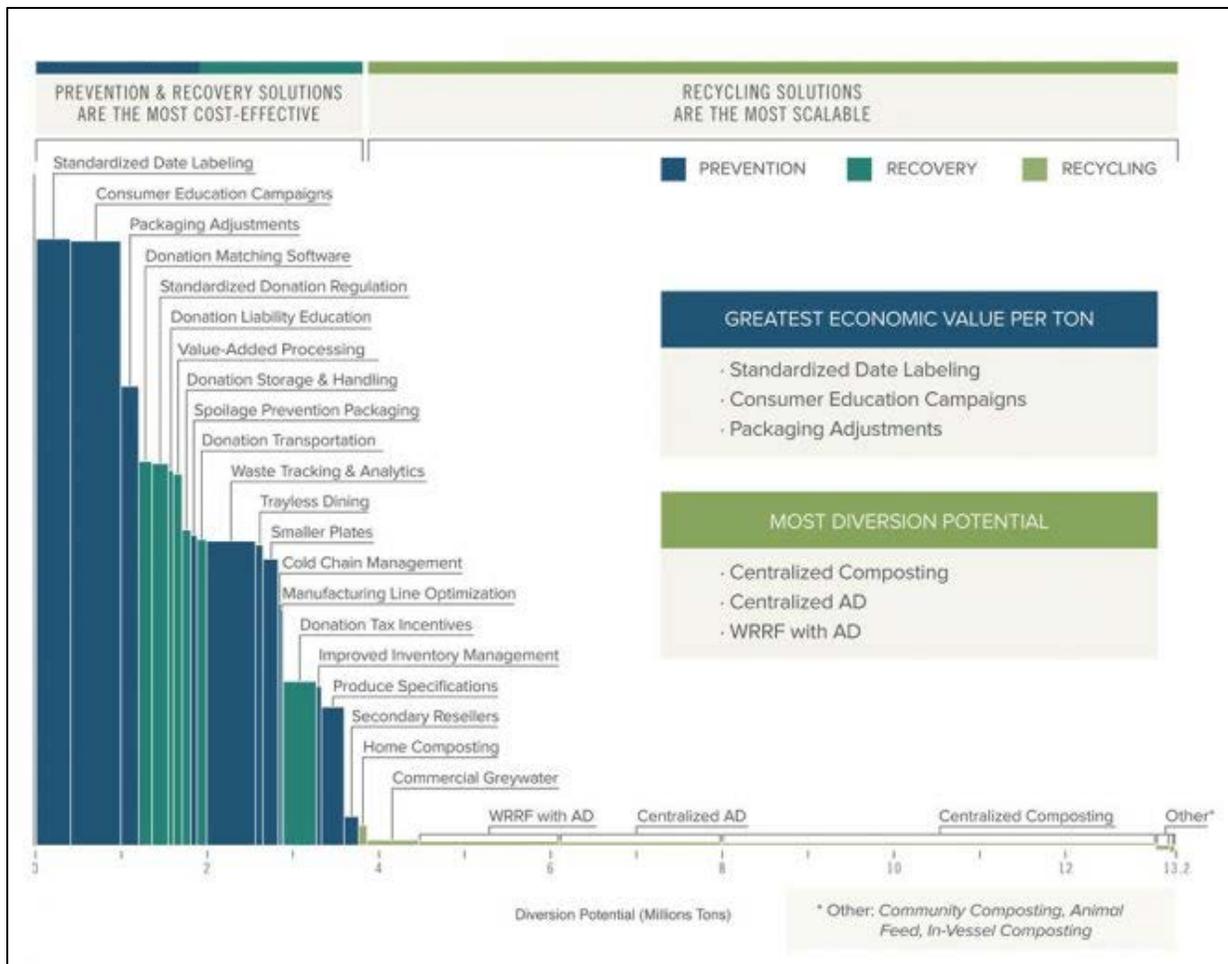


Figure 12 ReFed's Marginal Food Waste Abatement Cost Curve

We need a collaborative whole supply chain approach to food waste prevention

Food waste is a shared responsibility and all stakeholders have a role to play in the reduction challenge. Our international witness from WRAP¹⁴⁸ stressed that it crucial to remember that

¹⁴⁸ WS24 [WRAP]. She provided this example: If a project were implemented to help farmers grow more tomatoes without first assessing the market, this could potentially increase losses even though it is well intentioned. These losses could occur at the farm (i.e. the farmer cannot find a customer), at manufacturing (the manufacturer doesn't have any added value products to put the surplus tomatoes in), at retail (the supermarket cannot sell the additional tomatoes) or in the home (consumers throw away tomatoes they've bought on offer because they don't need them). At each stage of the supply chain, the product has become more costly in environmental terms as it is transported, packaged, stored and displayed.

many of the issues that generate food waste are systemic and therefore require a systemic solution or at least a consideration of the whole supply chain. The Zero Waste Scotland submission also made a similar point that while the desirability to act on food waste is accepted throughout the supply chain, sometimes the thinking is not lined up.¹⁴⁹

Collaboration across government

Wellington City Council's submission highlighted that as the food sector, and therefore food waste, affects much of the economy and thus requires engagement from Treasury, MPI, MBIE, MFAT, MSD, and MfE, a forum for cross-government engagement should be created.¹⁵⁰ International examples exist, such as the United States' Food Waste Caucus (the 'Friends of Food Waste' Parliamentary Group) which is a cross-partisan group established to support the passage of relevant food waste-related legislation.¹⁵¹ This cross-government group should consider how best to harmonise government policies impacting on food waste. For example, it is important to support the removal of any regulatory barriers that impede the sharing economy and ensure date label requirements are calibrated with consideration of food waste.

Recommendations

23. I recommend to the Committee that given the need for cross-government engagement on food waste, models for an appropriate forum for this should be explored.
24. This cross-government group should consider developing a policy framework in order to harmonise policies impacting on food waste.

Collaboration between governments

While collaboration between governments is already happening to some extent (e.g. through the APEC Policy Partnership on Food Security's food loss and waste project – see section 1.2 on New Zealand's efforts in international fora) increased international collaboration would help New Zealand move forward on the food waste front. Our international witness, Sarah May, stated in her submission how impressive it would be to see a trans-Tasman commitment by Australia and New Zealand on food waste reduction, and provided an example of a regional

¹⁴⁹ WS26 [Zero Waste Scotland]. For example, the perception "retailers" are to blame can reduce householder willingness to engage; catering businesses are far more willing to take responsibility for kitchen waste than plate waste; and contracting arrangements can lead to friction, rejections, and wasted food.

¹⁵⁰ WS23 [Wellington City Council]

¹⁵¹ <https://www.wastedive.com/news/congress-food-waste-caucus/522693/>. A joint agency formal agreement between the USDA, EPA and FDA was signed in 2018. <https://www.usda.gov/media/press-releases/2018/10/18/trump-administration-launches-winning-reducing-food-waste>

Nordic approach.¹⁵² She went on to suggest that as New Zealand and Australia mature in their understanding of the policy transformations required as per the 2030 Agenda, there is tremendous opportunity to support our Pacific neighbours and other regional partners, an aspect of the SDGs already recognised by both countries.¹⁵³

Recommendations

25. I recommend to the Committee that there is significant potential benefit to be gained for New Zealand by implementing trans-Transman and regional approaches to reducing food waste and therefore consideration should be given to building these collaborative partnerships.

