Food Waste Prevention & Management Study

Iowa Department of Natural Resources

October 2025

IOWA DNR

HDR

This Food Waste Prevention & Management Study was prepared on behalf of the Iowa Department of Natural Resources. The project was funded by a Solid Waste Infrastructure for Recycling grant through the U.S. Environmental Protection Agency.

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The goals of this study were to:

1 Identify opportunities to reduce food waste in the state of Iowa.

2 Review existing food donation and food waste processing infrastructure.

3 Consider options to increase food waste management for productive uses in Iowa.

THE PROBLEM OF FOOD WASTE

Food waste is a large portion of the waste stream in the U.S. and can have an impact on the environment and economy.

What is food waste?

Food waste (noun): an overarching term to describe food that was not eaten and was instead thrown away and disposed of in a landfill.

NEARLY **40%** of food in the U.S. is never eaten

The average American family spends $ $ $ $ $ $ $ $ $ $ **$3,000** $ $ $ $ $ $ $ $ per year on uneaten food

The average Iowan disposes of **200 pounds** of food per year at home

ABOUT **1/4** of that was thrown away in its original packaging

Impacts

Food waste affects individuals and families, the environment, and the economy.

- The Food Bank of Iowa estimates that **1 in 8 Iowans** and **1 in 6 Iowa children** face food insecurity. Approximately **385,000 Iowa residents do not know where they will find their next meal**, and the problem is worsening.
- When food waste is landfilled, the many resources used to grow, store, process, distribute, and prepare the food are also wasted. ReFED estimates that in 2023, the **cost of wasted food was $338 billion.**
- **Wasted food creates emissions of air pollutants** from municipal solid waste landfills.

FOOD WASTE IN IOWA

In Iowa, food waste is managed in a variety of ways.

There are five composting facilities and three water resource recovery facilities in Iowa that accept food waste.

Most food waste in Iowa is currently disposed of in landfills.

Some food is donated via food banks, pantries, and other programs located throughout the state.

Options to Avoid Sending Food Waste to the Landfill

There are opportunities for individuals, businesses, and municipalities to reduce their food waste footprint.

Residents can save food (and money!) by:

- Planning and shopping strategically.
- Storing food properly.
- Being creative with cooking and preparation.

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Businesses can:

- Look for opportunities to reduce food waste during food manufacturing and processing.
- Donate excess food to food banks or food pantries.
- Manage and track inventory to reduce the amount of time food is stored.
- Invest in onsite food waste processing technologies.

Municipalities can:

- Advance policies that govern the donation, processing, and disposal of food waste.
- Promote or incentivize practices that reduce food waste.
- Identify successful plans and policies in other states to gain insight into options for Iowa.

TARGETS AND CONSIDERATIONS

The following options could be implemented to reduce food wasted in the State of Iowa. Food is wasted in homes, manufacturing facilities, retail businesses, and restaurants, and all sectors can be part of the solution to reduce food waste and redirect edible food to Iowans in need.

The following options include potential considerations for various sectors and time frames for how long it may take to implement the actions. Actions were designated as short-term (0-3 years), medium term actions (4-10 years), and long term actions (10+ years). These timeframes are estimates, but actions may take more or less time to implement depending on available resources, time needed for relationship-building and strategic planning, political interest, and other factors. Potential considerations that are outside the control of the Department were not assigned time frames, as many factors may influence the timeline.

Measuring progress is an important component of food waste reduction. The Department has historically measured food waste during Material Characterization Studies and may plan to continue those efforts on a regular basis to assess effectiveness of the State's efforts to reduce food waste.

Key

- Short-term (0–3 years)
- Medium-term (4–10 years)
- Long-term (10+ years)
- N/A – Potential considerations that are outside the control of the Department were not assigned time frames

Prevent Wasted Food

- N/A – Reduce state business licensing fees for businesses that have food waste reduction plans.
- Short-term – Offer financial assistance to businesses for food reduction efforts.
- Medium-term – Offer technical assistance to businesses for food reduction efforts.
- Short-term – Develop and share educational materials related to the EPA Wasted Food Scale, food labeling (including "use by", "sell by", and "best by" dates), and strategies for reducing food waste for homes and businesses.
- Short-term – Focus reduction efforts on items that food banks and pantries do not want or that have limited nutritional value, such as bakery items and candy. Encourage grocery and retail stores to reduce cost of day-old bakery items rather than donating to food banks or food pantries (based on coordination and agreement with local food rescue organizations).
- Short-term – Coordinate with grocery stores on food waste reduction efforts and messaging, especially around use of "imperfect produce" or close-dated items.
- Short-term – Promote school conversations focused on food waste.
- N/A – Encourage the Iowa Department of Education to consider starting sharing table programs in schools to allow students to share packaged food that they do not intend to eat.

