

APPENDIX B

DISCUSSION PAPER:

**ADDRESSING FOOD AND ORGANIC WASTE
IN ONTARIO**

Ontario Ministry of the Environment and Climate Change

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**Climate Change
Action Plan**



DISCUSSION PAPER:
ADDRESSING FOOD AND ORGANIC WASTE IN ONTARIO

Contents

1. PURPOSE	3
2. ONTARIO'S NEED FOR ACTION	4
3. THE CURRENT MODEL AND THE FUTURE	6
4. PROGRESS TO DATE	8
Progress in the Residential Sector	8
Progress in the Industrial, Commercial and Institutional Sectors	10
Other Initiatives	10
5. PROVINCIAL COMMITMENT AND NEXT STEPS	11
Strategy for a Waste-Free Ontario: Building a Circular Economy	11
Food and Organic Waste Framework	11
Food and Organic Waste Stakeholder Working Group	12
6. DISCUSSION TOPICS & QUESTIONS	13
I. The Scope of the Food and Organic Waste Framework	13
II. Actions to Reduce Food and Organic Wastes Going to Disposal	17
A. Prevention of Food Waste	18
B. Diversion of Food and Organic Waste	20
III. Actions to Support Processing Capacity and End-Markets for Food and Organic Wastes	25
A. Supporting Food and Organic Waste Processing Capacity	25
B. Stimulating End-Markets for Food and Organic Wastes	27
7. CONCLUSION	31
8. GLOSSARY	32

1. PURPOSE

The intent of this Discussion Paper is to provide an early opportunity for Ontarians' to participate in the development of a Food and Organic Waste Framework for the Province. The Framework's aim is to:

- Reduce the amount of food that becomes waste
- Remove food and organic waste from the disposal stream
- Reduce greenhouse gas emissions that result from food and organic waste
- Support and stimulate end markets that recover the value from food and organic wastes
- Increase accountability of responsible parties
- Improve data on food and organic waste
- Enhance promotion and education regarding food and organic waste

This Discussion Paper will assist the Ministry of the Environment and Climate Change in gathering information and collating the various opinions of the general public and stakeholders on the following discussion topics:

- I. The Scope of the Food and Organic Waste Framework
- II. Actions to reduce food and organic wastes going to disposal
- III. Actions to support processing capacity and end-markets for food and organic wastes

Please note, the Food and Organic Waste Framework is not intended to capture waste generated from on-farm / agricultural activities (e.g. from raising farm animals), from forestry (e.g. harvesting) or wood processing activities (e.g. production of wood products), as these are managed within their own respective sectors.

2. ONTARIO'S NEED FOR ACTION

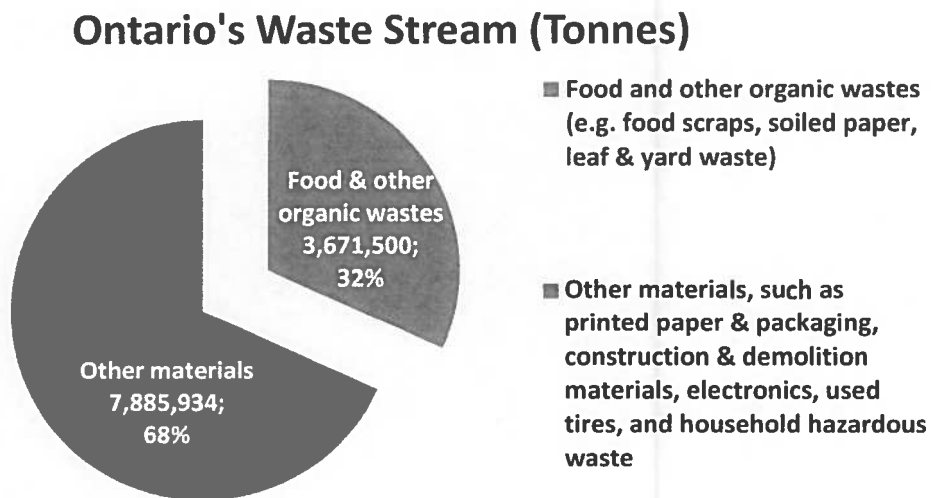
The amount of food being wasted across the world is staggering.

According to the Food and Agricultural Organization of the United Nations, at least one third or 1.3 billion tonnes of food produced is lost or wasted per year.¹ If global food loss and waste was a country, then it would be the third-largest emitter of carbon dioxide equivalent, after the United States and China.²

In Canada, roughly \$31 billion worth of food was wasted in 2014. This equates with about \$868 worth of food per person per year.³ In the same year, Ontarians generated about 3.6 million tonnes of food and organic waste, of which over 60 per cent was sent for disposal, mostly to landfill.⁴

Generally, food and organic waste comprises about one third of the total waste stream as shown in Figure 1.

Figure 1: Total Waste Generated in Ontario by Type, Residential and IC&I Sectors Combined (Estimated Tonnes, 2014)

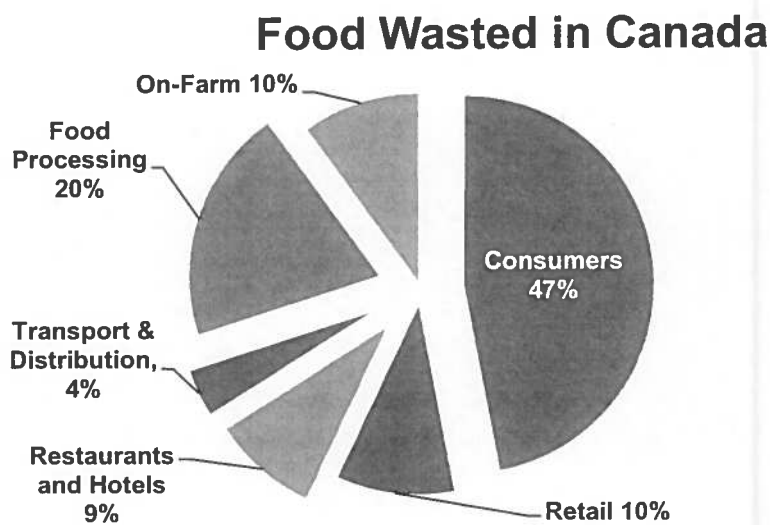


Source: Reports on Organic Waste Management in Ontario, prepared for the Ontario Ministry of the Environment and Climate Change, 2015. Note – biosolids are not captured in this chart

Although food is essential for life and organic materials are critical for healthy soils, significant amounts of organic material end up going to disposal. There is growing recognition, both domestically and globally, that food waste is a growing problem and current practices are not sustainable.

While much recent discussion has been about food wasted at the retail level, consumers are responsible for the largest share of food waste at approximately 47 per cent, as shown in Figure 2.⁵ The remaining food waste is generated along the supply chain, where food is grown, processed, transported, and sold.⁶

Figure 2: Value of Food Wasted by Sector in Canada



Source: Adapted from "The Cost of Canada's Annual Food Waste, VCM International, 2014"

There are serious environmental consequences to sending food and organic materials to disposal. When these valuable materials end up in a landfill, they contribute to climate change. As food and organic materials break down in an oxygen-deprived environment, they create methane, a potent greenhouse gas with a global warming potential 25 times greater than carbon dioxide (CO₂) over 100 years and 86 times over 20 years.