Collaboration between businesses

The submission from the Sustainable Business Network detailed research that showed a desire from New Zealand businesses to increase collaboration around optimising food waste practices.¹⁵⁴ We are already starting to see increased business cooperation around food waste. For example, the submission from the New Zealand Food and Grocery Council explained that this year they have established a small working group to examine current food waste-related practices.¹⁵⁵ During the briefing period, a new business collaboration has arisen. Aoraki Development is planning a major sustainability initiative for South Canterbury's food producing sector as it looks at new ways to cut down on waste. The initiative, called "Sustainable is Attainable", will join together more than 20 organisations, including DB Breweries, Sanford, Fonterra, Barkers and Fresh Pork in a bid to find new ways to sustainably manage industry's waste.¹⁵⁶ Also during the briefing period, a new coalition called 'Fwd: social procurement platform' formed that is looking to influence positive change by tapping into

¹⁵² WS18 [Sarah May]. The Nordic Council of Ministers have signed a declaration reaffirming their commitment to halving food waste, in line with SDG 12.3, <https://norden.diva-portal.org/smash/get/diva2:1231011/FULLTEXT01.pdf>

¹⁵³ WS18 [Sarah May]. <https://www.mfat.govt.nz/en/peace-rights-and-security/work-with-the-un-and-other-partners/newzealand-and-the-sustainable-development-goals-sdgs/>; and <https://dfat.gov.au/aid/topics/development-issues/2030-agenda/Pages/default.aspx>

¹⁵⁴ WS20 [Sustainable Business Network]

¹⁵⁵ WS15 [New Zealand Food and Grocery Council]

¹⁵⁶ <https://www.stuff.co.nz/timaru-herald/news/112204390/major-south-canterbury-food-sustainability-initiative-to-be-launched>

their supply chains to unlock positive benefits, including waste reduction, through their procurement policies.¹⁵⁷

As one of our international witnesses explained, a number of global business alliances are publicly committing to SDG 12.3.¹⁵⁸ For example in 2015 the Consumer Goods Forum Board approved a resolution to halve food waste within the operations of its members by 2025. The Consumer Goods Forum’s approximately 400 members (including Woolworths, the New Zealand Food and Grocery Council and Sanitarium Health & Wellbeing) have been asked to use the FLW Standard to measure their efforts on a 2016 baseline.¹⁵⁹ More recently the Global Agri-Business Alliance has followed suit with a Product Loss Resolution, covering a range of agricultural companies including growers and processors.¹⁶⁰

Collaboration between the public and private sectors

According to the Champions 12.3 submission¹⁶¹, such partnerships are arguably the most effective way to address this issue, given the need to simultaneously address government policies, business actions, farmer practices, and consumer behaviours. The UK pioneered such partnerships with the Courtauld Commitment in 2005.¹⁶² The United States followed suit in 2017 with Food Loss and Waste 2030 Champions.¹⁶³ In 2018, the Netherlands launched “United against Food Waste,” and Indonesia now has a public-private partnership on food loss and waste (among others).

WRAP’s submission explained their pioneering voluntary agreement – a methodology for precompetitive collaboration across the whole supply chain, as well some of the challenges of putting these in place (detailed in Figure 13).¹⁶⁴ Incorporating all the stakeholders from

¹⁵⁷ Fwd: social procurement platform. Leading public and private sector organisations Air New Zealand, ANZ Bank NZ, Auckland Council, Auckland Transport, Fonterra, Hamilton City Council, Inland Revenue, McConnell Dowell, New Zealand Post, Russell McVeagh, SAP and Waikato Regional Council. <http://akina.org.nz/news/big-businesses-sign-big-change-social-procurement-programme/>

¹⁵⁸ WS18 [Sarah May]

¹⁵⁹ <https://www.theconsumergoodsforum.com/initiatives/environmental-sustainability/key-projects/foodsolid-waste/>

¹⁶⁰ <https://globalagribusinessalliance.com/casestudy/global-agribusiness-alliance-4/>

¹⁶¹ WS3 [Champion 12.3]

¹⁶² <http://www.wrap.org.uk/food-drink/business-food-waste/courtauld-2025>

¹⁶³ <https://www.epa.gov/sustainable-management-food/united-states-food-loss-and-waste-2030-champions>

¹⁶⁴ WS24 [WRAP]. Claire Kneller has indicated that WRAP would be glad to provide a more detailed briefing/illustration on how VAs work if this would be of interest at the end of this briefing.

businesses, governments, trade associations and NGOs, it is being used in the UK and has helped the UK grocery sector reduce food waste by 23% so far. Voluntary agreements are now under development in eight other countries/regions (supported by WRAP). The VA methodology establishes and addresses the hotspots from farm to fork, develops and implements good practice, avoids unintended (if well meaning) consequences of individual action, drives signatories to move further and faster than they would alone and measures and publically reports on progress. Within the VA, there are multiple different types of interventions that could be implemented to address food waste.¹⁶⁵

A voluntary agreement (VA) requires a trusted organisation, independent from government and businesses, to ‘host’ the collaboration. In many cases, the VAs that are in development around the world are being led by an in country organisation with some expertise in the food system generally with support from WRAP on the technical development and implementation. The VA can be perceived as expensive and requires a medium term commitment from government to be able to demonstrate that impact is being delivered. In addition, it is now considered good practice to ask for business signatories to contribute financially to the cost of the VA from the outset, not just with in kind support (which is itself significant). In many cases, businesses are now eager to collaborate on addressing these challenges but a strong commitment is required from CEO level which is then cascaded down within the businesses. It is likely that there will be some signatories who can effect greater change than others but all signatories should be required to report their data. A consumer campaign can also be perceived as expensive and it can be challenging to demonstrate its direct impact. This is why the support and amplification from VA signatories is so important to build on the direct communication carried out by the campaign lead.

Figure 13 The challenges for putting a Voluntary Agreement in place

As well as creating our own national programme, looking to link in with existing global voluntary agreements or alliances would also be a strategic move for New Zealand. As discussed in the submission made by Sarah May, there is currently no New Zealand/Australian representation in the Champions 12.3 group of international CEOs.¹⁶⁶ Having high caliber New

¹⁶⁵ A few case studies can be found at the following link <http://www.wrap.org.uk/category/what-we-offer/case-studies> and there are many more available on the WRAP website.

¹⁶⁶ There is however, already Australian representation on The Friends of Champions 12.3 network which features companies and organisations that are contributing to the worldwide momentum on this issue. Members include: The Australian Fight Food Waste Cooperative Research Centre; The Australian Institute of Packaging; Potatoes South Australia, Ozharvest, and Foodbank Australia. <https://champions123.org/friends-of-champions-12-3/>

Zealand/Australian members of Champions 12.3 could be a significant win for domestic/regional progress on food waste.¹⁶⁷

Recommendations

26. I recommend to the Committee that existing public private partnership models should be reviewed, including WRAP's Voluntary Agreement programme, and consideration should be given to implementing whatever model or approach will work best for New Zealand.
27. New Zealand should also consider strategic opportunities to join existing global voluntary alliances, e.g. Champions 12.3 and Friends of Champions 12.3.

Collaboration with iwi and mana whenua

As outlined in the Auckland Council's submission, incorporating mātauranga and tikanga Māori into solutions and decision-making regarding food waste, by partnering with whānau, hapū, iwi, and communities will create change and facilitate the transfer of knowledge and actions to and for future generations.¹⁶⁸

Recommendations

28. I recommend to the Committee that collaboration with iwi and mana whenua on any development of a national strategy or agenda for tackling food waste is key to ensure that Te Ao Māori is incorporated into this discussion and that obligations under Aotearoa's Te Tiriti o Waitangi are upheld.

We need sufficient resourcing of food waste prevention initiatives

More activities that reduce waste at larger scales are needed. This will require investment from government and from industry.

¹⁶⁷ WS18 [Sarah May]. A trans-Tasman Champions 12.3 representative such as the CEO of Woolworths (which also owns Countdown) would be a strategic addition to Champions 12.3 and could help catalyse action and help engender a culture of transparency, particularly across the retail sector, in both countries.

¹⁶⁸ WS1 [Auckland Council]

Recommendations

29. I recommend to the Committee that programmes should be funded that tackle sector-specific food waste through targeted education and provision of ‘how to’ resources, e.g. ‘Love Food Hate Waste’ for household food waste and ‘Your Business is Food’ for the hospitality sector.