Donate or Upcycle

- Medium-term – Develop and share educational strategies related to food donation, including Good Samaritan laws, USDA's Food Keeper Guide, and ideas for residents who want to reduce food waste at home.
- Short-term – Reinvigorate the Department's business and school engagement post-pandemic focused on options for reducing, donating, and upcycling food.
- Short-term – Partner with wholesalers and retailers to train staff on food rescue processes.
- Short-term – Continue the Department's Food Storage Capacity grants to support food rescue efforts.
- Short-term – Create a scholarship program for businesses or students to attend seminars, conferences, or webinars to learn about food waste reduction strategies that they can implement in their organization.
- N/A – Establish requirements for businesses to donate food, based on their size.
- Long-term – Add food waste to the Special Waste Authorization process where other upcycling outlets for the material must be exhausted before requesting disposal if food waste quantity is above a certain threshold.
- N/A – Increase the tax credit available for taxpayers that donate food to emergency feeding organizations and food banks (compared to the current tax credit valued at 15% of fair market value or up to $5,000 annually).

TARGETS AND CONSIDERATIONS

Feed Animals or Leave Unharvested

- Evaluate animal feed policies currently in place in other Midwestern states to consider whether there may be best practices that Iowa could consider implementing.
- Strengthen partnerships with Iowa State University Extension, USDA, and food gleaning networks to promote food recovery and distribution.

Send Down the Drain, Landfill, or Incinerate

- Consider preventing landfilling certain food wastes (for example, compostable items like fruits or vegetables) in Iowa landfills.
- Continue to conduct Statewide Materials Characterization Studies to track progress toward food waste reduction goals.
- Continue to monitor other states' efforts to divert organics and food waste from the landfill for future implementation in Iowa (i.e. restrictions, incentives).
- Investigate state policies that subsidize tip fees for food waste processing at compost or WRRFs.
- Adjust landfill disposal fees or a DNR surcharge on tip fees to incentivize diversion efforts and reduce environmental impacts.

Compost or Anaerobic Digesion with beneficial use of digestate/biosolids

- Consider a legislative requirement that food waste generators submit information on food waste generation and reuse or disposal quantities.
- Facilitate public-private partnerships to purchase or rent composting equipment.
- Encourage municipalities to accept food waste in organics management programs.
- Encourage participants in the DNR Solid Waste EMS program to select food waste projects to fulfill the Organics Management requirement.
- Provide grants or incentives to facilities that accept and process food waste to offset equipment and operational costs.
- Consider a legislative requirement for businesses to compost food waste if the entity is within a certain distance of a local food waste processing facility.
- Encourage on-site food waste management by providing information about best practices for at-home composting and onsite food waste management tools.
- Incentivize public-private partnerships.
- Consider incentives or funding to pre-process food waste so it can be depackaged, ground, and flowable and therefore suitable for WRRF and AD processing.
- Consider a statewide hub and spoke system, where food waste from the eastern, central, and western portions of the state would be directed to a few dedicated facilities, including centralized pre-processing facilities.
- Add food waste processing equipment to the recycling property tax exemption, with finished compost and beneficially-reused digestate as recycled finished products.

Key

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Acknowledgements

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- Cedar Rapids/Linn County Solid Waste Agency (CRLCSWA) Compost Facility
- Dubuque Metropolitan Area Solid Waste Agency (DMASWA) Compost Facility
- Iowa City Landfill and Recycling Center's Compost Facility
- Landfill of North Iowa (LNI) Compost Facility
- Skunk River Compost
- City of Davenport Composting Facility
- J. Petticord
- Red Barn Acres
- Metro Park East Landfill
- Black Hawk County Landfill
- Food Bank of Iowa
- Food Rescue Partnership
- Table 2 Table
- Feed Iowa First
- Dubuque Food Pantry
- Des Moines Wastewater Reclamation Authority
- Muscatine Water and Resource Recovery Facility
- Sioux City Wastewater Treatment Plant
- Ames Waster Pollution Control Facility
- Atlantic Wastewater Treatment Plant
- Cedar Rapids Water Pollution Control Facility
- Council Bluffs Wastewater Treatment Plant
- Dubuque Water & Resource Recovery Center
- Marshalltown Water Pollution Control Plant

In addition, we would like to recognize Laurie Rasmus, the Department's project representative. Laurie's organizational skills and attention to detail were key to keeping the project on track, and we appreciate her support of this project.

