Organic Waste: A position statement from the Zero Waste Network

March 2021

Steps forward for action on organics

It is our opinion that regulatory instruments should be utilised in response to the issue of organic waste, and specifically organics in landfills, and food waste. This is because the negative consequences of business as usual are too great to rely on voluntary responses by producers, manufacturers, suppliers and consumers, or on the small-scale responses by community groups or on the capturing of methane at landfills. Organic waste must not be treated in a siloed manner, as how we address it has huge flow-on effects in many different areas.

We believe a national strategy for food waste reduction is necessary and should provide guidance for all sectors across the food cycle. A holistic approach needs to be taken in designing this national strategy. It needs to be in line with the waste hierarchy, with emphasis on reduction. It also needs to consider the unique context of Aotearoa, including cohesion with te ao Māori and Te Tiriti obligations, and serve to uphold related policy including climate targets and freshwater quality targets, as well as goals for waste reduction, resilience, community health and wellbeing.

Setting a national target for food waste reduction would facilitate planning, monitoring and delivery of action on this issue.

Mandating separate collection and 'recycling' (processing) of organics can be another useful and bold policy tool to drastically increase capture and processing of organics. For example in the EU, by 31 Dec 2023 all member states must ensure organic waste is "either separated and recycled at source, or is collected separately and is not mixed with other types of waste." (European Union, 2008).

Exploring a ban of organic waste to landfill or mandatory recycling of organic waste as happens in countries like Austria, Finland, Germany, Norway and Sweden is the kind of bold action required.

What are organics

The 2010 NZ Waste Strategy defines organics as, *"garden waste, kitchen waste, food process wastes, and sewage sludge"*

A WasteMINZ report The value of good science: organics diversion defines it: *"The term organic waste is often interchanged with green waste and includes putrescible waste; a range of treatment or disposal mechanisms often cater for both. However it is important to further define organic waste. Organic includes green waste from sources such as garden trimmings. It also includes the putrescible element of the waste stream such as food waste. MfE define organic waste simply as waste that includes garden, fruit and vegetable waste. WRAP similarly define organic waste as any waste stream that might contain food, vegetal matter, plant material and green waste."*

What is the problem?

New Zealand presently generates approximately 15 million tonnes of waste per year, with 4 million of that recovered. The percentage of organic material within that total varies from region to region:

- In Auckland it is estimated to be 50% of the weight of household waste, and comprises approximately 19% of waste to landfill (2016). In November 2019, Auckland Council announced a 20-year partnership with Ecogas Ltd to process the food scraps that will be collected at kerbside across urban Auckland from 2021. More than 80% of the organic kerbside domestic waste (p50) is food waste, but domestic waste only comprises approximately 15% of the total waste going to landfill, the remainder is commercial.
- In Christchurch, the most recent statistics from 2011-2012 indicated 21% of all materials going to landfill were organics. As part of their waste minimisation strategy, the Council's contractor collects the organics (food and garden waste) from green-lidded wheelie bins placed at the kerbside every week. The strategy includes the aim to reduce the recoverable green and kitchen waste sent to landfill to no more than 30 kilograms per person per year by 2020 (this strategy is due to be updated by 2020) . Their Organics Processing Plant will process approximately 55,000 tonnes of organic (food and vegetation) material into compost.
- In Wellington, a specific picture of organics as a percentage of the total is more difficult to document, but has been quoted as being 40% of the waste to Class 1 landfills. The Regional Council notes that approximately 46,000 tonnes of organic waste is diverted (2016).

Organic waste in landfills is a problem for several reasons. First, its decomposition in an anaerobic environment creates methane, an aggressive greenhouse gas. While some Class 1 landfills capture this methane for use as transportable energy, this is an inefficient process and "combustion of landfill gas releases both dioxins and furans, albeit at very low levels, which are two of the most toxic chemicals known and can be harmful even in very low concentrations" (WasteMINZ). It is

important to note that in New Zealand there are still landfills consented to accept household waste that have no methane capture system at all. Furthermore, even those with methane capturing systems may simply be burning the methane off in flares rather than reusing it as energy.