We need a cooperative research approach

Research is essential to understand not only the size and scope of the food waste problem but also to test solutions and provide an evidence base to help with successful adoption of reduction solutions. Our international witness, Dr Reynolds, described in his submission how research on waste has advanced over the last decade, with an exponentially growing number of papers on issues related to food waste published each year. He presented the result of a 2018 ‘innovation forum’ that engaged with the Global and UK research community, as well as practitioners, policy makers, and funding organisations in order to establish priority research questions and a collaborative research agenda that can help achieve SDG12.3.¹⁶⁹

To date, in New Zealand there has been very little academic interest in food waste and there remains a dearth of information on food waste quantities and localised solutions. To successfully make inroads in reducing food waste, we must better understand how much food is being wasted, where it is being wasted and why. We also need to test solutions, including new approaches and new technologies, to understand what will work best for us. As an example, the Australian Government has recently provided a \$30 million grant to establish the \$100 million 10-year “Fight Food Waste Cooperative Research Centre” to fund research into reducing food waste throughout the supply chain. The Centre brings together industry, research and the community to capitalise on Australia’s food waste opportunities.¹⁷⁰

Recommendations

30. I recommend to the Committee that government and industry should invest in food waste research.
31. To ensure research agendas are shared to avoid duplication and to leverage findings, a cooperative research approach should be explored.

¹⁶⁹ WS11 [Dr Reynolds]. 395 questions were submitted online by 110 individuals. A 1-day workshop was held to narrow down the initial list to define the top 25 questions which included ‘What interventions are effective in preventing food from being wasted in the home?’ and ‘How can transparency of food loss and waste across the supply chain be enhanced?’

¹⁷⁰ Winning this fight will save Australia \$20 billion per annum in food waste through increased industry profitability and reduced food insecurity, as well as enhancing Australia’s reputation as a sustainable producer of premium food products. Through their 3 R&D programs, they will REDUCE food waste across the supply chain, TRANSFORM unavoidable waste into innovative high-value co-products, and ENGAGE with industry and consumers to deliver behavioural change.

4. Redistributing Food Waste

This chapter addresses three key questions:

- What are effective methods for redistributing food waste to people? (4.1)
- What are effective methods for converting food waste to animal feed? (4.2)
- What are the challenges for putting these methods in place? (4.3)

4.1 What are effective methods for redistributing food waste to people?

Food distribution is important for New Zealand as it sits directly at the nexus of two issues facing our communities; food waste and food security. Effective methods for redistributing food have traditionally included food banks (which rescue dried and tinned food) and food rescue groups (which tend to specialise in perishable food redistribution). However, in the last few years a whole range of other informal community movements have sprung up to help reduce food waste and improve food security within the community.

Formal (traditional) food rescue organisations/social enterprises

Food rescue involves taking quality surplus food that, for any number of reasons, is unable to be sold but is still perfectly safe for human consumption and redistributing it - usually via other organisations - to individuals and families who are facing food insecurity. The majority of this food comes from retailers (supermarkets), producers, manufacturers and logistics companies.

Nationally, the food rescue sector has expanded rapidly over the last decade; New Zealand's first food rescue organisation Kaibosh was founded in 2008 and now there are currently 17 groups operating dedicated food rescue programmes across New Zealand, each at different stages of development.¹⁷¹

Whilst all food rescue organisations operate slightly different logistical models, each determined by resource availability and tailored to the local needs of their community, they generally collaborate with well-established community groups (e.g. food banks, women's refuges, schools, preschools, mental and intellectual health agencies, community hubs and

¹⁷¹ Food rescue groups operating in 2017: o800 Hungry; City Harvest; Fair Food; Food Rescue Northland; Good Neighbour; Just Zilch; Kaibosh; Kaivolition; Kiwi Community Assistance; KiwiHarvest; Love Soup; Satisfy Food Rescue; The Free Store. Waiwaste Note: Waste Not What Not Whakatane and Gizzy Kai Rescue began operating in 2018.

more) who themselves offer a range of wrap-around services. In New Zealand, all of the food recovery services are provided at no cost to food donors.

During the briefing, we heard directly from two of our countries most prominent food rescue organisations, Kaibosh¹⁷² and KiwiHarvest¹⁷³ and indirectly about another smaller scale operation, Kai Rescue.¹⁷⁴

Working in Wellington and the Hutt Valley with the help of a dedicated team of more than 200 volunteers, Kaibosh rescues and sorts food 7 days a week. They deliver up to 25,000kg of quality surplus food each month to community groups that support people in need. This is the equivalent of 71,000 meals provided to those who need it most, as well as a 19,400kg reduction in carbon emissions.

KiwiHarvest has branches in Auckland, North Shore, Hawkes Bay, Dunedin and Queenstown and facilitates the redistribution of bulk food around the country. In 2017 KiwiHarvest kept 561 tonnes of food in the food value chain by collecting and distributing it back into the community. In the first ten months from Jan-October 2018 this figure was 683 tonnes. KiwiHarvest has seven refrigerated trucks and vans operating at full capacity in five areas of New Zealand collecting all types of quality excess food (still fit for human consumption) that would otherwise be sent to landfill. Due to the increasing demand for their services they are currently looking at a bulk handling and distribution model to accommodate businesses wanting a solution to their large food loss and waste volumes.

Major food retailers in New Zealand are key donors to food recovery organisation and our supermarket witnesses described to the Committee involvement in such programs from their perspectives. For example, we heard that 100 per cent of Countdown supermarkets have a food rescue and food diversion programme in place, which covers everything from perishable food to dented cans and food scraps that are not suitable for human consumption. Because of their centralised ownership, they have been able to report publicly on donated food quantities and destinations.¹⁷⁵

¹⁷² WS9 [Kaibosh]

¹⁷³ WS10 [KiwiHarvest]

¹⁷⁴ WS25 [Zero Waste Network]. Nelson Environment Centre's Kai Rescue project collects food from retailers and suppliers and distributes it to over 40 local charities who work with those in need. They have purchased a van with a chiller to transport the food, and built a cool store. Since the start of the project in March 2017 they have diverted 137 tonnes of food from landfill. www.nec.org.nz

¹⁷⁵ WS17 [Progressive Enterprises]. In the last financial year (to 30 June 2018), the Countdown Food Rescue programme diverted the following away from landfill: Value of total food donated: \$6.3 million; Food donated to The Salvation Army:

Food rescue provides an extremely effective way of distributing quality food to those in need in our community. In addition to the retailers and food rescue organisation's own data that highlights this,¹⁷⁶ there is also independent evidence available on the benefits. For example, in 2016 and then again in 2018, the University of Otago partnered with KiwiHarvest to evaluate the social value of rescuing food by nourishing communities. These analyses used a Social Return on Investment (SROI) evaluation tool to demonstrate the efficiency and effectiveness of their operation. Outcomes of food rescue for various stakeholders were detailed¹⁷⁷ and prioritised social, economic and environmental outcomes were valued and impacts calculated, resulting in a SROI ratio (social value) of \$5.16 for every \$1 invested.¹⁷⁸ A study by international witness, Dr Reynolds, examined the impact of food rescue operations in an Australian context and showed that as a method of waste disposal, every tonne of food rescued led to US\$221.94 worth of economic activity (compared to US\$2.53 (landfill) or US\$47.37 (compost)).¹⁷⁹

Informal food rescue community initiatives

Social supermarkets

A social supermarket sells or gives surplus food received free or low cost from retailers/suppliers. There are a range of models but generally food is offered at low cost, pay-as-you-feel or free basis and is open to any community members who find themselves needing their service. Examples include Nourished for Nil, in Hastings¹⁸⁰ and Just Zilch, in Palmerston

\$1.74 million; Food donated to other food rescue and foodbank charities: \$2.05 million; Food donated to farmers as food scraps or for stock feed: \$2.53 million.

¹⁷⁶ C.f. WS9 [Kaibosh]. Kaibosh was able to provide each kg of food at an operating cost of \$2.06 per kg in 2017/2018. This is a per meal cost of only 72c.

