

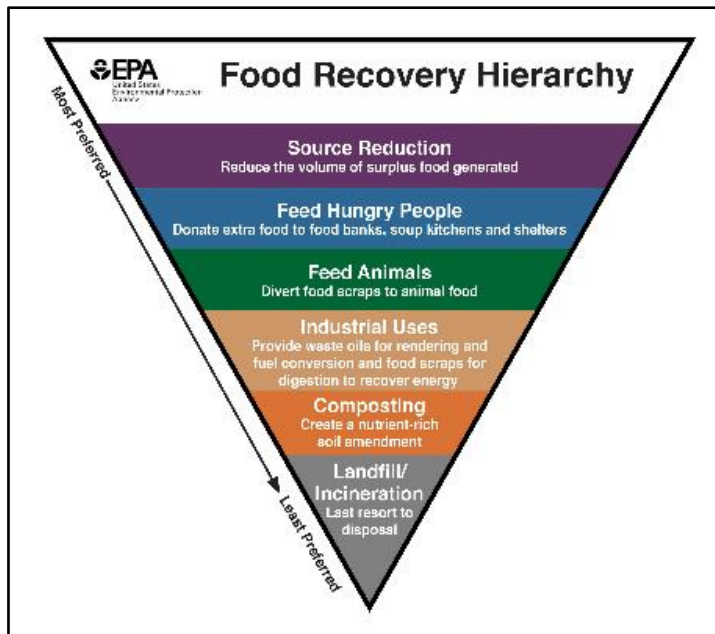
North Carolina's Food Waste Compost Capacity Gap

Executive Summary

In December 2021, the Environmental Protection Agency (EPA) released a report called "[From Farm to Kitchen: The Environmental Impacts of U.S. Food Waste](#)," which found that food waste comprised a quarter of what is disposed in landfills. As a country, the United States generates 160 million tons of food waste each year according to the EPA's report. This lost tonnage does not even account for the agricultural resources—water, fertilizer, energy and land—that are applied to every crop grown.

In addition, the processes of growing, harvesting, processing, distributing, and refrigerating food use massive amounts of energy. The EPA determined that this energy use is responsible for 8 percent of the human-caused greenhouse gas emissions that contribute to the planet's warming climate.

The EPA's Food Recovery Hierarchy (Figure 1) offers best management practices on how to reduce food waste. The hierarchy gives preference to solutions that reduce the generation of excess food at the source; the least preferred method is landfill disposal where organic material decomposes anaerobically and releases methane emissions. The EPA prioritizes composting ahead of landfill disposal and incineration because composting creates a nutrient-rich soil amendment from organic waste without releasing as much methane.



To better adhere to the EPA's best management practices, the North Carolina Division of Environmental Assistance and Customer Service (DEACS) completed a study comparing how much food waste is generated to the amount the state's permitted compost facilities can operationally manage. The study found that North Carolina generated 2.5 million tons of food waste per year, but commercial composters could only handle less than 350,000 food waste tons per year. This data will influence the strategies the state employs to mitigate the social, environmental, and economic impacts of food waste.

Figure 1. EPA's Food Recovery Hierarchy

Food Waste Generation

DEACS used ReFED's [2019 Surplus Food Summary](#) to estimate that the state's consumers, called the residential sector, wasted 1,006,575 tons of food in 2019 (Figure 2). This amount is comprised of the tons purchased from grocery stores which buyers never consumed. In North Carolina, a vast majority of this type of food waste is disposed in landfills.

The EPA estimates that North Carolina’s commercial sector, which includes restaurants, schools, hospitals, wholesalers, grocery stores, and food processors, generates almost one million tons of food waste annually. The EPA’s Excess Food Opportunities [map](#) provides high and low food waste generation estimates for several types of commercial industries. Using the annual average of each high and low estimates, the map’s data shows a total of 971,604 tons of wasted food from North Carolina’s commercial sector – most of which is destined for landfill disposal.