There are significant environmental impacts of the food cycle that must be considered in terms of organics disposal, including:

- The manufacture and use of fertilizers, pesticides and herbicides[1];
- The loss of nutrient cycling when organics are not returned to soils, and the missed potential for sequestering carbon via use of compost in farming, which both contribute to the degradation/desertification of soils;
- Impacts on freshwater quality, biodiversity loss, soil depletion, pollution and climate effects of the transportation of food from grower to market to consumer;
- Post-waste impacts such as the loss of landfill space, CO2 emissions from the transportation of waste to landfill, and leachate.

Social impacts of the food cycle include:

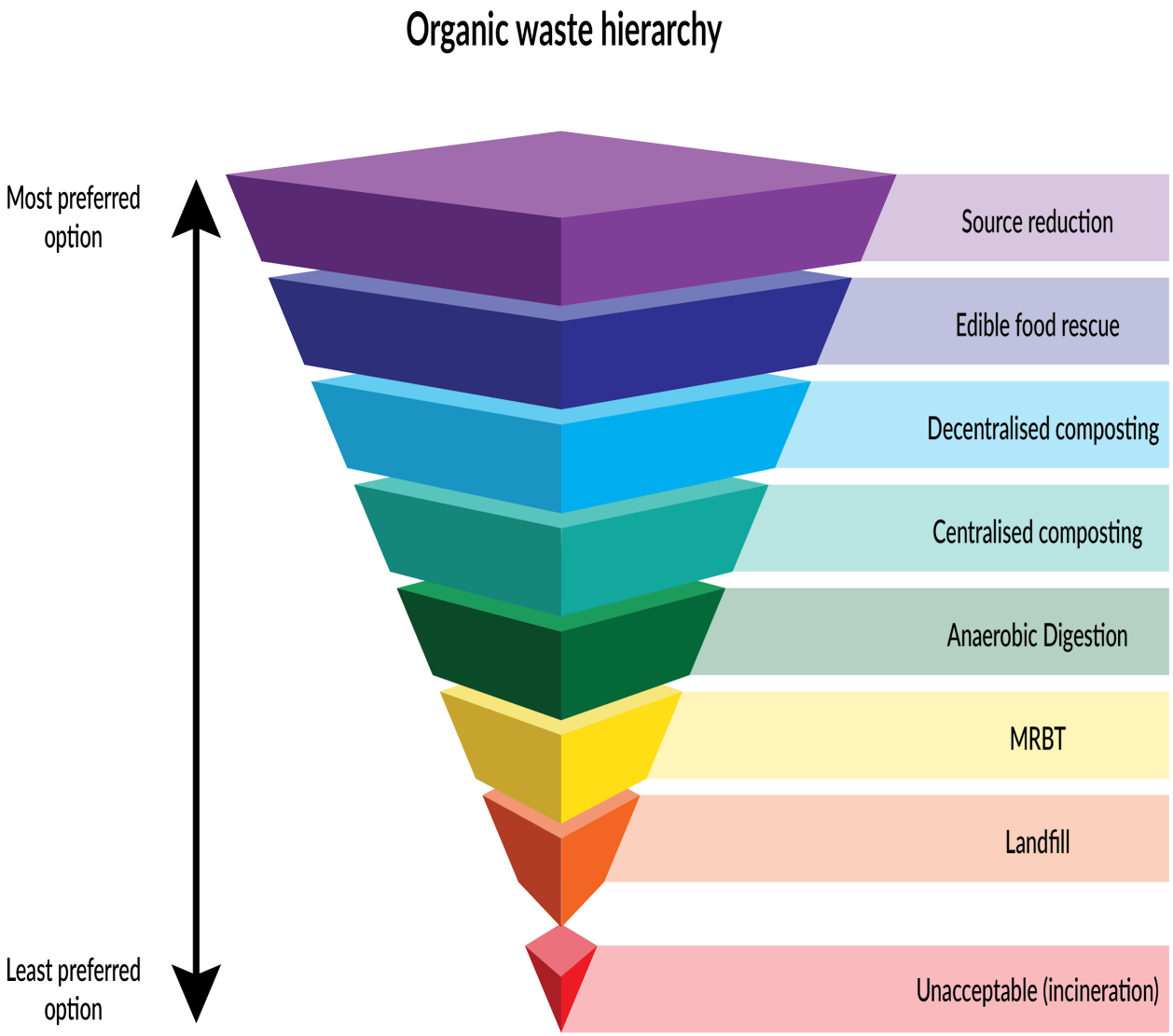
- Loss of food resilience and sovereignty;
- dependence on a food system built on overproduction and wastage (e.g. food banks with low-nutrition food do not provide true food security);
- potential removal of organic resources from community control (e.g. the Waste Bylaw 2019 that was almost passed in Auckland that would have made home and community composting very difficult/subject to fines);
- disconnection from our food system and lack of understanding of waste, soil, etc. issues;
- negative health impacts from different parts of the food system - from high nitrogen in tap water to an oversupply of low-nutrition food and NZ's obesity epidemic.