¹⁷⁷ Miroso et al. (2016), The social value of rescuing food, nourishing communities <https://www.emeraldinsight.com/doi/full/10.1108/BFJ-04-2016-0149>; E.g. food donors, outcomes included "more involved relationships with community", and "improved perceptions of corporate social responsibility". For the financial donors, these included "key promotional opportunity" and "do something good". For recipient agencies, important outcomes were "greater volume of food" and "increased reach". Volunteers reported "meeting new people", "a sense of accomplishment in helping others" and "learning new skills". There were also a number of nutritional and environmental outcomes for the wider community.

¹⁷⁸ Hartshorn (2018), MSc thesis: 'Evaluating the social value of a New Zealand food rescue organisation using Social Return on Investment analysis', University of Otago.

¹⁷⁹ WS11 [Dr Reynolds]. This higher economic activity of food rescue, could be interpreted as higher cost of disposal, or increased economic activity (greater amounts of jobs, and services required). In addition, it was calculated that is cheaper to rescue a tonne of food waste than it is to purchase a tonne of edible food at market value. Furthermore, we calculated that for every dollar spent on Australian food rescue, edible food to the value of US\$5.71 was rescued. To put it another way, for every dollar spent on food rescue, 1863 calories worth of food was rescued. <https://www.mdpi.com/2071-1050/7/4/4707/htm>

¹⁸⁰ <https://www.nourishedfornil.org/>

North.¹⁸¹ The Auckland Council submission described successful social supermarkets as being community-led and a part of a community hub of support, based on partnerships and based in a quality space that its patrons can be proud of. They explained that they (including the Waste Solutions Department, The Southern Initiative and Healthy Families) and KiwiHarvest alongside Otara families and whanau have been collaborating to investigate the potential of a social supermarket as a way to redistribute food within South Auckland.¹⁸²

Social Cafés

A similar concept to the social supermarkets, social cafés, that provide a free, pay-as-you-feel or low-cost meal to eaters, are springing up around the country. Some target specific groups while others are open to all eaters. For example Everybody Eats is a pay as you feel restaurant in Auckland which uses rescued food.¹⁸³ The Kai Conscious Café has been running for a year and a half at The Sustainability Centre on Waiheke and offers a free lunch every Friday.¹⁸⁴

Open Street Pantry Movement / Community Fruit and Vegetable stands

In the last couple of years many community drop-offs, including 90 Community Fruit and Vegetable stands and 65 Pātaka Kais, have been established.¹⁸⁵ These are places where people can drop off their excess produce, cafés can drop off unsold food items at the end of the day and food rescue groups can drop off excess items that they may not be able to distribute to their conventional recipients. Others, like Love Soup, work with local suppliers and companies to redistribute food within their local community.¹⁸⁶ As we heard in the submissions, these models help build communities and provides very easy access to food for those living with food insecurity, which is incredibly important when individuals and families are equally likely to have a transport affordability issue. The popularity of these community drop-offs is due to the fact that they are open much longer hours than a conventional food

¹⁸¹ <https://justzilch.org.nz>

¹⁸² WS1 [Auckland Council]

¹⁸³ <https://www.everybodyeats.nz/>

¹⁸⁴ WS25 [Zero Waste Network]. <http://www.wrt.org.nz/> They collect surplus food from 13 different businesses. The community is invited to volunteer their time by cooking, preparing the tables, doing dishes or providing a koha to enjoy this free lunch. Two staff are in the kitchen guiding the volunteering and teaching new recipes and how to cook food that's past its best. All the food is weighed each week, averaging at 120kg of food that is diverted from landfill - totalling 6240kg of food waste a year.

¹⁸⁵ <https://www.patakai.co.nz>

¹⁸⁶ <https://lovesoup.org.nz/>

bank, donations of any size can be accepted, and recipients don't need to complete lengthy paperwork.¹⁸⁷

Community Fridges

Community Fridges are the same concept as the pantries and fruit and vegetable stands but require significantly more resources to set up and operate (often in the form of Council and Community Centre volunteer support). Wellington City Council described in their submission how they are currently setting up two community fridges following the successful establishment of those operating in Auckland and Christchurch which have been up and running 2 years and 1 year respectively.¹⁸⁸ Auckland's fridge alone which is open 24 hours a day has distributed an estimated 4 tonnes of food in one year. These informal drop-offs are low cost, low maintenance, community led initiatives and can complement the work of more traditional food banks and food rescues.¹⁸⁹

Digital redistributions

Mobile apps have already started rapidly changing the food recovery landscape.¹⁹⁰ These include apps that connect community groups with local food stores,¹⁹¹ apps that link eaters directly with surplus retail food such as Y Waste, available now in New Zealand through KiwiHarvest¹⁹² and apps that also link consumers with other consumers that have spare food such as Olio.¹⁹³

¹⁸⁷ WS23 [Wellington City Council] and WS21. [WasteMINZ TAO Forum].

¹⁸⁸ WS23 [Wellington City Council]

¹⁸⁹ WS21 [WasteMINZ TAO Forum]. Auckland's fridge has a group of volunteers who daily collects salads, sandwiches and deli meats which are nearing their use by date from a New World Supermarket; it receives bread collected by the Salvation Army from another 3 supermarkets which are surplus to the needs of the Salvation Army's foodbanks and it receives any excess fresh food every Friday from another foodbank as they are closed on the weekend.

¹⁹⁰ A review of 19 different types of apps currently in use in the US can be found here: <https://foodtank.com/news/2019/01/theres-an-app-for-that-reducing-our-food-waste/>

¹⁹¹ In the UK, some supermarkets have collaboration with aggregation companies/technology which enable local stores to connect with charities in their area to donate food. See <https://food.cloud/> for an example which was rolled out by Tesco and has since been adopted by other UK supermarkets including Waitrose, ASDA and Aldi.

¹⁹² <https://ywasteapp.com/>

¹⁹³ <https://www.stuff.co.nz/life-style/food-wine/111270001/food-sharing-wastereducing-app-olio-takes-off-in-new-zealand>

4.2 What are effective methods for converting food waste to animal feed?

According to the waste food use hierarchy, food waste prevention must be the top priority. If there is surplus, then redistribution for human consumption is the next priority. If the food is no longer suitable for human consumption, then using this as livestock feed is the next best option. WRAP's submission explained to the Committee that food waste can be fed to animals through a variety of routes – direct to animals where suitable (e.g. to omnivorous livestock such as pigs and chickens), through the manufacture of animal feeds (e.g. pet food) or through the use of food waste as a feed source for protein generation (e.g. by black fly larvae). Direct supply tends to be more localised whereas manufacturing animal feed creates a more durable product. While these two methods are widespread, the third method is less established.¹⁹⁴

There are huge global environmental benefits of converting food waste to animal feed in terms of reducing the land use footprint for crops grown for animal feed¹⁹⁵. There are also a raft of economic benefits, including taking pressure off feed costs as well as the potential of attracting a premium for meat products from animals raised on this “eco-feed”, with some consumers seeing them as healthier and more environmentally friendly.¹⁹⁶

In New Zealand, the process of converting food waste to animal feed is well established. In the financial year (to 30 June 2018), the Countdown Food Rescue programme donated \$2.53 million worth of food to farmers to use as food scraps or as stockfeed.¹⁹⁷ Eco Stock Supplies

¹⁹⁴ WS24 [WRAP]. For an example of the third route, see <https://www.smithsonianmag.com/smart-news/maggots-may-be-our-solution-foodwaste-180963558/>.

¹⁹⁵ WS7 [Feedback]. Calculations based on EU-wide data suggests that feeding meat-containing surplus to pigs could reduce demand for up to 268,000 hectares of soybean production, which could mitigate ca. 2.6 % of the forecast expansion of soybean, reducing pressure on high-biodiversity tropical biomes accordingly. <https://doi.org/10.1371/journal.pone.0196288>. Using food waste as animal feed scores better on 12 out of 14 environmental (e.g. eutrophication and eco-toxicity) and health (e.g. carcinogens) indicators compared to anaerobic digestion or composting <https://doi.org/10.1016/j.jclepro.2016.05.049>; and <https://feedbackglobal.org/wp/wp-content/uploads/2017/10/The-Pig-Idea-researchsummary-July-2017.pdf>. The calculations in the study were based on the current UK energy mix for the energy needed to render the food waste safe. If renewable energy was used, feed could potentially beat biogas and compost on all indicators.