Icon Legend

Icons were used throughout this report to help readers navigate and indicate the type of topic being discussed in each section. The following shows which icons were used in the report, and the associated report section(s).

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	The Problem of Food Waste Current State: Food Waste Generation
	Current State: Food Rescue and Donation
	Current State: Composting in Iowa Considerations: Onsite Management of Food Waste
	Current State: Food Waste at Water Resource Recovery Facilities
	Current State: End Markets for Organics Processing Products
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	Considerations: Policy and Data Collection Definitions and Abbreviations
	Path Forward: Targets and Considerations

The Problem of Food Waste

Food waste is a major portion of the waste stream in the U.S and can have an impact on the environment and economy. The EPA estimates that nearly 40% of food in the U.S. is never eaten.[1] According to the U.S. Department of Agriculture (USDA), 133 billion pounds of the 430 billion pounds of available food supply at the retail and consumer levels were not eaten in the U.S.[2]

Social Impacts

In 2023, 13.5% of U.S. households (18 million households) were food insecure, which means they were unable to acquire adequate food for one or more household members because they had insufficient money or other resources for food, at least some of the time.[3] The Food Bank of Iowa estimates that 1 in 8 Iowans and 1 in 6 Iowa children face food insecurity. Approximately 385,000 Iowa residents do not know where they will find their next meal, and the problem is worsening.[4] Much of the food that is wasted in Iowa could be redistributed to food insecure families via established programs, including food banks, food pantries, and food rescue organizations.

Environmental Impacts

Most food waste generated in Iowa is disposed in landfills. When food breaks down in an environment without oxygen, as in a landfill, it generates hazardous air pollutants that can impact human health and the environment. When food waste is landfilled, the many resources used to grow, store, process, distribute and prepare the food are also wasted. The EPA estimates that food wasted in the U.S. each year also wastes the following resources:[5]

- 140 million acres of agricultural land.
- 5.9 trillion gallons of water.
- 778 million pounds of pesticides.
- 14 billion pounds of fertilizer.
- Enough energy to power more than 50 million homes per year.

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[1] U.S. Environmental Protection Agency. 2025. "Sustainable Management of Food Basics." Accessed April 2025. Sustainable Management of Food Basics | US EPA

[2] U.S. Department of Agriculture. 2014. "The Estimated Amount, Value, and Calories of Postharvest Food Losses at the Retail and Consumer Levels in the United States." Accessed April 2025. The Estimated Amount, Value, and Calories of Postharvest Food Losses at the Retail and Consumer Levels in the United States

[3] U.S. Department of Agriculture Economic Research Service. 2024. "Household Food Security in the United States in 2023." Accessed April 2025. Household Food Security in the United States in 2023

[4] Food Bank of Iowa. May 14,2025. "Feeding America study: Food insecurity has increased in every Iowa county." Accessed June 2025. Feeding America study: Food insecurity has increased in every Iowa county - Food Bank of Iowa

[5] U.S. Environmental Protection Agency. 2023. "From Field to Bin: The Environmental Impacts of U.S. Food Waste Management Pathways." Accessed April 2025. www.epa.gov/system/files/documents/2023-10/part2_wf-pathways_report_formatted_no-appendices_508-compliant.pdf