ReFED’s report also shows that North Carolina also had 513,477 tons of food waste from the agricultural industry during that year. ReFED estimated this total by determining the tons of crops never harvested, the tons left behind after harvest, tons of packhouse losses, and the tons from buyer rejection. Essentially, agricultural food waste is comprised of edible and inedible food that has never reached consumers because it was left behind or rejected by wholesalers. Some farms in North Carolina have the capability to compost their own excess waste.

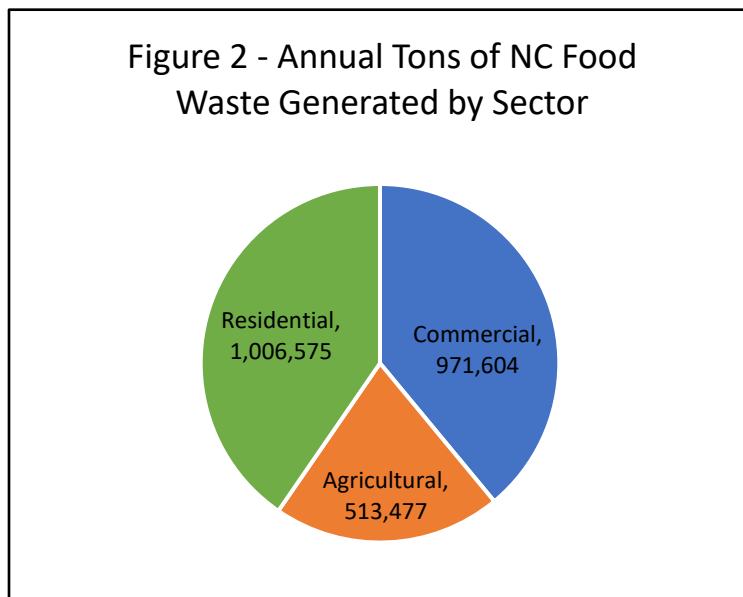


Figure 2. Commercial tons were determined by EPA Excess Food Opportunities Map. Residential and agricultural tons were determined by ReFED’s 2019 Surplus Food Summary.

A few local governments, mostly in metropolitan areas, offer drop-off sites to collect food waste; however, most North Carolinians do not have access to such programs. Several communities provide discounted backyard compost bins and trainings to incentivize residents to compost their food scraps at home. In addition to these public programs, businesses have started curbside food scrap collection opportunities in the Triangle and Charlotte. Through these programs, residents put food scraps in a bin, and the collector hauls them to a commercial composter for a fee. The total amount of residential food waste composted through drop-off sites, backyard composting, or collection programs is unknown.

The total amount of food waste from North Carolina’s agricultural, commercial, and residential sectors totals almost 2.5 million tons (5 billion pounds) per year.

Composters’ Food Waste Capacity

North Carolina has more than 30 facilities permitted as Type II, III, or IV composters which are permitted to process food waste. The total permitted capacity of these 30 commercial composters is more than 1 million tons per year; however, the total operational capacity for food waste is much lower. Compost facilities must process a certain percentage of carbon-rich debris, like tree limbs and wood scraps, to ensure they can produce quality compost. Adding too much nitrogen-rich food waste will unbalance their mix of carbon and nitrogen, therefore disrupting their processes.

In January 2022, DEACS surveyed North Carolina’s permitted commercial composters to determine how many tons of food waste they could manage under their current operating parameters. DEACS estimates that the state’s commercial compost facilities have no more than 350,000 tons of operational capacity to accept food waste (Figure 3). This operational capacity leaves a 2.1-million-ton gap between the total generation of food waste and the amount the state’s commercial composting facilities can maximally handle under ideal conditions.