¹⁹⁶ WS7 [Feedback]. Savings on feed costs could be invested in maintaining and improving animal welfare standards and insulate farmers from the need to compromise on animal welfare to remain competitive. Adding a diversity of food waste based feeds, so long as these give optimal nutrition balanced out over time, may maintain homeostasis and reduce levels of stress – thus improving animal welfare and profitability. <https://feedbackglobal.org/wp/wp-content/uploads/2017/10/The-Pig-Idea-researchsummary-July-2017.pdf>. Kurishima et al, 2011. ‘The Effect of CO₂ Information Labelling for the Pork Produced with Feed Made from Food Residuals’ https://doi.org/10.1007/978-94-007-1899-9_34.

¹⁹⁷ WS17 [Progressive Enterprises]

Ltd is an Auckland based company that specialises in the processing of pre-consumer industrial and commercial food and organic waste into animal feed with approximately 35,000 tonnes per annum being processed.¹⁹⁸ We also heard from the New Zealand Food and Grocery Council and from the Bioresource Processing Alliance that a number of their members had conversion programmes in place.¹⁹⁹

While all of the different routes of feeding food waste to animals are commendable, the ‘direct to animal’ route (e.g. feeding food waste to omnivorous livestock such as pigs and chickens) in particular, has been touted as a ‘win-win’ for farmers and for the environment and there is an international movement driven to explore how to safely allow the recycling of more categories of food waste into animal feed.²⁰⁰ According to New Zealand’s Biosecurity Regulations 2005, meat-free waste can be fed to pigs without further treatment, or food waste that contains meat, or has come into contact with meat, must be treated before being fed to pigs.²⁰¹

4.3 What are the challenges for putting these methods in place?

Food recovery

The greatest challenge for food rescue organisations across New Zealand is sustainable funding. Other challenges include: misunderstandings about the safety and legality of food donations; lack of education; lack of national coordination in the food recovery sector; and lack of adoption of technological solutions. This section addresses each of these challenges in turn.

Lack of sustainable funding

Across New Zealand, food rescue organisations tend to be initiated and run by community groups or social enterprises and are usually reliant on many donated hours contributed by volunteers from within their communities as well as grants and donations to survive. In some

¹⁹⁸ WS5 [EcoStock]. Among their clients are major food manufacturers such as Goodman Fielder, Griffins and Nespresso. <https://www.ecostock.co.nz/ABOUT+US.html>

¹⁹⁹ WS15 [New Zealand Food and Grocery Council] and WS2 [Bioresource Processing Alliance] – The confidentiality of the details programmes was noted because of intellectual property concerns.

²⁰⁰ WS7 [Feedback]. For example, the UK’s Department of Environment, Food and Rural Affairs is currently considering removing its current ban on processing meat-containing food waste to feed pigs.

²⁰¹ Treatment involves heating the food waste (to 100 degrees Celsius for one hour) to destroy any disease-causing bacteria and viruses <https://www.mpi.govt.nz/processing/pet-food-inedibles-animal-feed-and-supplements/animal-feed-and-disease-prevention/feeding-food-waste-to-pigs-and-preventing-disease/>

cases, local government has stepped up to provide funding or amenities for food rescue services. For example, Kaibosh Food Rescue is currently the recipient of \$30,000 per annum grant from the Wellington City Council.²⁰² KiwiHarvest received a \$40,000 grant in 2015 from Auckland Council who also provided a grant of \$25,000 in 2016 to Fair Food.²⁰³ Dunedin City Council provides funding assistance to KiwiHarvest.²⁰⁴ Some councils such as Hastings and Waimakariri support their local food rescue groups by providing premises free of charge. Some groups have benefitted directly from Government administered funding streams such as the Waste Minimisation fund or EECA's electric vehicle fund.²⁰⁵ The private sector has also played a role in funding the sector. Two years ago, Countdown set up a Contestable Fund for their food rescue charity partners to access, and since then they have provided \$250,000.²⁰⁶

There exists a myriad of issues though with each of these funding streams. For example, in their submission, Kaibosh state that easily accessible, reliable and ongoing sources of funding from central government do not currently exist, despite the fact that there are often benefits to other government funded organisations.²⁰⁷ Another issue that was highlighted by our international witness from Feedback is that government subsidy for charitable redistribution does carry the risk of using public funds to clean up waste created by supermarket practices.²⁰⁸ The irregularity of most funding from all of the different streams means that ongoing efforts toward fundraising are significant for all food rescue groups which takes an enormous amount of time and energy, not to mention cost, away from the core service of rescuing and redistributing quality surplus food to those in need.²⁰⁹

²⁰² WS9 [Kaibosh]

²⁰³ WS1 [Auckland Council]

²⁰⁴ WS3 [Dunedin City Council]

²⁰⁵ As a point of interest, the Turnbull Government in Australia is delivering on an important election commitment to support those on the front line of food rescue and food waste reduction with \$1.2 million in funding under the Food Rescue Charities Program. <https://www.environment.gov.au/minister/frydenberg/media-releases/mr20170530.html>

²⁰⁶ WS17 [Progressive Enterprises]. This has supported a range of initiatives from an external chiller for KiwiHarvest, upgrading a network of fridges at The Salvation Army's foodbanks, providing the delivery vans for Love Soup and Satisfy Food Rescue, increasing paid employee hours to focus on growth for City Harvest, and many other initiatives.

²⁰⁷ WS9 [Kaibosh]. In Wellington alone, 4 DHB-funded services regularly receive Kaibosh-rescued food: C&C DHB Community Addiction Series, Early Intervention Services, Community Mental Health Team, TACT gTeam for Assertive Care Treatment.

²⁰⁸ WS7 [Feedback]

²⁰⁹ WS9 [Kaibosh]

Another issue is that because food rescue organisations usually take the food free of charge, the costs of disposing of food waste (i.e. transportation costs and landfill charges) are shifted from the commercial entity (e.g. the producer or retailer) to the not-for-profit food rescue operation. This could potentially lead to a situation where food businesses face very low costs for disposing of surplus food, which removes the incentive to reduce waste in the first place.²¹⁰ A further caveat is that food rescue organisations sometimes have to dispose of food that they cannot pass on leading to extra costs for their organisation.²¹¹ Furthermore, while food-donating businesses see the contribution of food to charities as a fulfilment of their corporate social responsibility, there is a perception that when they donate food that would otherwise be wasted to charity, that they are doing the charity a favour.²¹² At the same time, they capitalise on the ‘feel good’ public relations outcomes. As Auckland Council’s submission stresses, highlighting this issue is not intended to undermine the efforts and work of commercial entities and their important role in the successful outcome of food redistribution but rather to stress the need for a more equal allocation of the cost burden that can come with this work.²¹³

The lack of financial sustainability can impact on the reliability of redistribution services, which is problematic for donors. We heard in the Auckland Council’s submission, that through their discussions with Eco Stock Supplies Ltd (an Auckland based company that turns food waste into animal feed), they had identified an increasing trend of commercial companies/ food manufacturers using this service as an alternative to the option of food redistribution due to the lack of reliability of redistribution services.²¹⁴ This is concerning as feeding food to humans should be the priority according to the waste hierarchy.

Directly related to funding, another significant challenge to the successful delivery of food rescue services is a lack of required infrastructure (e.g. premises, logistical capabilities, storage space, and refrigeration capacity) for managing the logistics of food redistribution. As we heard from Kaibosh, they believe that this lack of available infrastructure is one of the greatest limitations to the national spread of food rescue groups through New Zealand.²¹⁵ On a similar

²¹⁰ WS7 [Feedback]

²¹¹ WS11 [Reynolds]. This is dangerous as this can price out food rescue from being effective. To be effective as volumes of food waste diverted to it increase, food rescue operations will need to have subsidies for disposal of inedible food waste.

