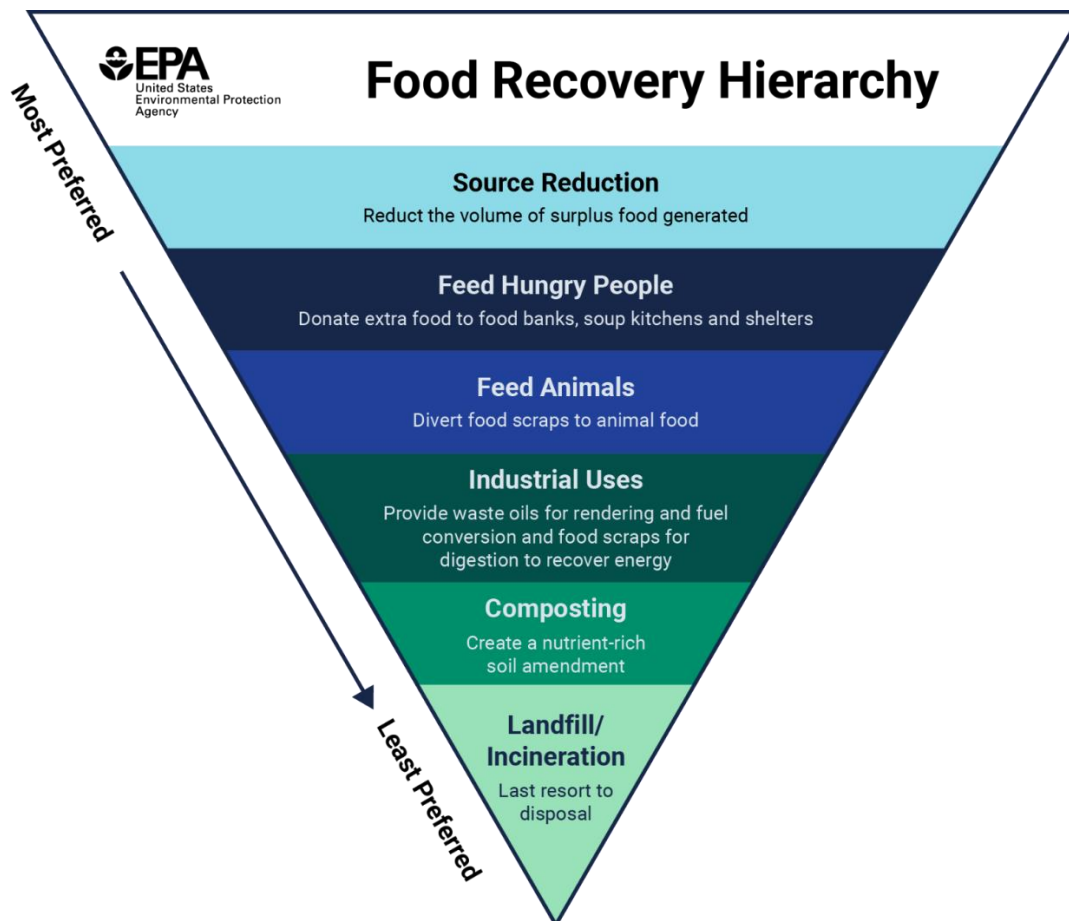


Compost and Biogas: A Waste of Food Waste?

The statistics on food waste are well known and disheartening – an estimated 50 million tonnes¹ annually in Canada. There are a number of initiatives under way to reduce the amount of food that is being wasted outright and the amount of food waste that ends up in landfills. The chart below shows the preferred hierarchy of food waste reduction methods as summarized by the US Environmental Protection Agency.



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¹ <https://madeinca.ca/food-waste-canada-statistics/#:~:text=How%20much%20food%20is%20wasted,average%20household%20in%20a%20year>

² <https://www.rts.com/wp-content/uploads/2020/05/food-recovery-hierarchy-1536x1304.png>

In Canada, we have several organizations and initiatives working on source reduction and feeding hungry people. The most well known in the second category would be Second Harvest that bills itself as Canada's largest food rescue organization.³ We also have all levels of government working on diverting food waste from landfills – primarily to composting and biogas production. Ontario's Food and Organic Waste Framework⁴ features each of these solutions but makes no mention of the use of the waste for animal feed.