When considering this list, it is clear that when food is wasted there are a lot of negative impacts, with no corresponding benefit. This indicates a highly inefficient food system.

A waste hierarchy for organics

In order to work towards zero waste and regenerative circular economy, organic materials need a specific waste hierarchy. Following models proposed by the Institute of Local Self-Reliance and Zero Waste Europe, we propose the following hierarchy should be applied to organic waste.

[1] One type of substance of particular concern are pyridine herbicides, which can severely inhibit and distort the growth of certain types of vegetables. These herbicides, such as clopyralid, still have widespread commercial use in agriculture and in public parks, golf courses and so on - though they have been banned for most domestic applications. They often find their way into commercial composting facilities via contaminated grass, manure and other feedstocks. Pyridine herbicides can be persistent in soils and composts, and require specific conditions to decompose, making it costly and intensive to decontaminate composts and soils. For more information see:
https://organicnz.org.nz/magazine-articles/keep-your-garden-safe-from-killer-compost/



This infographic is explained further in the table at the end of this document covering each of the steps on the Organic waste hierarchy, with an assessment of the key activities required to achieve each.

Focus on source reduction

Source reduction, also known as waste prevention, is the practice of reducing the amount of materials that enter the waste stream. To date, much of the effort to reduce organic waste to landfill has focused on post-waste solutions such as composting. While these efforts are important, they cannot fully address the economic waste and the embedded energy opportunities available in a waste reduction approach. Source reduction sits at the top of the waste hierarchy because it is the single most effective way to reduce the downstream impacts of waste by removing them entirely.

The Love Food Hate Waste campaign is focused on promoting a range of reduction strategies, including:

- Meal planning
- Correct portioning
- Storage
- Understanding expiry dates
- Using leftovers

Behaviour change campaigns and projects that focus on getting people doing these activities need to be prioritised for financial and policy support at central and local government levels.

Why is diversion important?

The purpose of the Waste Minimisation Act is to *encourage waste minimisation and a decrease in waste disposal in order to protect the environment from harm, and provide environmental, social, economic and cultural benefits.* (Section 3)

From the perspective of the Zero Waste Network, the building of a circular economy that creates strong communities, develops employment opportunities and enhances the environment means that organics must be viewed as a valuable resource to be recovered. At the same time, diverting and separately collecting organics is a vital step in improving collection, recovery and recycling of non-organic materials because organics are one of the most significant sources of contamination of different waste streams.

Composting of organics is already practiced on both large and small scale across New Zealand. Christchurch City Council, for example, has had a separate Organics Kerbside collection for many years, and their organics processing plant processes approximately 45,000 tonnes of organic material each year.

Five examples of projects happening at a local level to illustrate the grassroots response to this issue.

CBEC Eco Solutions based in Whangarei and is focused on reduction. Their Community Compost Connection project teaches people about the issue of food waste, ways to combat it and provides resources to encourage composting. Participating households diverted 85% of food waste from landfill after taking part in the programme.

Nelson Environment Centre's Kai Rescue programme which collects food from retailers and suppliers and distributes it to local charities who work with those in need. The project diverted 137 tonnes of food from landfill in the first 18 months.