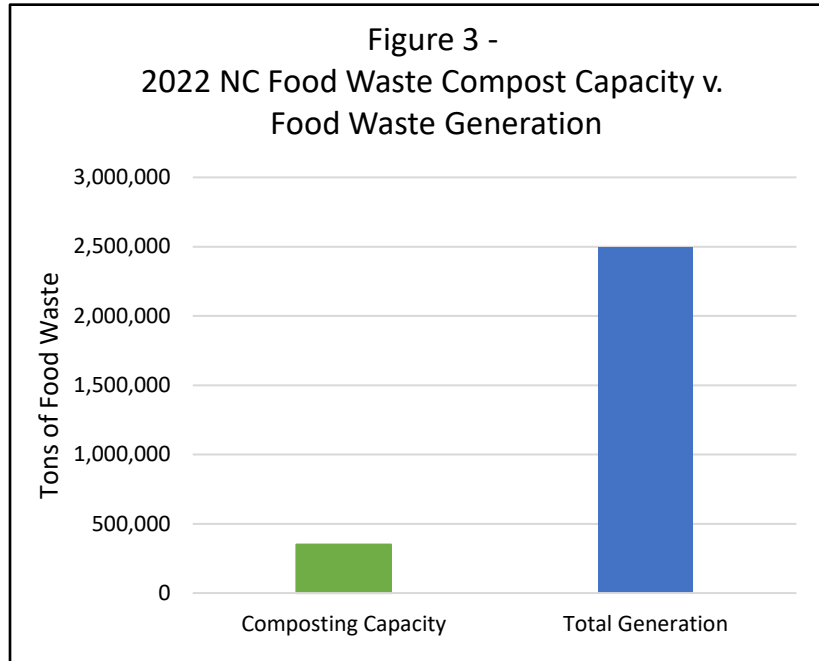


Figure 3. DEACS estimated NC’s food waste composting capacity by surveying the state’s permitted composters. Generation data came from EPA data and ReFED’s 2019 report.

Even with an estimated total operational capacity of 350,000 tons per year, commercial composters are currently only processing less than 100,000 tons of recovered food waste per year in North Carolina. The amount of excess food composted through residential backyard programs is unknown. Further study is required to determine how many North Carolinians compost their own food scraps and to estimate how many tons are recovered as a result.

Challenges for Commercial Composters

The survey revealed both perceived and concrete obstacles to composting a greater amount of food waste. Some operators indicated they had concerns about odor and fear the smell of food scraps may affect their neighbors and ultimately damage their public image. Others said that they were only interested in composting the organic material from a few clients. Most surveyed operators acknowledged that their ability to compost more food waste was limited by the size of their operation. If they increased the amount, they would need to process more wood to counterbalance the nitrogen-rich food waste. Facilities may not have the staffing, equipment, or land to introduce much more material into their processes.

For example, one surveyed facility stated they had committed to composting several thousand tons of biosolids for a specific client. For that facility to accept more food waste, they would need additional land so they could still maintain their current commitments. Changes to the size and scope of existing compost facilities will be the main obstacle for increasing food waste composting capacity.

Recommendations

Based on commercial composters’ existing operations, closing the gap between the total amount of food waste and their ability to compost it will remain impossible. Without a substantial increase in the number of commercial composters and their operational capacity, North Carolina will not have the capability to compost all the currently generated food waste.

To mitigate the social, economic, and environmental impacts of food waste, it is vital for the state to identify and implement approaches to decrease the amount food waste currently sent to landfills. Using a comprehensive, multi-pronged approach to reduce food waste, rescue edible food for donation, and increase compost operations, North Carolina can close the gap between food waste generation and the state's capacity to compost it. Strategies could include:

- Conducting a statewide campaign to educate residential, commercial, and agricultural sectors about how to reduce food waste,
- Mapping food waste generation sources,
- Fostering donation networks between excess food generators and food banks,
- Disseminating education materials about backyard composting,
- Assisting existing composters to maximize acceptance of food waste,
- Targeting grants to increase the food waste recycling processing capacity across the state,
- Providing technical assistance to local governments to reduce food waste in local communities,
- Creating programs to incentivize the reduction of food waste, following the EPA's food recovery hierarchy, and
- Establishing partnerships between state agencies and organizations to encourage food waste reduction across all sectors of the supply chain.