In 2015, greenhouse gas emissions from the waste sector accounted for 8.6 megatonnes of carbon dioxide equivalent, or approximately five per cent of Ontario's total greenhouse gas emissions from all sources.⁷

While current efforts to divert food and organic waste avoid approximately one megatonne of greenhouse gas emissions, the ministry estimates that doubling the food and organic material diversion rate from 38 per cent to 80 per cent would lead to a reduction of an additional 1.2 megatonnes in greenhouse gas emissions and bring us closer to our climate change goals.

There are other environmental benefits in diverting food and organic wastes from the disposal stream beyond greenhouse gas reductions. These benefits include creating products such as compost and digestate, which can improve soil health when applied appropriately, help reduce erosion, and improve water quality. Similarly, renewable natural gas and biofuels can be produced from diverted organic material and their use can help reduce our dependence on greenhouse gas-intensive fossil fuels.

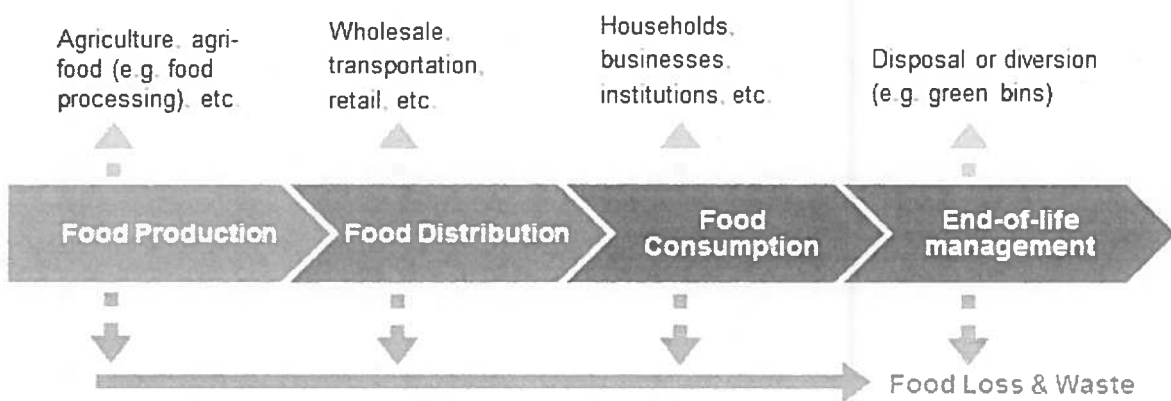
Turning food and organic waste into valuable products creates economic and environmental benefits of recovering nutrients, energy and other resources to serve as inputs into new products.

Diverting 1,000 tonnes of food and organic waste generates 60 per cent more GDP and 40 per cent more jobs than disposal.⁸ Current efforts to divert source separated food and organic waste (green bin waste – i.e., food scraps, soiled paper) and leaf and yard waste support up to 1,682 direct and indirect jobs in Ontario, and generate over \$100 million in GDP.⁹

3. THE CURRENT MODEL AND THE FUTURE

In a linear economy, which we have up to now operated under, materials such as food move through a process where waste is generated at each stage, with few incentives to prevent or reduce waste before it occurs. Linear economies ultimately waste large volumes of food and organic resources.

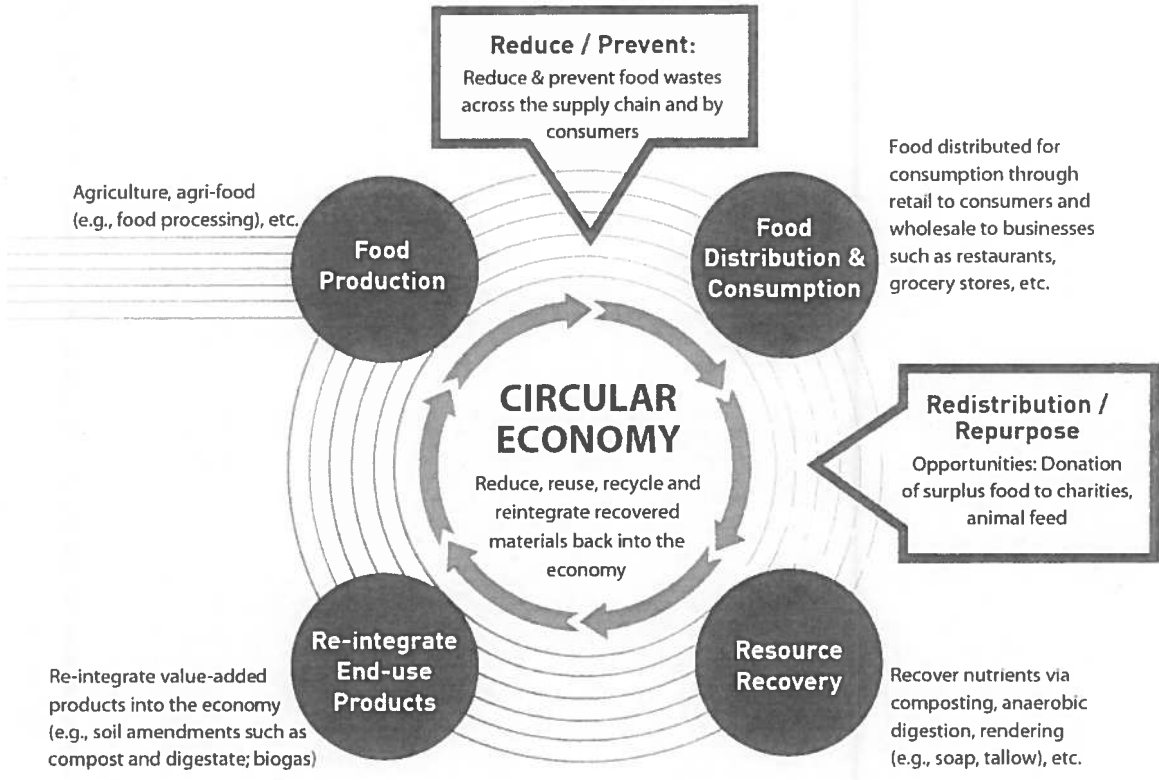
Figure 3: Food in a Linear Economy



Ontario is moving from a linear economy towards a circular economy “where *waste is seen as a resource that can be recovered, reused and reintegrated to achieve a circular economy.*”¹⁰

However, in order to move Ontario towards a truly circular economy, efforts should not be limited to recycling nutrients and resources at the end-of-life stage. There is increasing recognition that effort should be taken to prevent food from becoming waste and to recover organic materials.