Members of the Urban Farmers Alliance
Many of the members of the Urban Farmers Alliance are piloting circular systems for organics that includes local food scraps collections on low-carbon transport, professional and high quality compost creation, regenerative growing practices (including sequestering carbon in the soil), and building local food resilience. https://www.urbanfarmersalliance.org.nz/network

Xtreme Zero Waste, Raglan. In a single year they diverted 140 tonnes or 200 cubic meters of food waste through a kerbside collection to 2000 houses. They sell the recycled product back to the community as compost.

Waiheke Resources Trust's Kai Conscious project covers reduction, reuse and recycling activities. Their Kai Conscious cafe takes food that is close to its use by date from local businesses, and turn that food into a community meal that feeds 80-100 people each week. This diverts 6.8 tonnes from landfill each year and is a way of drawing attention to the problem and possible solutions to food waste. In addition, their Compost Company collects food scraps and compostable packaging from local cafes, and hot composts them on the island. Since starting operations, 13 businesses have got involved and have diverted 2.8 tonnes of waste from landfill.

Composting vs anaerobic biodigestion - further considerations:

Anaerobic digestion (AD) is a process in which microorganisms break down organic matter in the absence of oxygen. It is known as 'Biodigestion'. It is commonly used for waste streams such as animal slurry, sewage sludge and crop residues. Anaerobic digesters can also be fed with food waste and purpose-grown energy crops, such as maize. The process produces a digestate which can be used as fertilizer, as well as biogas, which can be used as a fuel.

Composting vs anaerobic digestion is a topical issue in Aotearoa currently. ZWN is aligned with the Zero Waste International Alliance policy on the issue, in general prioritising composting over AD. This is due to its focus on returning discarded organic materials back to soils, its intrinsic robustness, and scalability.

We agree with the ZWIA policy that "A.D. may be a good alternative when composting may not be successful or there are critical issues in planning, siting and operating". However, there are a number of aspects to AD that mean it should only be considered where composting is not possible.

References and relevant info:

Waste-to-Energy Guide for NZ
Kate Walmley AD response article spinoff link
Andrew Walters paper 2010 here

ISWA report, Benefits of Compost and Anaerobic Digestate

https://www.iswa.org/index.php?eID=tx_bee4mememberships_download&fileUid=295

European Union, Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives, Article 22 (1): https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02008L0098-20180705

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WRAP, Digestate & compost in agriculture, Bulletin 2 - November 2011. https://www.zerowastescotland.org.uk/sites/default/files/Bulletin%202%20-%20agronomic%20benefits.pdf

WRAP, Digestate and compost in agriculture: Good practice guidance for farmers, growers and advisers, February 2016. Accessed from https://wrap.org.uk/resources/guide/compost-and-digestate-agriculture-good-practice-guide#farmers (WRAP-farmers-growers-advisers-Digestate_and_compost_use_in_agriculture_v1.pdf)

MPI, Fit for a better world – accelerating our economic potential, July 2020. https://www.mpi.govt.nz/dmsdocument/41031-Fit-for-a-Better-World-Accelerating-our-economic-potential

MfE, A waste to energy guide for New Zealand, August 2020. https://www.mfe.govt.nz/sites/default/files/media/Waste/waste-to-energy-guide-for-new-zealand.pdf

RNZ, First large-scale food waste-to-bioenergy facility construction begins, August 2020. https://www.rnz.co.nz/news/national/422742/first-large-scale-food-waste-to-bioenergy-facility-construction-begins

Newsroom, Food scraps: The man turning our waste into natural gas, January 2020. https://www.newsroom.co.nz/food-scraps-the-man-turning-our-waste-into-natural-gas

Xu et al., Anaerobic digestion of food waste - Challenges and opportunities, Bioresource Technology, September 2017.
DOI: 10.1016/j.biortech.2017.09.020
https://www.researchgate.net/publication/319638603_Anaerobic_digestion_of_food_waste_-_Challenges_and_opportunities