²¹² WS21 [WasteMINZ TAO Forum]

²¹³ WS1 [Auckland Council]

²¹⁴ WS1 [Auckland Council]

²¹⁵ WS9 [Kaibosh]. With only 17 food rescue organisations equipped to receive chilled items, there are still numerous places around New Zealand where there is no organisation currently operating to divert fresh, chilled and frozen food from landfill.

note, Auckland Council pointed out that one of the biggest barriers to getting their social supermarket project up and running is the availability of suitable space.²¹⁶

Also directly related to funding, another significant challenge is lack of capacity. While the focus to date has largely been on rescuing food from the retail sector, the need to provide a similar solution to bulk food waste (e.g. from cancelled export orders or industry oversupply) is becoming more obvious.²¹⁷ New Zealand's food rescue network is becoming increasingly sophisticated and able to distribute tonnes of fresh food often at short notice²¹⁸ but much more robust solutions are needed.²¹⁹

One option for increasing the rate of food rescue that is used overseas in a number of countries including the US and the UK, is government provision of tax breaks/credits or other fiscal measures to companies that redistribute surplus food. In New Zealand, only cash (not food) donations are currently eligible for tax credits.

To increase the rate of food rescue and in order for it to be financially sustainable moving forward, a more consistent, fair and reliable funding model is required.

Recommendations

32. I recommend to the Committee that both the public and private sectors should explore how food rescue organisations can best be supported in their mandate.
33. Government should consider its legislative frameworks and how these could better support food recovery in New Zealand. Changes could include providing incentives to donate food waste to charities such as through tax breaks, or allowing for more flexibility in donor liability law so food rescue organisations can confidently ask food donors to pay for the removal of their unwanted food.

²¹⁶ WS1 [Auckland Council]

²¹⁷ WS21 [WasteMINZ TAO Forum]. Cancelled export orders can be a significant source of food waste as produce is often landfilled or composted in order to avoid flooding the domestic market as demonstrated by Zespri. Yet this produce is usually highly suitable to donate to food banks.

²¹⁸ WS21 [WasteMINZ TAO Forum]. In 2016 twenty tonnes of persimmons were rescued from an orchard in Hamilton where the growers due to poor health were unable to harvest the crop. The fruit picked by volunteers was sent to food rescue groups in Auckland, Hamilton, Tauranga, Palmerston North and Wellington for distribution.

²¹⁹ KiwiHarvest CEO explains how Australian models exist for a system whereby bulk product can be sent to warehouses throughout the country and then distributed to regions that need it. This would require a logistics partner and buy-in from food businesses to agree to do it. "It's easier for some businesses to dispose of it quickly and quietly. That's part of the mindset change we're working on." <https://www.odt.co.nz/news/dunedin/creating-national-food-rescue-network>

Misunderstanding about food donations safety and legality

As stated in the submission made by Kaibosh, a constant problem that food rescue groups face is a lack of awareness and understanding of the “Good Samaritan” clause 352 in the New Zealand Food Act 2014 regarding the removal of legal liability from donated food. Many potential food donors are not currently willing to engage with food rescue organisations as they lack confidence on what the repercussions would be ‘should something go wrong with their food’.²²⁰

Recommendations

34. I recommend to the Committee that in order to encourage more businesses to donate food waste, the Ministry for Primary Industries should explore ways to help raise awareness of the “Good Samaritan” clause 352 in the New Zealand Food Act 2014.

Lack of education

Food donors require education to ensure that they pass on edible food products that are not contaminated with non-food items e.g. used gloves, general rubbish. Ensuring that food recipients know how to cook and eat the rescued food they are given is also important. As community refrigerators and community free pantries become increasingly popular, education on food hygiene and safe food practices is required for all users.

Lack of national coordination in the food recovery sector

The food recovery sector in New Zealand has largely been shaped by grassroots, locally-led developments which have resulted in many different operating models. As the size and scope of the food waste issues becomes increasingly apparent, there is an obvious need to scale up operations. Acting at scale will require greater collaboration across the sector. Countdown’s Food Rescue Charity Partners Summits²²¹ have made a good start in strengthening collaboration and therefore food rescue as a sector but more effort is needed. One of our international witnesses explained that as that part of the Courtauld Commitment 2025²²², WRAP had established a Surplus Food Redistribution Working Group.

²²⁰ WS9 [Kaibosh]

²²¹ WS17 [Progressive Enterprises]. Countdown covers all costs of their partners attending the summit.

²²² Food redistribution shared vision statement: ‘As part of C2025, business signatories including leading retailers, manufacturers, and food redistribution organisations have agreed an ambition to work collaboratively with WRAP to double

Recommendations

35. I recommend to the Committee that given the value in taking a more collaborative approach to food recovery, a national food recovery working group should be established to provide a forum to look at practical ways to increase food redistribution; discuss and share best practice; identify barriers and opportunities etc.
36. Such a group is strongly encouraged to consider alternative business models to food recovery, e.g. where larger organisations with bulk volumes pay for surplus food pickup services.
37. The group is also encouraged to consider strategies for diverting and redistributing large-scale food waste from producers and manufactures, such as might occur when an export order is rejected/cancelled or a whole product line is mislabelled.

Lack of adoption of technological solutions

New Zealand has been much slower than some of our counterparts at adopting technological solutions to food redistribution.

Recommendations

38. I recommend to the Committee that retailers should further investigate the use of technologies to make it easier for charities to know what food is available.
39. Retailers should also consider the development of online portals and applications that provide alternative vehicles for donating, or selling/buying, surplus food.

Converting food waste to animal feed

We heard from our food waste processor, EcoStock, that one of the current limitations to further expansion of this sector is a lack of volume of food waste available. In part, this is due to cheap landfill. It is also because of 'one-stop-shop' solutions that financially incentivise companies and householders to combine rather than separate waste streams. The fact that food waste collection and tracking is not currently licensed or regulated was also mentioned

the amount of surplus food they redistribute by 2020 against a 2015 baseline.' <http://www.wrap.org.uk/content/surplus-food-redistribution-wrap-work>

as a limiting factor as without licensing/regulation there are no minimum standards and therefore no 'price' floor and no ability to consolidate waste volumes.²²³

On a similar note, our international witness cited evidence in their submission that in the UK this 'feeding of food waste to animals' step of the waste use hierarchy is often ignored by food businesses who find it easier to prioritise sending waste to alternative disposal routes such as bio-gas production. This can be due to the extra work required on the part of the business to ensure that the food waste remains uncontaminated with other materials.²²⁴ Other challenges for the sector include the need to financially invest in infrastructure to process the waste and the need for ingredients with a known nutritional value so that materials can be blended into balanced feeds.

Recommendations

40. Given the business and environmental case for feeding food waste to animals, further consideration should be given to how best to scale up this conversion activity in New Zealand to ensure, suitable food which is currently going to landfill is instead fed to animals. A discussion about how to do this at larger scale should include a wide range of stakeholders including meat processors, retailers and potential customers to ensure that there is minimal negative public perception of the activity.²²⁵

²²³ WS5 [EcoStock]

²²⁴ WS7 [Feedback]. O'Sullivan, C. 2018. The supermarket food waste scorecard. London: Feedback.

²²⁵ WS24 [WRAP]. The UK has direct experience of this discussion and have offered to share the learnings from their detailed stakeholder engagement and knowledge exchange activities.

5. Conclusion Summary of where we are at across the supply chain

Sector	What we know	What we don't know	What we need to know	
<i>Agriculture and Horticulture</i>	In addition to nationally-funded efforts to convert FW into value-add products, there are also some small scale reduction initiatives underway (e.g. gleaning)	We need FW measurements and to identify hotspots as well as the associated impacts of this waste	What are the key drivers for FW at this level?	What interventions are most cost effective in preventing FW? How can more of this FW be rescued to feed people and animals?
<i>Manufacturing</i>	There is increased desire from companies to collaborate to reduce FW, with a number of initiatives already underway There is some consumer confusion around date labels resulting in FW		We need to understand if improving packaging labelling and design can help reduce waste	
<i>Supermarkets</i>	Some supermarkets have set reduction targets and already engaged in a range of reduction initiatives	We need to know what business models will increase food recovery	Would changes in legislative frameworks (e.g. tax breaks or more flexibility in donor liability law) encourage donations?	
<i>Food Service</i>	There is a need to further raise awareness of the “Good Samaritan Clause” to facilitate food donation given current misunderstandings Waste tracking can raise awareness of FW	We need to explore which technologies, online portals and applications make it easier for FW from one company to be donated and/or sold/bought by another	Can WRAP’s education campaign ‘Your Business is Food’ be successfully run in NZ?	
<i>Households</i>	The LFHW education campaign has had significant impact, esp. in creating awareness of FW	We need to test solutions, including new approaches and technologies	How can FW best be incorporated into lessons and activities at schools?	
<i>Disposal</i>	Sending FW to landfill has a significant negative environmental impact	We need to understand if banning FW in NZ landfills is feasible	Can FW collections engage residents in prevention?	