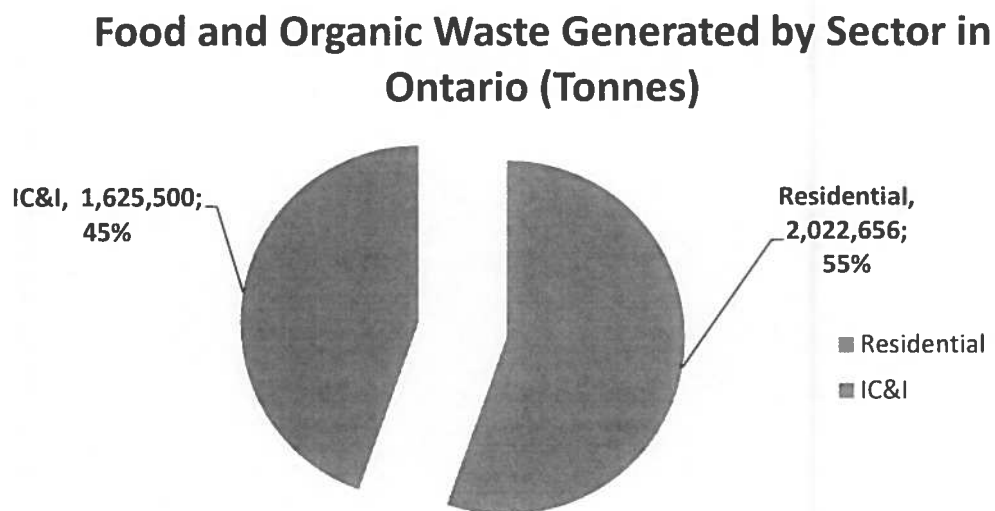
Figure 4: Food in a Circular Economy



4. PROGRESS TO DATE

Food and organic wastes are generated by both the residential sector, including single and multi-unit residences, and the industrial, commercial and institutional (IC&I) sectors, which is comprised of food processors, wholesalers, grocery stores and restaurants.

Figure 5: Percentage of Food and Organic Generated Waste by Sector
(Estimated Tonnes, 2014)



Source: *Reports on Organic Waste Management in Ontario*, prepared for the Ontario Ministry of the Environment and Climate Change, 2015

Progress in the Residential Sector

Ontario has made considerable progress in diverting food and organic waste over the last 10 years, and much of this has been led by the efforts of municipalities. In 2014, Ontario's residential sector diverted over one million tonnes of organic materials, including about 480,000 tonnes of green bin waste and 567,000 tonnes of leaf and yard waste.

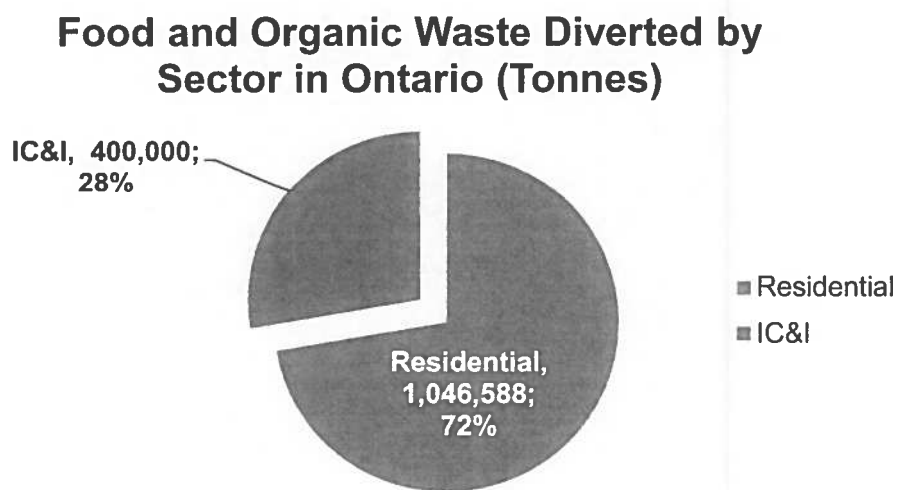
Some 37 municipalities in Ontario, covering about 70% of Ontario's population, have already implemented residential green bin programs.¹¹ Programs cover a wide range of organic materials, including food waste, soiled paper, and pet waste. Most programs also offer curbside collection and associated public education activities to make participation easy.

In addition to residential green bin efforts, municipalities with populations of 50,000 or over are required to establish a leaf and yard waste program, as per Ontario Regulation 101/94 Recycling and Composting of Municipal Waste under the Environmental Protection Act. Municipalities have demonstrated success in their leaf and yard waste programs through high participation rates from the residential sector, and have reported strong diversion figures year after year. According to industry experts, most of the leaf and yard waste that is generated by households is captured by these programs.¹² In 2014, 107 municipalities collected leaf and yard waste, including a number of municipalities with a population under 50,000.¹³

Recovered organic materials can be turned into soil amendments such as compost and digestate from composting facilities or anaerobic digesters. This product can be beneficial to agriculture and landscaping as a soil remediation. Anaerobic digesters also create biogas that can be used to create electricity or renewable natural gas, which helps Ontario to reduce its reliance on fossil fuels and creates economic opportunities in the form of jobs and infrastructure development.

Households also make an important contribution through the composting of leaf and yard waste and kitchen scraps, such as fruit and vegetable peelings, in backyard composters. Some municipalities provide access to home composters at cost.

Figure 6: Tonnes of Food and Organic Waste Diverted by Sector (Estimated Tonnes, 2014)



Source: Reports on Organic Waste Management in Ontario, prepared for the Ontario Ministry of the Environment and Climate Change, 2015

Progress in the Industrial, Commercial and Institutional Sectors

As per figure 6, the IC&I sectors (e.g. restaurants, office buildings, shopping complexes, and hotels) lag behind municipal residential efforts. Many companies, small and large, are making improvements in reducing the amount of food and organic wastes they generate, often because it makes financial sense to do so. A noticeable example is the efforts of some shopping mall owners to separate and collect food waste for diversion in their food courts.

The IC&I sectors diverted an estimated 400,000 tonnes of food and organic waste in 2014, which only accounted for a diversion rate of about 25 per cent.¹⁴ Similar to residential green bin waste, IC&I food and organic waste can be processed into compost, electricity or natural gas.

Currently, most of the food and organic waste that is diverted from the IC&I sectors is sent to anaerobic digestion facilities, to create digestate and electricity. There is no doubt that a greater effort is needed from these sectors.

Other Initiatives

With respect to surplus food, a number of innovative initiatives have been launched by businesses, social enterprises, non-profit organizations and charities to rescue food which would otherwise be likely destined for disposal. These initiatives include collecting surplus or excess food and donating items that can be safely consumed to local food banks, meal centres and shelters to feed Canadians in need. These efforts can lead to the creation of new jobs and opportunities, improve food security and reduce GHG emissions (i.e., one tonne of avoidable food and drink waste is equivalent to emitting 4 – 4.6 tonnes of carbon dioxide equivalent¹⁵).

The province is also developing a food security strategy to increase physical and economic access to sufficient, safe, nutritious, culturally appropriate food. Ontario's draft vision is a province where every person has access to high-quality, safe, nutritious and culturally appropriate food, to support them in leading healthy and active lives. In the immediate future, the province is focused on closing the gap in realizing those benefits for the over 595,000 food insecure households in Ontario.

To support the development of this strategy, Ontario has prepared a draft framework for discussion, which is currently available online at: <https://www.ontario.ca/page/food-security-consultation>.

As the ministry moves forward, we will consider how to build on existing efforts to reduce food from becoming waste and increase the diversion of food and organic wastes.

5. PROVINCIAL COMMITMENT AND NEXT STEPS

Strategy for a Waste-Free Ontario: Building a Circular Economy

In February 2017, the province released its “Strategy for a Waste-Free Ontario: Building a Circular Economy”.

The strategy sets goals and actions to support Ontario moving toward a circular economy.

A committed action in the the strategy is to develop and implement a Food and Organic Waste Action Plan (Action #10), and with a possible disposal ban on food waste. The development of a Food and Organic Waste Action Plan is also reiterated in Ontario’s Climate Change Action Plan.

