

The hidden climate cost: Food loss, waste, and greenhouse gas emissions

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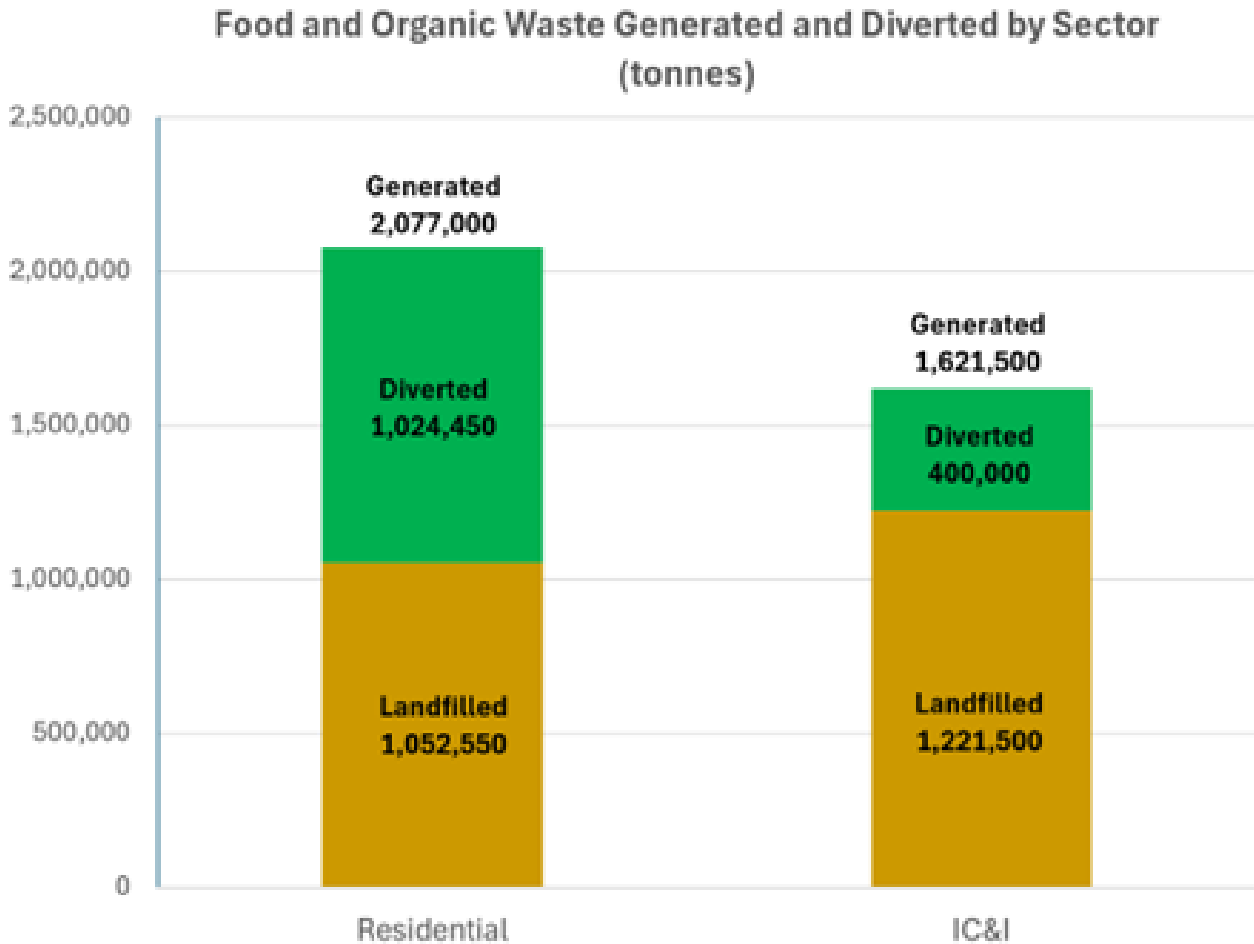


Figure 1. Amounts of food loss and waste generated and diverted from landfill for beneficial uses, from the residential and industrial, commercial, and institutional (IC&I) sectors in Ontario, Canada (adapted from Government of Ontario, 2017).