Figure 14 Where we are at across the supply chain: What we know, don't know and need to know

A road map process

To move forward on the food waste front, New Zealand should adopt a three step approach for reducing food waste: target, measure, and act.

Target: In the first instance, I recommend that Central Government hold a national Roundtable/Summit to bring together key stakeholders across the food supply and consumption chain to build support and consensus on an approach for a national food waste definition, strategy and implementation plan.²²⁶

Measure: Data issues require immediate attention. Key areas of discussion at the Roundtable/Summit should be on how: (a) New Zealand could best establish base-year data to measure the target; and (b) conduct a return on investment analysis to identify where opportunities exist to reduce food waste. Given Australia's recent activities in both of these areas, it would be beneficial to invite key personnel involved in their work to our Roundtable/Summit to share their experiences and learnings.

Act: Actions that begin to address issues identified in this report need not necessarily wait on the development of a national strategy, nor improved data, both of which take time. This report has recommended a number of actions that require attention (e.g. establishment of: a cooperative research approach; working groups to explore how best to scale up efforts in food waste recovery and conversion to animal feed; a review of date labelling and packaging design). Making progress on these actions should begin immediately!

Figure 15 shows the 40 recommendations organised according to this three step framework.

²²⁶ This was the first step in the development of the development of the Australian Government's National Food Waste Strategy. The summit brought together those <http://www.environment.gov.au/protection/waste-resource-recovery/food-waste/food-waste-summit>

New Zealand needs:

- a national definition of food waste (R1)
- a national food waste reduction target aligned with SDG Target 12.3 (R16) as well as individual entity/company targets (R17)
- a national level food waste reduction strategy and implementation plan (R18-20) that adopts a collaborative whole supply chain approach to food waste prevention. This will require working locally with iwi and mana whenua (R28), forming public private partnerships (R26), creating cross-governmental (R23,24) and trans-Transman approaches (R25), and joining global initiatives (R27)

Target

- a national food waste baseline data collection project (R2-5) as well as individual entity/company baselines (R6)
- an economic analysis project to identify where opportunities exist for New Zealand to reduce food waste (R22)
- large food businesses to regularly measure and report on food waste in their business and supply chains (R14) and report on their reduction activity in relation to the food waste hierarchy (R21)

Measure

- a review of date and packaging labelling and design practices (R8-11)
- more NZ-specific research (R30) and a cooperative approach to this work (R31), including continual R&D of value-added products from waste (R7)
- sector-specific educative FW prevention initiatives (R29), e.g. for businesses (R12,34) and consumers (R13,15)
- to scale up food recovery (R31) by considering legislative frameworks (R33) and establishing a stakeholder working group (R36) to look at alternative businesses models for recovery (R35), strategies for diverting large-scale food waste (R37), and the implementation of retailer-led new technologies (R38,39)
- to convert more currently landfilled food waste into animal feed (R40)

Act

Figure 15 Recommendations (R1-40) organised according to the 3-step framework 'Target, Measure & Act'

Appendices:

Additional information requested by the committee during the briefing process

Information from MPI regarding food from businesses that could be donated, and what is done to raise awareness about the statutory requirements.

The Food Act 2014 includes a clause relating to people who donate food. The clause (section 352) protects those who donate food (e.g. to a food bank) that: is safe at the time of donation; and includes information necessary to maintain its safety and suitability. So long as these requirements are met at the time of donation, these donors cannot be prosecuted under the Act if the food later makes people ill.

Food that is given away as promotional material is subject to regulation (i.e. if the food is advertising a product or promoting a business). Those intending to give food away as promotional material should contact a local council Environmental Health Officer for advice on any requirements for these activities.

Information about donating food is freely available on the MPI website, including the web page [Fundraising & community events](#) and documents [Donations of food from commercial sources](#) and [Food Act Q&A](#).

MPI has also promoted food donation messages through the media, including “[Community fridge installed in the middle of Auckland's CBD](#)” (Stuff, Dec 2 2016) and social media (Facebook, May 10 2019). MPI has also provided multiple comments about food waste (e.g. takeaway food and BYO containers) through the media including “[Doggy bag ban annoys diners, ignites debate](#)” (Stuff, Dec 19 2018) and social media, including Facebook and Twitter (May 14 2019).

MPI has no data on the amount of food from businesses that is currently wasted, and that could be donated.

Information about gathering and targeting data associated with food waste. What models are in use or have been proposed.

Chapter 2 of this report deals with data issues. Section 2.1 introduces the global Food Loss and Waste Accounting and Reporting Standard (FLW Standard) developed to support SDG Target 12.3 and then outlines the different models currently in use in New Zealand to gather data

associated with food waste (i.e. Inference by calculation; Measurement; and Self-reporting/Observer-reporting). Section 2.3 makes the case that a New Zealand food waste baseline methodology is needed and that this should incorporate leading international approaches such as the above-mentioned FLW Standard. An example of Australia's 2019 National Food Waste Baseline Project is provided.

Information about statutory requirements in other countries that prevent food to land waste.

Section 3.2 (sub-section 'New Zealand needs a national level food waste reduction strategy and an implementation plan') details what is known about landfill bans for food waste. A number of places have already put statutory requirements in place that prevent food to land waste, including Scotland, Austria, Germany, Finland, Norway, Sweden, the Netherlands, and several US and Canadian states. In some instances there is a total ban on all residential and commercial food going to landfill and in other places policies have been enacted that ban some generators of food waste from landfilling food. In many cases, such laws are relatively new and so data about their effectiveness isn't yet widely available. There is some evidence, however, that show these policy solutions are making headway. Further review and input of local authority and industry experts is needed to explore the feasibility of banning food waste in New Zealand landfills.

Information on food waste cost-benefit analysis' and the processes they use.

Section 3.2 notes that return on investments studies that have been done for individual entities such as countries, cities, and company sites and presents the results of the study done on behalf of Champions 12.3, The Business Case for Reducing Food Loss and Waste, which analyses the financial impacts of historical food loss and waste reduction efforts (Figure 5). The most well-known return on investment study conducted for potential food waste reduction solutions, the economic analysis conducted by ReFED, is presented. The screening criteria used to yield the highest priority solutions is provided. It was noted that the delivery of Australia's National Food Waste Strategy included funding a return on investment study and it was recommend that an economic analysis is required to identify where opportunities exist for New Zealand to reduce food waste.

Information regarding the food waste processes used by schools, hospitals, and other large organisations with daily food waste.

Section 3.1 (sub-section 'Hospitality and food service') details the initiatives that the NZ Defense Force are taking to reduce waste. While there are a couple of studies that investigate specific New Zealand foodservice sites (e.g. hospitals and an airline catering kitchen), little is

known more generally about how New Zealand schools, hospitals, and other large organisations with daily food waste deal with their waste.

Information regarding “best by dates” and “use by dates” what is the purpose and impact of using them.

MPI responded to this information request by explaining that there are specific rules around labelling for the shelf life of products. Most packaged foods with a shelf life of less than two years need to include a date mark somewhere on the packaging. These rules cover both animal products produced under the Animal Products Act 1999 and other food products produced under the Food Act 2014. Date marks inform consumers how long they can keep the products before they start to deteriorate or become unsafe to eat.

