

A Municipal Guide to Composting



Why does composting matter?

Organic matter is an essential component of soils and plays a fundamental role in soil conservation, crop production, and fertility maintenance. Recycling organic matter to the soil is a part of carbon cycling, an emerging and important environmental issue. Organic waste is recognized as an important organic matter resource and has numerous beneficial attributes. However, when sent to landfills, organic waste generates greenhouse gas (GHG) emissions and can create nuisances and health issues. Therefore, it is important to turn this valuable resource into a soil amendment and fertilizer through sound and efficient collection, transportation, treatment, and management practices.

Benefits of composting

When all of the advantages of sound MSW organics management are taken into account, significant benefits occur.

a) **Environmental Benefits:**

- **Greenhouse Gas Reduction:** GHG reductions can be realized when organic waste is diverted from landfills to composting and anaerobic digestion (AD) facilities and processed under controlled conditions

- Diverting organics to composting and AD facilities reduces the methane emissions from landfills
- Additional reductions can be obtained when AD is used. Biogas produced during the AD process is captured and can be used to produce electricity that displaces the electricity produced from burning fossil fuels. Biogas can also be refined into a fuel that displaces fossil fuels in heating and vehicles, which further contributes to GHG reductions.

b) Social Benefits:

- All of the environmental benefits associated with landfill diversion and compost use also provide social benefits. Reducing the GHG and other pollutant emissions (e.g., particulates and air pollutants) help protect human health and prevent degradation of natural ecosystems.
- Reducing the quantity of organics in landfills helps to reduce the amount of landfill gas generated and the associated safety risks.

c) Economic Benefits:

- When conducting a life-cycle analysis of an organics diversion program, supplemental costs to the environmental and social benefits gained would be considered to estimate the net cost impact to society.
- Positive impacts of organic diversion programs that would also be considered include: Extended landfill life, reductions in GHG emissions and air pollutants (versus landfilling), direct and indirect employment benefits, energy and costs savings from chemical fertilizer replacement, potential revenues from energy produced from anaerobic digestion, lower cost for leachate management

Organic waste diversion programs thus provide net benefits when a life-cycle accounting procedure is used to measure the cost of capital and operations, taking into account the social and environmental benefits.

In addition to cost savings, revenues can be obtained from byproducts, such as compost that can be marketed and sold. AD facilities may also be able to convert biogas into heat and various grades of fuel for electrical generation, district heating, and powering vehicles. The economic benefits of selling these products, or using them to offset internal consumption of fossil fuels, can be significant.

Composting can help eliminate the need for additional/larger landfills

Landfill space has become a valuable commodity in many parts of Canada. Diverting organic materials with viable management options away from landfills and preserving that space in the

landfill for materials that have no other alternative, makes good business sense. With less waste coming in, the lifespan of existing landfills can be extended significantly, which defers the costs associated with finding and constructing new landfill sites.

Organics Collection Programs

In addition to creating a source-separated organics (SSO) program, it is equally important that municipalities consider organics collection methods:

a) Drop-Off Depots

Constructing one or more centralized drop-off depots is generally the least expensive method available to large and small municipalities for collecting organic wastes. However, they rarely capture more than 50% of the available materials, and diversion rates of less than 25% are more common. Drop-off depots are also generally not appropriate for collection of SSO that contains food waste.

b) Community Collection Sites

Rather than providing one or two larger centralized drop-off locations, a municipality can choose to provide several smaller drop-off sites located at a neighbourhood level throughout the community. This allows sites to be located closer to waste generators, making them more convenient to use. Theoretically, the higher level of convenience should result in higher participation rate and greater diversion than a program based on drop-off depots.

c) Curbside Collection Programs

Curbside collection of organic waste from residential sources can significantly increase diversion rates by making the service more convenient; thus, increasing program participation and capture rates. In established programs with regular weekly service, consistent participation rates of 80 to 90%, and diversion rates of 75%, are achievable. (Although curbside programs can increase diversion rates, they come at a substantially higher cost than maintaining and operating a network of drop-off depot and community collection sites. Costs for curbside collection programs vary depending on the frequency of collection, the number of households, and the distance to/from processing facilities.)

d) Bag-Based Collection Programs

Bag-based programs provide a convenient option for both residents and municipalities, since bags are readily available at retail stores. Bag-based programs require manual collection; thus, equipping collection trucks with specialized lifting arms is also not required. This means that smaller municipalities may be able to set up a collection

schedule that allows the same collection trucks to be used for garbage and organics pickup, thereby avoiding fleet expansion.

e) **Cart-Based Collection Programs**

Collection of organic wastes, garbage, and recyclables using standardized, wheeled carts is becoming more commonplace in Canada. Cart-based collection programs for organics eliminate many of the problems associated with plastic-bag-based collection, and when combined with automated or semi-automated collection trucks, allow for increased collection productivity.

Municipal source separated organics (SSO) plan

Any technology utilized for waste re-use or re-purpose will need to have organics separated from the feedstock. A municipal SSO plan will utilize waste characterization study data (resulting from a feasibility study) on organics found with the community waste profile to develop commercial and residential organics separation plan that will divert organics from the landfill. The SSO plan will be developed to encompass all communities participating in the study resulting in a single regional solution where applicable.

The plan will thus be developed through the background information collected from the communities on current organics waste management, waste characterization data and gaps that exist in the collection, transfer, processing and promotion in the benefits of organics diversion.

A complete SSO plan and feasibility study will provide the following strategies to minimize organic impact within the landfill:

- Identify short and long-term processing options
- Facility and technology requirements
- Recovery goals and performance metrics
- A process for engagement, consultation, and community adoption
- A business model
- Timelines and resources needed by the communities to implement a cohesive plan