Food and Organic Waste Framework

The Food and Organic Waste Framework will include two components:

- The Food and Organic Waste Action Plan will outline the actions to be taken by the province
- A policy statement under the Resource Recovery and Circular Economy Act, 2016, which would provide direction to the province the municipal sector and IC&I sectors on food and organic waste.

In developing the Framework, the ministry will consider:

- Enhancing existing partnerships with stakeholders and building new relationships
- Building on progress made in Ontario and learn from other leading jurisdictions
- Collaborating across all levels of government to avoid duplication
- Supporting an outcome-based approach
- Using evidence to guide decision making
- Using regulatory and non-regulatory tools
- Creating conditions that support sustainable end-markets

- Increasing the use of innovative technologies
- Enabling efficient and effective recovery systems
- Recognizing the administrative impacts and costs to divert organic materials
- Increasing accountability

Food and Organic Waste Stakeholder Working Group

The issue of food and organic waste is complex and involves a number of sectors across the supply chain. Addressing food and organic wastes will require coordinated action among many players across multiple sectors. It will also require the right regulatory and incentive structure.

A multi-stakeholder working group has been established to provide advice on the development of the Food and Organic Waste Framework. The stakeholder working group includes representatives from key groups, such as municipalities, the waste management industry, producers, non-governmental organizations, the agri-food industry (e.g. farmers, food processors) and generators of organic waste in the IC&I sectors (e.g., food retailers, restaurants, offices, hospitals).

The members of the stakeholder working group will provide advice on the:

- Issues regarding food and organic waste reduction and resource recovery
- Outcomes setting
- Identifying mechanisms and tools, both regulatory and non-regulatory, to increase food and organic waste diversion
- Opportunities to stimulate end-markets for by-products of organic waste diversion
- Complementary measures to support increased organic waste diversion (e.g. industry standards or best practices)

The stakeholder working group will also:

- Assist in data compilation and cost/benefit analysis
- Discuss feedback from broader public consultation on the Framework and provide advice to finalize the Framework
- Provide updates and seek input from their organization or association members as appropriate on discussion topics
- Assist in ongoing roll-out of the Food and Organics Waste Framework (e.g. supporting implementation, monitoring results)

6. DISCUSSION TOPICS & QUESTIONS

The ministry is seeking input of all interested parties to support the development of a Framework and has identified questions for your consideration under each of the following discussion topics:

- I. The Scope of the Food and Organic Waste Framework
- II. Actions to reduce food and organic wastes going to disposal
- III. Actions to support processing capacity and stimulate end-markets for food and organic wastes

I. The Scope of the Food and Organic Waste Framework

As the scope of food and organic waste can be very broad, a clearly defined scope is required for the Framework to focus our effort. Commonly, the public's view of food and organic waste tends to be limited to leftover food scraps, spoiled food and leaf and yard waste. However, there are a number of other organic materials that could be considered as part of the Framework.

The ministry is interested in hearing from you about what should be priorities for Ontario. As such, the scope for the Framework could consider a broad range of materials, including those captured in Table 1 below.

Table 1: Examples of Food and Organic Wastes and their Management in Ontario

Material	Description (common materials)	Sources (examples)	Current Approach (examples)
Surplus food	Cooked or raw food that is safe for donation or redistribution (includes perishable and non-perishable items)	Households, grocery stores, restaurants, food processors, and farmers	Voluntary – some charities or other not-for-profit organizations accept safe surplus food

Material	Description (common materials)	Sources (examples)	Current Approach (examples)
Food waste	Cooked or raw food preparation scraps, spoiled food, or food that was not consumed by the residential or IC&I sectors	Households, grocery stores, restaurants, hospitals, long-term care facilities, schools, universities / colleges, hotels	Voluntary – many municipalities offer collection
Food processing / manufacturing waste and by-products	Food and organic material that is a waste or by-product of producing / preparing foods (e.g., food or agricultural residue and non-saleable products) By-products may be managed economically (e.g., dry distillers' grains, whey and bran can be used in animal feed)	Food and beverage processing, pet food manufacturing, personal health care product manufacturing, bioprocessing (including biofuel production, enzyme production and biosugar)	Voluntary / Market-driven approach (e.g. animal feed) New technologies can transform agri-food waste into by-products with an economic use (e.g., advanced chemistry used to transform waste products to alternative jet fuels)
Soiled paper	Used paper towels, facial tissues and non-waxed paper bags/packaging	Households and businesses that prepare or sell food products, such as restaurants, grocery stores	Voluntary – many municipalities offer collection
Leaf and yard waste	Hedge trimmings, leaves, small tree limbs, trunks, or stumps, Christmas trees, and pumpkins	Households and landscaping / gardening businesses	Mandatory collection applies to municipalities with a population of 50,000 or more (O. Reg 101/94), including curbside or depot. Some voluntary collection under population of 50,000

Material	Description (common materials)	Sources (examples)	Current Approach (examples)
Compostable products and packaging	Examples include: absorbent hygiene products (e.g., diapers, feminine hygiene products and incontinence products); compostable cups, cutlery, and plates; compostable plastic wrapping	Households, restaurants, and hospitals and long-term care facilities	Voluntary – some municipalities offer collection of limited materials

Other materials not mentioned above that have been well managed through other means include:

- **Fats, oils and greases** from food sector (e. restaurants, food processors). The majority of fats, oils and greases are currently being managed via a voluntary market driven approach, where these are recycled (e.g., rendering) or used as an input into other processes (e.g., anaerobic digestion, bio-based diesel).
- **Biosolids**, a nutrient rich material that remains after being treated at a wastewater processing facility. They are typically land applied (e.g., soil enhancement), composted, processed via anaerobic digestion, or sent for disposal (i.e., landfill or incineration). There are existing regulations in Ontario for the land application of biosolids and for feedstocks used for making compost (e.g., Nutrient Management Act, Compost Quality Standards and Guideline for the Product of Compost in Ontario). Wastewater processing facilities that are equipped with anaerobic digesters may, in some cases, be able to add food and organic waste to biosolids to produce renewable natural gas.
- **Other compostable materials** such as pet waste, house plants, ash, and hair from households are included in some municipal green bin programs. Depending on the processing method and technology, some facilities accept these materials while others do not, often because of technical challenges in managing them and in maintaining compost or digestate quality.

The ministry recognizes that some of the materials mentioned above pose challenges for existing organic waste processing facilities. For example, some compostable products and packages are not accepted at all processing facilities as these products require a longer time to breakdown than other organic wastes resulting in quality issues with the end product.

The ministry also recognizes that there are varying degrees of operational requirements, capabilities and capacities available for food and organic waste collection and processing across the province. Some of the differences are related to the availability of processing capacity in Southern Ontario, and challenges in Northern Ontario related to low population density and wildlife attracted to organic materials. These realities will be considered as part of the ministry's considerations when developing the Framework.

As mentioned at the outset, the Framework is not intended to capture waste generated from on-farm / agricultural or forestry residuals as these are managed within their own respective sectors.