The critical date marks are “best before” dates and “use by” dates. Food Standard Code definitions of the “best before” date and “use by” date apply to food that remains in an intact package during its storage, and is stored in accordance with any instructions provided on the label. Once the product is opened, the date mark may no longer be valid and the manufacturer may provide further instructions to the consumer on how to store and use the product safely.

It is the manufacturer’s responsibility to determine what the appropriate date mark is to use on their products. Different foods have different keeping qualities, and MPI has developed guidance material to assist industry to [determine the shelf life of their food products](#) and to apply the appropriate date marking.

Date marks can be checked by verifiers as part of verification processes for businesses that operate under Food Act or Animal Products Act Risk Based Measures. Businesses can only change their date marks (under the Food Act) with permission from MPI (as the relevant authority). MPI can also check on date marks as part of compliance action.

“Use by” dates

“Use by” indicates the date up to which the manufacturer has determined their food is still safe to consume. Consumers are advised to not eat food after this date, even though it may not always be obvious to the consumer that the food is not safe to eat.

It is illegal to sell food after its “Use by” date. If consumers see food being sold past its “use by” date, they are advised to notify the retailer. If the retailer does not respond appropriately, consumers can also notify New Zealand Food Safety (a Branded Business Unit within MPI).

“Best before” dates

The “best before” date indicates when the manufacturer has identified the food will be at its highest quality.

Food will remain safe to eat after the “best before” date, unless it deteriorates to a point where the consumer would reject it due to smell/taste/texture etc. Foods that have passed the ‘best before’ date are sometimes offered at marked-down prices. Consumers are advised to carefully consider buying these products, depending on when they want to use the food.

It is important to note that fresh, unprocessed fruit and vegetables do not usually come with “use by” or “best before” dates. In these cases, operators along the food chain have the responsibility of determining the level of ripeness or spoilage, and ensuring that the produce being sold is safe and suitable.

Information about organisations that provide pre-prepared meals and their processes regarding “best by dates” and “use by dates” and what responsibilities they have once their product is in a customer’s home.

According to MPI, it is the manufacturer’s responsibility to determine what the appropriate date mark is to use on their products, and to indicate this clearly on any pre-prepared meals it sells.

While a manufacturer cannot control what the customer does with their product once it has been purchased, they must provide any information needed to ensure the product is safe and suitable if it is consumed up to the end of its “use by” date. This includes information about how the food needs to be stored and used.

Where specific storage conditions are required for an item of food to keep until its date mark (“best before” or “use by” date), those conditions must be included on the label. For example, “This meal should be kept frozen.” If the food item must be used in accordance with certain directions for health or safety reasons, those directions must be included on the label.

MPI has developed guidance material to assist industry to understand their labelling requirements. This material can be found at the following websites:

<https://www.mpi.govt.nz/dmsdocument/2965-a-guide-to-food-labelling>

<https://www.mpi.govt.nz/food-safety/labelling-and-composition/>

Consumers are also advised to follow the “Clean, Cook, Chill” advice given on New Zealand Food Safety’s website to ensure that they are handling, preparing, storing and cooking their food properly in the home. This includes keeping kitchen and eating utensils clean, cooking

food for the right time and at the right temperature, and keeping food cool in the fridge if it will not be eaten straight away.

Information about food-stuffs packaging and the waste cost/benefit of packaging that increase the life cycle of food.

Section 3.1 (sub-section 'Improved packaging labelling and design) details that recent research identifies a strong correlation between foods with the highest percentage of wastage and the least amount of packaging. On the other hand, research also reveals that throwaway plastics is failing to solve the food waste problem. Given the apparent contradictions about the role of packaging in food waste, a recommendation is made that more research is needed on the value of packaging in reducing food waste. The review would include an assessment of research being undertaken to understand the most effective packaging approaches and technologies for New Zealand food products. It will also be important to better understand how best to communicate the advantages of any packaging solutions to consumers at a time where there is negative public sentiments about packaging waste.

A Summary of where we are at across the supply chain - what we know, don't know and need to know.

A summary table is presented in Chapter 5.

Suggestions and a road map process of what we need to put together to understand the issues and put together policy suggestions.

Chapter 5 suggests that in order to move forward on the food waste front, New Zealand should adopt a three step approach for reducing food waste: (1) Target; (2) Measure; and (3) Act. An organisational roadmap process chart is presented at the start of the report.

How this can be tied into United Nations sustainable development goal 12.3.

Section 3.2 suggests that New Zealand needs to adopt and communicate a national food waste reduction target in line with SDG12.3. Recommendations are put forward that New Zealand needs to develop a national food waste reduction strategy and an implementation plan that sets out short, medium and long-term actions to support reductions in food waste. The plan should also detail a monitoring and evaluation framework to measure progress towards the reduction target.

Published Written Submissions (WS)

- WS1. Auckland Council
- WS2. Bioresource Processing Alliance
- WS3. Champions 12.3
 - a. Champions 12.3 Supp 1
 - b. Champions 12.3 Supp 2
 - c. Champions 12.3 Supp 3
- WS4. Dunedin City Council
 - a. Dunedin City Council Supp1
- WS5. EcoStock
- WS6. EnviroWaste
- WS7. Feedback
- WS8. FoodStuffs
- WS9. Kaibosh
- WS10. KiwiHarvest
- WS11. Knowledge Exchange Research Fellow - Doctor Christian Reynolds
 - a. Knowledge Exchange Research Fellow - Doctor Christian Reynolds Supp 1
 - b. Knowledge Exchange Research Fellow - Doctor Christian Reynolds Supp 2
 - c. Knowledge Exchange Research Fellow - Doctor Christian Reynolds Supp 3
 - d. Knowledge Exchange Research Fellow - Doctor Christian Reynolds Supp 4
- WS12. Ministry for Primary Industries
- WS13. Ministry for the Environment
- WS14. New Zealand Defence Force
- WS15. New Zealand Food and Grocery Council
- WS16. Para Kore Marae Inc
- WS17. Progressive Enterprises
- WS18. Sarah May
- WS19. Statistics New Zealand
- WS20. Sustainable Business Network
- WS21. WasteMINZ and WasteMINZ Territorial Authorities' Officers Forum
- WS22. WasteMINZ Love Food Hate Waste
- WS23. Wellington City Council
- WS24. WRAP
 - a. WRAP Supp 1
 - b. WRAP Supp 2
- WS25. Zero Waste Network
- WS26. Zero Waste Scotland

Hearing of Evidence (HoE)

Oral Hearing Session 1: Thursday 7 March 2019

- HoE1. **NZ Defence Force**
Rob Krushka, Brigadier
- HoE2. **Kaibosh**
Matt Dagger, General Manager
- HoE3. **Para Kore Marae Inc**
Jacqui Forbes, General Manager

Oral Hearing Session 2: Thursday 14 March 2019

- HoE4. **WasteMINZ and WasteMINZ Territorial Authorities' Officers Forum**
Jenny Marshall, Sector Projects Manager
- HoE5. **WasteMINZ Love Food Hate Waste**
Jenny Marshall, Sector Projects Manager
- HoE6. **FoodStuffs**
Melissa Hodd, GM Government Relations
- HoE7. **Sustainable Business Network**
James Griffin, General Manager Projects and Advisory
- HoE8. **New Zealand Food and Grocery Council**
Carole Inkster, Policy & Regulatory Director
- HoE9. **KiwiHarvest - Videoconference**
Deborah Manning, CEO & Founder
- HoE10. **Auckland Council - Videoconference**
Sophien Brockbank, Team Leader Strategic Planning
- HoE11. **Bioresource Processing Alliance**
Anna Yallop, General Manager
- HoE12. **EcoStock**
Andrew Fisher, Managing Director
- HoE13. **Wellington City Council**
David Lee, Councilor
- HoE14. **Zero Waste Network**
Dorte Wray, Executive Officer

Oral Hearing Session 3: Thursday 2 May 2019

- HoE15. **Progressive Enterprises – Countdown**
Kiri Hannifin, General Manager Corporate Affairs and Sustainability