Professor Gordon Price from Dalhousie University and Professor Grant Clark from McGill University study the hidden climate change costs of food loss and waste in Canada. Here, they highlight the need for greater cooperation and data sharing

What connects a meal left uneaten, crops left to rot in the field, and spoiled produce buried in a landfill? They all contribute to the more than one billion tonnes of food that is lost or wasted globally every year (UNEP, 2024). Food loss and waste (FLW) is an important source of greenhouse gas emissions (GHGs) and consequently a driver of

climate change. The intertwined relationship between food policy, production, and consumption requires that government, industry, and consumers take immediate and collective action to reduce FLW and its environmental impact.

Global estimates of all food lost in the food supply chain approach 1.6 billion tonnes, representing a colossal waste of resources with far-reaching environmental implications (Ishangulyyev et al., 2019). In Canada, primary agriculture generates about 10% of national GHGs. However, our food supply also relies on supporting industries such as energy, transport, processing, and retail.

When taken together, the parts of the economy related to food production and consumption could generate as much as 40% of national GHGs, which is the equivalent of releasing 672 million tons of carbon dioxide into the atmosphere every year (Crippa et al., 2021; ECCC, 2022). When food is wasted, society squanders social value, stifles potential economic growth, and compromises the sustainability of the ecosystems that we are part of.

The climate cost of food waste

It is well known that food waste buried in landfills produces methane, a GHG about thirty times more potent than carbon dioxide (IPCC, 2021). It needs to be better recognized, however, that FLW along the whole food value chain contributes to GHGs, from production losses in the field, to burying food waste in a landfill, or reprocessing it by composting or biodigestion.

Notably, FLW from industry, commerce, and institutions (IC&I) should be addressed mainly due to regulatory barriers, poor accounting methods, and an absence of rules requiring private enterprises to share information. In Ontario, Canada's most populous province, for example, the residential and IC&I sectors together generate about 3.7 million tonnes of FLW annually, 60% of which is sent to landfills (Figure 1).

To help address these knowledge gaps, researchers at Dalhousie University and McGill University lead projects, funded by the Natural Sciences and Engineering Research Council of Canada and Environment and Climate Change Canada, to quantify FLW and GHGs across the IC&I sectors in Canada, alongside governments, non-governmental organizations, industry, and other academic partners. One partnering organization on these research projects, the Circular Innovation Council, for example, conducts pilot programs in communities across Canada in partnership with volunteers from the IC&I sectors.

These pilot projects show the potential to reduce FLW. For example, in one Canadian community, sixty volunteers ran a pilot program for two years and avoided edible and organic waste that would have released GHGs equivalent to 4,130 t of carbon dioxide (CIC, 2024).

Reductions in FLW could be achieved in part through better policy at all levels of government.

In Canada, solid waste management is regulated by a mosaic of federal and provincial legislation, but finance and operations are municipal responsibilities. Coordinated policy could better align local management decisions with national GHG reduction targets, lighten the burden of waste management on municipalities, and relieve industry from having to comply with the same requirements as residential waste diversion programs.

Impacts on climate change

The simple act of discarding food has ripple effects on food security, climate change, and ecosystem health. Food loss predominantly occurs during production, storage, and transportation due to imperfect infrastructure and technology, while food waste occurs during processing, retail, and consumption, driven by factors such as over-purchasing, misinterpretation of expiration dates, and cultural norms.

Reducing FLW not only conserves resources but could also help achieve the United Nations' Sustainable Development Goals (SDGs), particularly the goal of halving per capita global food waste by 2030 (SDG 12.3). Climate-conscious decision-making must also recognize that GHGs are emitted when we generate energy for food production, processing, transportation, and even to manage food waste.

Food loss and waste:

Towards a sustainable future Reducing the climate impacts of FLW requires efforts across the entire food supply chain. Improved agricultural practices, better storage and transportation infrastructure, and optimized supply chains can all reduce food loss. Alerting processors, distributors, retailers, and consumers to the environmental consequences of food waste can promote more efficient practices and the adoption of more sustainable consumption habits.

Policies to reduce FLW will play a pivotal role, such as the promotion of circular economic initiatives for food recovery, redistribution, and recycling. Dalhousie University and McGill University are leading research that tackles these pressing issues in several ways:

- Building open platforms for sharing data and exchanging information.
- Tracking the flow of food at municipal and national scales.
- Comparing GHGs generated from different waste management practices.
- Evaluating current regulations.

The impact of food loss and waste on GHGs is a pressing issue that demands urgent attention and lasting commitment from all of us.

References

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