While the framework touts the requisite jargon around a circular economy, it fails to apply a framework that looks for the highest and best use of the resources being circulated. Food waste that is no longer fit for human consumption is still a source of calories and nutrients for animals (primarily pigs and chickens as they are naturally omnivores and can digest the full range of food wastes). Diverting the food waste to biogas and composting is a “less bad” solution than landfill, but it is not the best use of the waste. The captured solar energy stored in the chemical bonds of the food has a higher value and better use than feeding microbes involved in composting and the production of methane gas. The nutrients that are captured in the compost are not lost by feeding animals, they still become available as fertilizer in the animal's manure.

There are challenges with recovering food waste for use as animal feed. Ontario used to have hog farms that were known colloquially as “garbage feeders” that routinely collected food waste from establishments in urban areas and fed their hogs. In the latter half of the 20th century the leadership of the industry supported regulations that dissuaded the practise as part of an effort to improve the public perception of pork.

The question isn't as simple as the relative carbon footprint of composting versus feeding the food waste to pigs. There are several legitimate health and safety concerns with feeding the food waste to animals that would need to be addressed:

- **Disease Transmission:** Food waste, especially if it contains meat or animal products, can carry pathogens like bacteria (e.g., Salmonella, E. coli) or viruses (e.g., African swine fever, foot-and-mouth disease). Improperly treated food waste can lead to disease outbreaks among pigs, which may also spread to other animals and humans. This is a real risk as the Foot and Mouth outbreak in the UK was suspected to have been caused⁵ by improperly treated, contaminated food waste fed to pigs on a farm licensed to do so.
- **Food Contamination:** Waste from household kitchens, restaurants, or food processing plants may be contaminated with harmful substances like chemicals, plastics, or other toxins that could be dangerous to pigs' health.
- **Consistency and Nutrition:** Food waste often varies in composition and nutritional value, making it difficult to provide pigs with a balanced and consistent diet. Pigs require specific

³ <https://www.secondharvest.ca/>

⁴ https://files.ontario.ca/ontarios_food_and_organic_waste_framework.pdf

⁵ https://www.ecolab.com/expertise-and-innovation/microbial-risks/~/_media/229e1f86251e474da055612d15af4b8e.ashx

nutrient levels for healthy growth, and inconsistent feed may lead to malnutrition, poor growth, or reproduction issues.

There are treatment protocols that can assure the safety of food waste – primarily a heat treatment or “cooking.” The consistency, nutrition and contamination issues vary in importance with the inclusion rates of the food waste in a hog’s diet. Most studies have considered inclusion rates of 30% or more. However, the risks from these issues decline proportionately when inclusion rates are reduced to the 10% to 25% range.

The economics of the practise have been questionable for small producers collecting and transporting small amounts. However, most municipalities are now mandated to provide collection of “green” waste. The question then becomes whether there is a process for processing and diverting the food waste that is economically and environmentally more beneficial than composting.

Whether this is the case depends primarily on the processing method. Since composting requires a significant input of energy to maintain aerobic conditions and produces a significant amount of heat and waste carbon dioxide that is released into the atmosphere, there is a significant decision frontier where feeding the food waste could result in environmental benefit without factoring in the additional benefits of a reduction in the amount of land required to produce the hog feed or the associated emissions.

With the relative proximity of hog and chicken farms to major urban centres, southern Ontario should be a place where feeding food waste to animals could work environmentally and economically. To give an idea of the potential scale, Ontario produces more tonnes of food waste than tonnes of corn annually.⁶

Using food waste as animal feed is an opportunity for Ontario’s animal agriculture industry to demonstrate its commitment to reducing its environmental footprint and being part of the solution to reducing GHG emissions. At the very least, it is an idea worth researching and conducting pilot projects around.

⁶ There wouldn’t be a one-to-one substitution between food waste and corn as the nutrient density of dried corn is significantly higher than wet food waste which is at a significantly higher water content.