- **Agricultural wastes** generated by a farm operation activity, including, the growing, producing or raising of farm animals and the production of agricultural crops) are specifically exempt from Part V of the Environmental Protection Act and Regulation 347 (General – Waste Management). This exemption recognizes that, with some limited exceptions, organic waste materials that are generated in the normal course of agricultural and horticultural activities can be successfully managed on-farm through voluntary approaches such as land application, composting and anaerobic digestion. For some materials and activities, the Nutrient Management Act, 2002 (the NMA) and its regulations address the management, land application and storage of those materials when they are applied to agricultural lands as a nutrient.
- **Forest harvesting residues** include branches, tree tops, cull trees and undersized trees that remain in the forest or on the landing at the completion of harvesting activities. Forest operations on Crown land are governed by the Crown Forest Sustainability Act (CFSA), which provides for the regulation of forest operations. Forest operations must comply with the Forest Operations and Silviculture Manual (1995).
- **Wood processing residues** are generated during the production of wood products, and include hog fuel (unrefined wood fibre), slabs, chips, shavings, sawdust and bark. Residues are often used for on-site cogeneration, or sold for further processing into other materials (e.g., wood pellets produced from sawdust and shavings; chips used for pulp and paper production). Wood processing residues typically do not enter the waste stream, and their use is generally based on market conditions.

There are a number of factors that may influence the scope of what material will be considered, including:

- Environmental and economic opportunities, including the viability of existing or potential end-markets
- Emerging trends in the marketplace for the production, use and/or processing of materials
- Recovery of high-volume resource streams to increase diversion
- Costs and benefits, including cost efficiency and program effectiveness
- The effectiveness of the current process to manage the material

Discussion question 1:

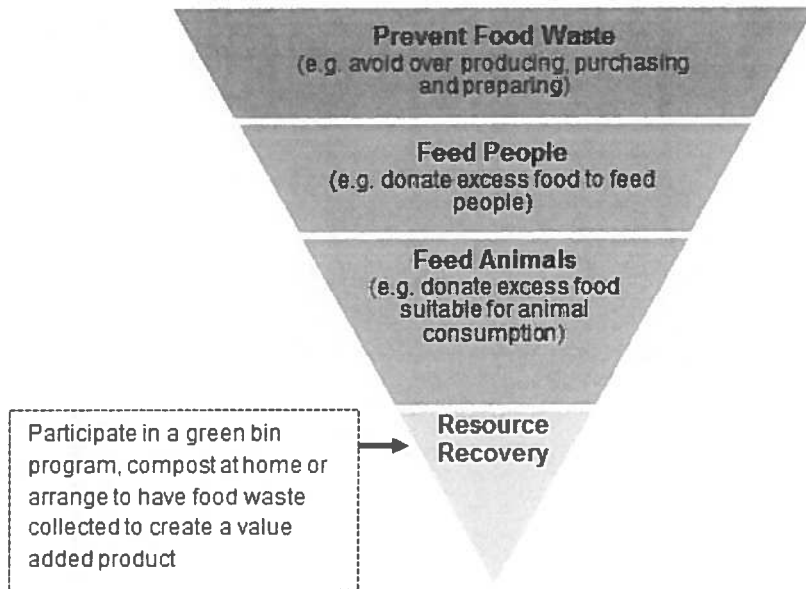
1. What food and organic materials should be a priority and as such addressed in the Framework?

II. Actions to Reduce Food and Organic Wastes Going to Disposal

In order to build Ontario's circular economy, Ontarians will have to reduce the amount of food and organic waste going to disposal and divert and reintegrate these materials into viable end-markets. To this end, both waste prevention and waste diversion activities are critical.

Figure 7, on the next page, provides an example of a food waste hierarchy adapted from the United States Environmental Protection Agency. The hierarchy demonstrates the steps to be considered before food becomes waste.¹⁶

Figure 7: Food Waste Hierarchy



A. Prevention of Food Waste

Food rescue initiatives and raising public awareness are key components of preventing food from becoming waste.

Food rescue

Food is rescued when grocery stores, restaurants, food processors and farmers make excess food available for use by charities or other not-for-profit organizations. These include organizations such as the Food Bank of Canada's Retail Food Program, the Ontario Association of Food Banks' Community Harvest and Feeding Families program, Second Harvest, Ontario Christian Gleaners, Food for Life and Forgotten Harvest.

Ensuring that surplus food is safe for human consumption is a common concern for organizations that support food rescue initiatives, such as food banks and food retailers.

The ministry has heard from organizations involved with food rescue that food safety is one of their top priorities and can lead to food being disposed if there is any doubt regarding how the food may have been stored or handled.

Food Waste Reduction

In the feedback on the Strategy for a Waste-Free Ontario, the ministry heard that reducing the amount of food that becomes waste should be a priority at all points of the supply chain, including consumers. Reducing the amount of food that becomes waste avoids the environmental impacts associated with food that is grown, processed, transported and offered for sale or sold – only to be thrown out.

Globally and locally, efforts aimed at preventing food from becoming waste are underway. Over the past few years, a number of organizations world-wide have taken promotion and education actions, including:

- The United Kingdom “Love Food, Hate Waste” campaign, also adopted by Metro Vancouver, and New South Wales in Australia
- The Food Waste Challenge - United States
- The Ontario Food Collaborative (a municipal led initiative), as well as working groups within the Provision Coalition and the Municipal Waste Association in Ontario.

Many stakeholders in Ontario want to increase the awareness about the importance of food waste prevention, and there needs to be a focus on encouraging residents and the IC&I sectors to take actions in reducing food waste.

To support efforts to prevent food from becoming waste, different tools and approaches have been implemented in other leading jurisdictions. The following chart outlines some of these tools and approaches, which could also be considered for Ontario.

Table 2: Examples of Policy Tools to Prevent Food Waste

Tools / Approaches	Description	Jurisdictions with Related Tool
Communication and Outreach	Outreach activities targeted at households and across the supply chain (e.g., best before dates, best practices for meal planning, food portioning and storage)	Common in multiple jurisdictions, but leaders include United Kingdom, United States, and New South Wales (Australia) Ontario: municipal and industry initiatives underway, including the Ontario Food Collaborative and Food Waste Stakeholders Collaborative

Tools / Approaches	Description	Jurisdictions with Related Tool
Donor Protection	Donor protection limits or removes liability from donors who donate food in good faith (i.e., no intent to injure, food is safe for human consumption)	British Columbia, United States, New South Wales (Australia) Ontario: Food Donation Act, 1994
Incentives	Incentives to support food waste prevention and reduction activities, including food rescue / redistribution of surplus or excess food before it becomes waste, and these activities are often led by charities and other not-for-profit organizations	France, California, New South Wales (Australia) Ontario: Community Food Program Donation Tax Credit for Farmers, under the Taxation Act, 2007

Discussion questions 2 & 3:

2. In addition to the examples given, what actions do you think the ministry should consider in preventing food from becoming waste?

3. What are the most important actions to take first?

B. Diversion of Food and Organic Waste

Food and organic waste make up a significant portion of the residential sector's waste stream.

Over the past decade, Ontario's residential sector has been successful in diverting food and organic wastes from disposal. Between 2010 and 2014, the total amount diverted via municipal green bin programs has increased at an average annual rate of about 5 per cent. These programs are currently offered in population-dense urban areas; however interest is growing among small municipalities and communities.