Organic Waste hierarchy explained

	What is it?	Key outcomes/ benefits	Key costs	Activities required
Source reduction	Reducing the amount of waste produced	Less waste to divert Less resource use including land use, water, transport, and human resources.	Investment in long term behaviour change programmes. Good quality research on what are effective reduction activities needed to inform the design of behaviour change programmes	Behaviour change programmes focused on reduction Regulation to incentivise or mandate producers and retailers (e.g. farmers and supermarkets) to adopt best practice activities and create better coordination of supply & demand, logistics etc in the food system
Edible food rescue	Collecting edible food that would otherwise go to waste from places such as restaurants, grocery stores, produce markets, or dining facilities and distributing	Increased food security Waste diversion GHG emissions reductions - food loss and waste are estimated		- Food waste reduction target (e.g. 50% reduction by 2030, in alignment with UN SDG 12.3)

	it to people who will use it as food. Wastage of produce that never even makes it to market or retail (due to imperfections etc)	to account for 6-8% of total global emissions		
Decentralised composting including residential backyard composting; onsite composting solutions for institutions/ manufacturers; on-farm composting; community-scale	Composting as close as possible to the source of organic waste to minimise transport and maximise availability of resource to be used locally. Usually small to medium scale	Long-term positive effects on soil health, including carbon sequestration Enables greater control of compost quality (if professionally managed) Contribution towards increased food security via the improvement of agricultural soil Simple technology and labor intensive (more jobs) Relatively low transportation costs Scalable and flexible, can be adapted depending on local needs and circumstances	High levels of labour - greater regulatory hurdles via planning and consenting laws - poorly managed processes can result in production of methane and leachate. Good education and training needed	Investment from local and central government Change to resource management regulations to remove barriers to accessing and developing sites

Centralised composting	Advanced technology with highly mechanized equipment	Long-term positive effects on soil health, including carbon sequestration, Contribution towards increased food security via the improvement of agricultural soil	Relatively high transportation costs High operation and maintenance costs and a high degree of specialised skills to operate and maintain Low quality of compost due to poor separation of wastes with high risk of contamination	Kerbside foodwaste collections
Anaerobic digestion	Anaerobic digestion is a process in which microorganisms break down organic matter in the absence of oxygen.	Digestate can be used to fertilize soils, reducing the need for synthetic nitrogen, phosphorus, and potassium fertilizers however "the long-term benefits to soil of anaerobic digestate are less clear cut than those of compost, and it is thought that it has a negligible effect on soil organic matter in the long term". (ref: ISWA report). A.D. produces biomethane. This can be	High infrastructure costs. High investment in industrial-scale solutions creates a lock-in effect, undermining reduction of waste created in the first place and diverts organics from being processed and used locally. Long-term waste contracts needed to ensure payback of investment/ profit-making.	A.D. should not be pursued solely to produce energy with the residue ("digestate") being landfilled. Decisions to adopt AD should be explained in terms of why composting is not a viable alternative

		burnt to produce electrical/heat energy or stored as fuel.		
Materials Recovery and Biological Treatment	Processes that enable the recovery of materials contained within mixed waste. The biodegradable component of the material is often processed further via composting or anaerobic digestion - stabilizing them before they are sent to landfill	Reduces emissions of unprocessed mixed waste in landfill	High infrastructure costs Material is stabilised but still sent to landfill	
Landfill	Landfills are facilities for the final controlled disposal of waste in or onto land.		Organic matter in landfill produces methane High infrastructure costs. High investment in industrial-scale solutions creates a lock-in effect, undermining reduction of waste created in the first place. Long-term waste contracts needed	

			to ensure payback of investment/ profit-making.	
Incineration	Incineration refers to the combustion of waste materials, resulting in ash residues and air emissions. Gasification, pyrolysis, and vitrification are variations of incineration, and waste-to-energy refers to an incinerator that incorporates technology to generate power from the heat produced during the combustion process.		High infrastructure costs High investment in industrial-scale solutions creates a lock-in effect, undermining reduction of waste created in the first place. Long-term waste contracts needed to ensure payback of investment/ profit-making. When organic matter is burned, it still emits significant quantities of carbon dioxide. Other toxins that come out of incinerators include dioxins, mercury and cadmium. These can cause significant health issues and environmental harm. Food waste has high	Waste to energy incineration should never be considered as a waste treatment process in Aotearoa

			moisture content and thus doesn't combust easily. It requires addition of other more combustible materials, such as plastics or even coal (as is added in some places), which raises emissions	