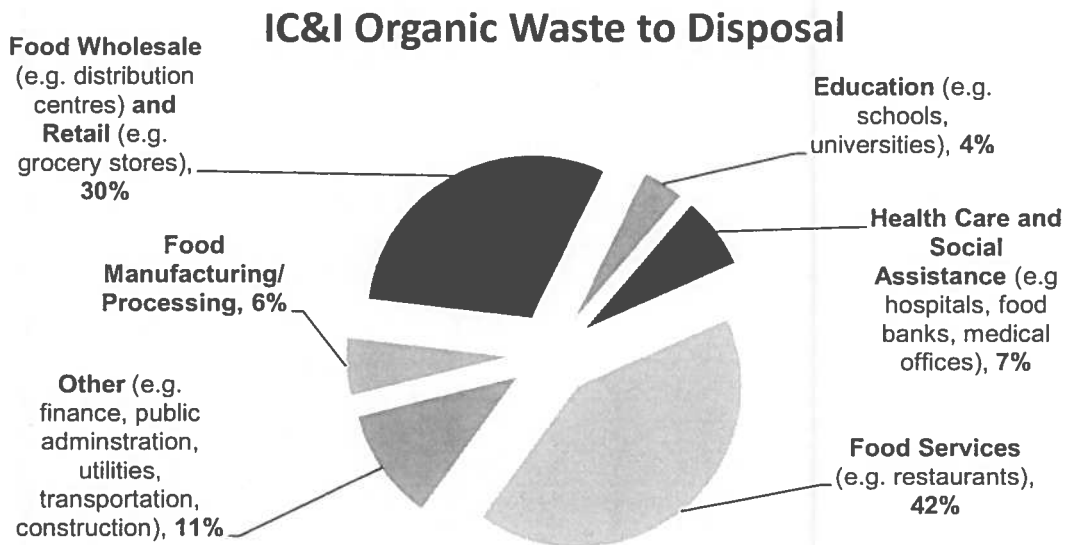
While much of Ontario's population may live in a municipality that offers green bin services, an increasing number of people are living in multi-unit residential buildings that may not offer a green bin program. Although seven municipalities have extended their green bin programs to multi-unit residential buildings, most of Ontario's apartments and condominiums do not have green-bin programs in place. As Ontario's growth becomes more intensified, housing stock is shifting to more multi-unit residential dwellings which will put further pressure on the need to service these populations.

The remaining Ontario population does not receive green bin services. Most municipalities without this program are: smaller in population; in more geographically isolated areas; or, have expressed concerns about offering a green bin program due to the expected costs. In some municipalities, the distance between homes to offer curbside pickup can be considerable and can lead to high costs. The overall average cost of a municipal green bin program is about \$268 per tonne, which includes collection, transportation and processing costs.¹⁷

The IC&I sectors generate approximately 45 per cent of all food and organic materials in Ontario and yet divert only an estimated 25 per cent of their food and organic waste. The food service (e.g., full service & quick serve restaurants) and food wholesale / retail (e.g., grocery stores, fruit markets, butcher shops) sectors account for about 72 per cent of total IC&I food and organic materials sent to disposal in Ontario each year.¹⁸

The lower cost of disposal for IC&I waste (i.e., \$118 per tonne for disposal in the U.S. and \$134 per tonne for disposal in Ontario), compared to the cost of diverting organic materials (i.e., \$205 per tonne in the IC&I sectors) is the main reason for the low diversion rates.¹⁹

Figure 8: Organic Waste from the IC&I Sector sent to Disposal (Estimated Tonnes, 2014)



Source: Reports on Organic Waste Management in Ontario, prepared for the Ontario Ministry of the Environment and Climate Change, 2015

To support efforts to divert food and organic waste from disposal, different tools and approaches have been implemented in other leading jurisdictions. The following chart outlines some of these tools and approaches that could be considered for Ontario.

Table 3: Examples of Policy Tools to Support Diversion of Food and Organic Waste

Tools / Approaches	Description	Jurisdictions with Related Tool
Disposal Ban	Prohibits specified wastes (e.g., food or leaf and yard waste) from being disposed (e.g., landfills, transfer stations, incineration)	Nova Scotia, British Columbia (only districts of Victoria, Nanaimo, Metro Vancouver), Massachusetts, and Austria. Proposed in Quebec (by 2020) Ontario: Strategy for a Waste-Free Ontario includes a commitment to a possible disposal ban on food waste by 2022

Tools / Approaches	Description	Jurisdictions with Related Tool
Food and Organic Waste Diversion Requirement	Requires collection and diversion of food and organic waste (i.e., green bin) from the residential sector and/or the IC&I sectors	<p>Municipal and IC&I sectors: Austria, Germany, Scotland, Vermont (by 2020), Belgium (Flanders).</p> <p>IC&I sectors only: California (Alameda & San Francisco have municipal requirements), Massachusetts, Northern Ireland</p> <p>Municipalities only: New York City (large food services and retailers only), Seattle (businesses and residents)</p> <p>Ontario: <i>IC&I Sectors</i> O. Reg 102/94 requires IC&I facilities to develop waste audits and waste reduction work plans</p> <p><i>Municipal sector</i> O Reg. 101/94 requires municipalities with populations of 50,000 or over to establish a leaf and yard waste program</p>
Educational programs	Supports education and awareness activities to enhance food and organic waste diversion, and increase participation in municipal green bin programs	<p>Commonly offered in various communities across Canada, including Ontario</p> <p>Ontario: Promotion and education efforts as part of municipal green bin programs</p>

Tools / Approaches	Description	Jurisdictions with Related Tool
Producer Responsibility	<p>Holds producers environmentally accountable and financially responsible for recovering resources and reducing waste associated with their products and packaging.</p> <p>Producers are brand holders and/or others with a commercial connection to designated products and packaging in Ontario, such as first importers, wholesalers, retailers and e-tailers.</p>	<p>The Netherlands and Austria – biodegradable packaging (e.g., biopolymers or bioplastics)</p> <p>Ontario: Waste-Free Ontario Act, 2016 establishes a producer responsibility regime. No producer responsibility requirements on compostable products or packaging</p>
Incentives	<p>Incentives can vary based on the outcomes desired (e.g., pilot projects for multi-unit residential buildings and IC&I sectors, such as colleges, universities, shopping malls, restaurants, retailers, hospitals; carbon credits for organic waste management or digestion facilities; incentives for converting biogas from anaerobic digestion facilities into a renewable natural gas)</p>	<p>Quebec, California, Massachusetts, Austria, Germany, Scotland, New South Wales (Australia)</p> <p>Ontario: No incentives available for food and organic waste diversion</p>

Discussion questions 4, 5 and 6:

4. What are the barriers to reducing food waste and why is more not recovered at present?

5. In addition to the examples given, what tools and actions do you think the ministry should consider to increase diversion of food and organic wastes?

6. What are the most important tools and actions to take first?

III. Actions to Support Processing Capacity and End-Markets for Food and Organic Wastes

The processing of food and organic waste allows for the creation of economically valuable products. Some of examples of the type of process and the end-product developed include:

- **Composting facilities:** These facilities use an aerobic process to decompose organic matter to create a soil amendment that can be used in agricultural and horticultural applications
- **Anaerobic digestion facilities:** These facilities use an anaerobic process to decompose organic matter which creates biogas and digestate. The biogas can be used to fuel electrical generators, or it can be further processed to turn into renewable natural gas. The digestate may also be used as a soil amendment that is most commonly used in agricultural operations.
- **Rendering facilities:** These facilities use a variety of processes to recover animal by-products and transform them into pet food, soap and other industrial products.

A. Supporting Food and Organic Waste Processing Capacity

In 2014, there were a total of 76 facilities in Ontario that processed food and/or organic waste, with a combined estimated approved processing capacity of 2.3 million tonnes. This includes 41 compost facilities and 35 anaerobic digestion facilities, with 29 on-farm facilities and six off-farm facilities.²⁰ Operational factors such as maintenance, unplanned downtime or technical issues means the amount of food and organic waste processed at these facilities can be much lower than the approved capacity. In 2014, Ontario diverted about 1.4 million tonnes of food and organic waste (i.e. source separated organic waste and leaf & yard waste); while about 2.2 million tonnes were sent to disposal.²¹

Currently, Ontario's processing capacity can accommodate more food and organic waste. However, to move towards a circular economy where food and organic waste is kept out of the disposal stream, Ontario will need to develop additional capacity to process the food and organic wastes that are diverted from disposal. Developing additional capacity to process food and/or organic waste provides economic and environmental benefits as well as it creates opportunities for innovation and employment.

While it is recognized that diverting food and organic wastes from disposal through composting, anaerobic digestion or other facilities creates valuable end-products, these facilities may also face challenges in managing nuisance impacts, in particular, odours. Currently, nuisance and negative impacts are addressed through a regulatory

mechanism where new facilities or expansions to existing facilities may be subjected to an Environmental Compliance Approval and/or a Renewable Energy Approvals. In addition, to avoid nuisance and negative impacts that could potentially result from incompatible land uses proximity, the ministry has developed guidance (D-series) to help determine compatibility of major facilities (i.e. composting facilities) with adjacent land users (i.e. residential) during the planning stages of a facility. While supporting the development of additional capacity for organic waste processing, the ministry recognizes that further considerations are needed to mitigate potential impacts on nearby communities as part of the development and implementation of the Food and Organic Waste Framework.

To support the development of additional processing capacity for food and organic waste, a number of tools and actions taken by leading jurisdictions may be considered in Ontario. The following chart outlines some of these tools and actions, which could be considered in Ontario.

Table 4: Examples of Policy Tools to Support Processing Capacity

Tools / Approaches	Description	Jurisdictions with Related Tool
Streamline Approvals and Review Existing Requirements	Implementing measures to better support innovative environmental technologies, reduce regulatory burden on facilities with low environmental risks, and improving the process to set up small-scale, community composting and/or organic waste processing equipment while mitigating the negative impact to adjacent communities	Quebec, British Columbia, United Kingdom Ontario: Modern regulator initiatives are underway, including modernization of environmental approvals and review of D-Series Guidelines
Carbon Offsets	Supporting the development of infrastructure to process food and organic wastes by offering the ability to generate carbon offsets	Alberta, California and Quebec Ontario: Proposed development of offset protocols for organic waste management and digestion (with Quebec)

Tools / Approaches	Description	Jurisdictions with Related Tool
Support for Renewable Natural Gas	<p>Exploring opportunities to promote sources of renewable natural gas, including biogas from anaerobic digestion facilities.</p> <p>Supporting the development of infrastructure to process food and organic wastes, particularly anaerobic digestion, by introducing a renewable content requirement for natural gas and investments to promote the use of renewable natural gas.</p>	<p>United States, United Kingdom, Germany, British Columbia, Quebec</p> <p>Ontario: Proposed approach under Climate Change Action Plan</p>
Incentives/ Partnerships	<p>Supporting the development of infrastructure to process food and organic wastes. This could include support for new facilities, partnerships, and pilot projects.</p>	<p>Quebec, Australia (New South Wales), California</p> <p>Ontario: Existing funding programs for infrastructure development. Not specific to food and organic waste</p>
Data Reporting	<p>Requiring data reporting to understand current end-markets and conditions needed to support diversion of food and organic waste</p>	<p>European Union, Australia, Canada (federal)</p> <p>Ontario: Voluntary municipal reporting on household food and organic waste and leaf & yard waste</p>

B. Stimulating End-Markets for Food and Organic Wastes

Given the right conditions (e.g. the consistent availability of feedstocks to processing facilities, the production of high-quality end-products), and sustainable end-markets, food and organic waste can be recovered and re-integrated into the economy. For this to happen, more emphasis will be needed to support the development of viable markets for the end-products created (e.g. compost, digestate).

Food and organic wastes can be processed to create safe and valuable end-products, such as soil amendments. Soil amendments such as compost, digestate, and biochar (from pyrolysis) can be used by farmers, residents, municipalities and landscaping / horticulture industries. Compost can sell for up to \$7 per tonne. Leaf and yard waste compost is frequently given to residents by their municipalities but compost from green bin waste is also sold to agricultural and landscaping/horticultural businesses.

One concern from stakeholders is ensuring that soil amendments are safe and beneficial to soils, particularly for farms where biosecurity is concerned. There are concerns of potential adverse effect to crops or land through organic materials that may not be mature or that contain pests, diseases, chemical or residues. Ontario's existing standards and requirements for production and use of compost and sewage biosolids aim to ensure that soil amendments do not pose any negative impacts to the environment or human health.

Ontario's Compost Quality Standards and Guidelines for the Production of Compost in Ontario enable the composting of a broad range of materials and provide guidance for compost facility operators, while protecting the environment and human health. Under the Compost Quality Standards, there are three categories of compost (AA, A and B), which each have quality standards for metals, pathogens, foreign matter and maturity. Compost meeting the AA and A standards is exempt from ministry approvals for transport and use. Organic materials can also be applied to land through an Environmental Compliance Approval or, specifically for farm, as a Non-Source Agricultural Material, for which a plan may be required. As additional food and organic waste processing capacity is developed, end-markets for compost may need to be expanded and diversified into new and innovative approaches to compost use. Changes to Ontario's existing regulatory framework may be needed to support these uses.

Anaerobic digestion is a process that creates digestate and biogas from food and organic materials. Biogas can be turned into a renewable form of energy, including electricity or renewable natural gas used to heat homes and fuel vehicles. In Ontario, often the resulting digestate is applied to agricultural fields to improve soil organic matter and as a Canadian Food Inspection Agency registered fertilizer under the Fertilizer Act (Canada).

Markets for biogas could further be stimulated through Ontario's actions to fight climate change. The Climate Change Action Plan commits the province to consider introducing a renewable content requirement for natural gas as well as investments to promote the use of renewable natural gas. The Climate Change Action Plan also commits to consider setting a renewable fuel standard for transportation fuels which would encourage increased use of biofuels.

Food, in particular animal by-products, can also be processed into value-added rendered by-products. Rendering uses animal byproducts (fat, bone and meat scraps) to create products ranging from tallow, pet and livestock food, and biofuels. These valuable products also support diverting the animal by-products from disposal. The rendering process is independently managed within a competitive market-driven approach.

Different tools and approaches have been implemented in other leading jurisdictions to support the development of food and organic waste processing capacity and to strengthen end-markets for their end-products. The following chart outlines some of these tools and approaches, which could be considered in Ontario.

Table 5: Examples of Policy Tools to Support End Markets

Tools / Approaches	Description	Jurisdictions with Related Tool
Renewable Natural Gas Standard Supports	<p>Ontario working to promote sources of renewable natural gas, including biogas from anaerobic digestion facilities.</p> <p>Supporting the development of new end-markets for biogas by introducing a renewable content requirement for natural gas and investments to promote the use of renewable natural gas.</p>	<p>United States, United Kingdom, Germany, British Columbia, Quebec</p> <p>Ontario: Proposed approach under Climate Change Action Plan</p>
Compost Standards	<p>Reviewing compost standards, compost facility guidelines and associated regulations to ensure they are reflective of best practices and current end-market conditions. Ensuring standards maximize opportunities for nutrient recovery and are environmentally protective can provide greater certainty to those supporting end-markets and those using the products developed from those markets</p>	<p>United Kingdom (BSI PAS 100), CCME guidelines (CAN / BNQ standards)</p> <p>Ontario: Compost Quality Standards and Guideline for the Production of Compost in Ontario (2012)</p>

Tools / Approaches	Description	Jurisdictions with Related Tool
Government Procurement policies	Supporting demand for products made from processed food and/or organic materials (e.g. compost), such as in the construction of buildings, homes and roads	<p>New York state (construction & landscape projects), King County (Washington state), and United States Environmental Protection Agency</p> <p>Ontario: Existing procurement policies to encourage and support purchasing green products and services that do not impact the environment, where applicable</p>

Discussion questions 7 and 8:

7. In addition to the examples given, what actions can the ministry take to support viable end markets for food and organic materials?

8. What are the most important actions to take first, and who is best positioned to lead the action?

7. CONCLUSION

Reducing the amount of food and organic waste ending up in Ontario's disposal stream will require multiple actions by many organizations. Municipalities, the waste management industry, producers, non-governmental organizations, the agri-food industry (e.g. farmers, food processors) and generators of organic waste in the IC&I sectors (e.g., food retailers, restaurants), the government and members of the public all have a role to play.

As Ontario moves forward towards the development of the Framework to address food and organic waste in Ontario, there will be a number of opportunities for public and stakeholder input.

We would like to hear from you on how we can best address food and organic waste in Ontario. Please provide responses to all, or some of the, eight questions included in this document and provide any additional feedback to help inform the development of Ontario's Food and Organic Waste Framework, before the closing of the posting on the Environmental Registry.

8. GLOSSARY

Anaerobic Digestion: Means the decomposition of organic matter by bacteria in an oxygen-limiting environment. Biogas and digestate may be produced from the anaerobic digestion process.

Biochar: Soil amendment created from a pyrolysis process; can be used to boost carbon retention and increase biodiversity.

Biogas: A gaseous by-product of the anaerobic digestion process. The major components of biogas are methane (CH₄) and carbon dioxide (CO₂).

Biosolids: Created when wastewater treatment facilities separate wastewater into liquid and the leftover solids. Solids go through an additional treatment process to reduce the presence of potentially harmful micro-organisms and potential causes of odour. Biosolids that do not exceed the regulatory limits for contaminants, pathogens and odour can be applied to land.

Circular Economy: Means an economy in which participants strive,

- a) to minimize the use of raw materials,
- b) to maximize the useful life of materials and other resources through resource recovery, and
- c) to minimize waste generated at the end of life of products and packaging;

Compost: Compost is a stabilized humus that is a solid, mature product produced by an aerobic composting process that meets the compost standards specified in the Ontario Compost Quality Standards.

Composting: Means the treatment of waste by aerobic decomposition of organic matter by bacterial action for the production of stabilized humus.

Digestate: The solid or liquid material that results from the treatment of anaerobic digestion materials in a mixed anaerobic digestion facility.

Greenhouse Gas (GHG) Emission: are gases that trap heat in the atmosphere. There are six types of GHGs as outlined by the United Nations Framework Convention on Climate Change (UNFCCC) in the Kyoto Protocol: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride.

Industrial, Commercial and Institutional (IC&I) Sectors: Includes all non-residential sources of waste, including educational institutions (e.g. schools, universities, and colleges), hotels/ motels, hospitals, long-term care, correctional services, manufacturing, office buildings, restaurants, entertainment venues, convention centres, food processors/ manufacturing establishments, retailers and wholesalers. For the purposes of this discussion paper, IC&I sectors also include multi-unit residences such as apartment buildings and condominiums.

Rendering: An industrial process that converts waste animal tissue into stable, value-added materials such as purified fats like lard or tallow.

Surplus Food: Food that was not consumed when it was originally offered or prepared, but has been stored and handled safely to allow the food to be redistributed at a later date.

ENDNOTES

- ¹ Global Food Losses and Food Waste, Food and Agriculture Organization of the United Nations, 2011, <http://www.fao.org/3/a-i2697e.pdf>
- ² Food Wastage Footprint and Climate Change, Food and Agriculture Organization of the United Nations, 2015 <http://www.fao.org/3/a-bb144e.pdf>
- ³ VCMI, Food Waste in Canada - \$27 Billion Revisited, 2014
- ⁴ Reports on Organic Waste Management in Ontario, prepared for the Ontario Ministry of the Environment and Climate Change, 2015. Organic waste included in the reports: source separated organics and leaf & yard waste
- ⁵ Reports on Organic Waste Management in Ontario, prepared for the Ontario Ministry of the Environment and Climate Change, 2015
- ⁶ The Cost of Canada's Annual Food Waste. VCM International, 2014, <http://vcm-international.com/wp-content/uploads/2014/12/Food-Waste-in-Canada-27-Billion-Revisited-Dec-10-2014.pdf>
- ⁷ National Inventory Report 1990-2015: Greenhouse Gas Sources and Sinks in Canada, Part 3, Environment and Climate Change Canada
- ⁸ Reports on Organic Waste Management in Ontario, prepared for the Ontario Ministry of the Environment and Climate Change, 2015
- ⁹ Reports on Organic Waste Management in Ontario, prepared for the Ontario Ministry of the Environment and Climate Change, 2015
- ¹⁰ Page 10, the [Strategy for a Waste-Free Ontario: Building the Circular Economy](#)
- ¹¹ Ontario Ministry of the Environment and Climate Change, 2017. This is an approximate figure. Green bin services are currently available in municipalities that represent about 71 per cent of Ontario's population (2011 Census data). Note that the actual figure should be lower given multi-unit residential buildings are offered services in only 7 municipalities.
- ¹² Reports on Organic Waste Management in Ontario, prepared for the Ontario Ministry of the Environment and Climate Change, 2015
- ¹³ RPRA data – organics data, 2016
- ¹⁴ Reports on Organic Waste Management in Ontario, prepared for the Ontario Ministry of the Environment and Climate Change, 2015
- ¹⁵ See: Methods used for Household Food and Drink Waste in the UK 2012, WRAP, 2013
- ¹⁶ United States Environmental Protection Agency, Food Waste Hierarchy, see: [link to EPA food recovery hierarchy](#)
- ¹⁷ Reports on Organic Waste Management in Ontario, prepared for the Ontario Ministry of the Environment and Climate Change, 2015
- ¹⁸ Reports on Organic Waste Management in Ontario, prepared for the Ontario Ministry of the Environment and Climate Change, 2015
- ¹⁹ Reports on Organic Waste Management in Ontario, prepared for the Ontario Ministry of the Environment and Climate Change, 2015. Include average collection, transportation and processing costs.
- ²⁰ State of Waste in Ontario: Organics Report, Ontario Waste Management Association, 2016
- ²¹ Reports on Organic Waste Management in Ontario, prepared for the Ontario Ministry of the Environment and Climate Change, 2015. Does not include materials from on-farm sources that are processed by on-farm anaerobic digesters. Does not include materials processed by rendering plants or materials from IC&I sectors that are used as animal feed.