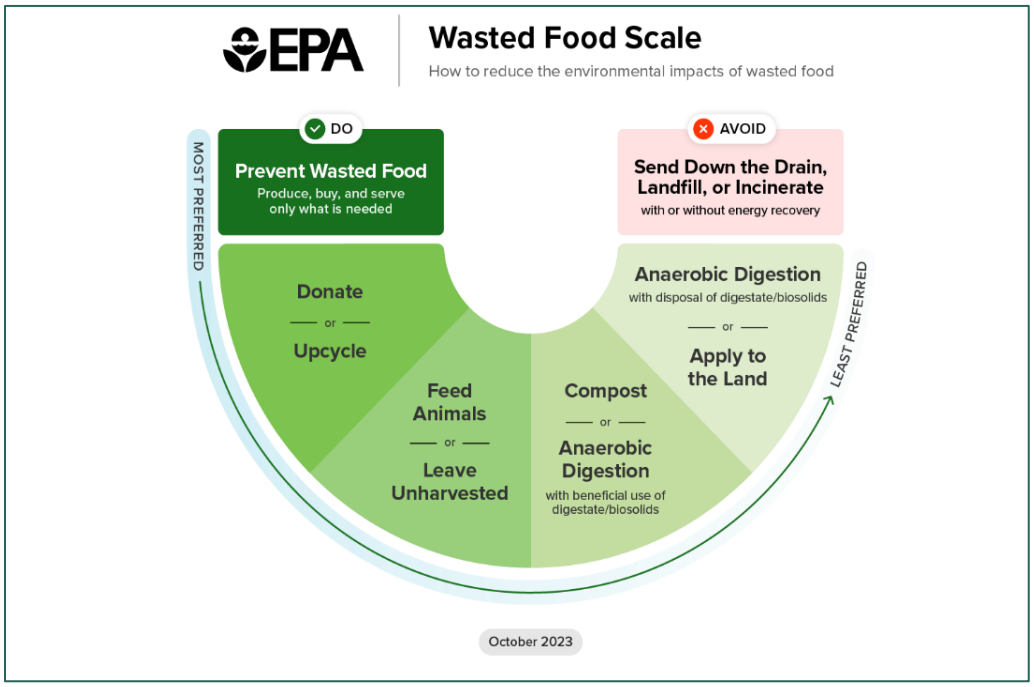
Economic Impacts

Food waste also impacts the economy. The EPA estimates that the average American family spends nearly $3,000 per year on uneaten food.[6] Based on research from the USDA Economic Research Service (ERS)'s Food Expenditure Series,[7] this represents approximately 11% of household food expenditures. During periods of high inflation, consumers are anticipated to waste even more money on uneaten food. The most commonly wasted foods are sugar and sweeteners, fresh vegetables, grains, milk, meat, and fresh fruit. Households spend the most money on wasted meat, dairy, processed fruit, fish and seafood, and fresh vegetables.[8]

Options for Managing Food Waste

Food waste can be managed in several ways, as shown on the EPA's Wasted Food Scale below. The preferred option is to reduce food waste by producing and purchasing only what is needed. However, wasted food can also be donated to other people via food banks, pantries, or other programs; used for animal feed; processed via composting or anaerobic digestion; and sent down the drain, landfilled, or incinerated.

Figure 1: EPA Wasted Food Scale



[6] U.S. Environmental Protection Agency. 2025. "Estimating the Cost of Food Waste to American Consumers." Accessed May 2025. Estimating the Cost of Food Waste to American Consumers

[7] Okrent, A. M., Elitzak, H., Park, T., & Rehkamp, S. (2018). Measuring the value of the U.S. food system: Revisions to the food expenditure series (TB-1948). U.S. Department of Agriculture, Economic Research Service.

[8] U.S. Environmental Protection Agency. 2025. "Estimating the Cost of Food Waste to American Consumers." Accessed May 2025. Estimating the Cost of Food Waste to American Consumers

In Iowa, food waste is managed in a variety of ways. This study performed research and data analysis into the methods used to manage food waste in Iowa, including donation, composting, and anerobic digestion.

Current State: Food Waste Generation

Food waste is the #1 material disposed in Iowa's landfills. In 2022, the Department conducted a Statewide Material Characterization Study (Study)[9] to assess which materials were being disposed in Iowa's landfills. To conduct the Study, trash was sorted by material type (for example, cardboard, aluminum beverage containers, tin cans, etc.) and weighed to see which types of materials Iowans threw away. Ten landfills, located across the state, participated in the study.

What is food waste?

Food waste is "an overarching term to describe food that was not used for its intended purpose and is managed in a variety of ways, such as donation to feed people, creation of animal feed, composting, anaerobic digestion, or disposal in landfills or combustion facilities. Examples include unsold food from retail stores; plate waste, uneaten prepared food, or kitchen trimmings from restaurants, cafeterias, and households; or by-products from food and beverage processing facilities." – US EPA

The Department was interested in considering whether food being wasted is food scraps (such as discarded meat scraps, eggshells, fruit or vegetable peels, etc.), or packaged food that could be upcycled. Therefore, both loose and packaged food waste were included in the Study. The Study indicates that **about 19% of the trash disposed in Iowa is either loose or packaged food waste.** In 2022, approximately 2.54M tons of municipal solid waste (MSW, hereafter referred to as "trash") was disposed in

[9] SCS Engineers. 2022. "2022 Iowa Statewide Material Characterization Study." Accessed June 2025. 2022 Iowa Statewide Material Characterization Study

Iowa's landfills, which means that approximately **488,000 tons of loose or packaged food was thrown away.** A majority of the food waste (approximately 330,000 tons) was disposed by residents, and the remaining food waste was disposed by commercial entities.

Based on an evaluation of the Study, the service area for each landfill, and the total quantity of residential waste disposed in the state, **the average Iowan disposes approximately 200 pounds of food per year at home. Almost a quarter of that food waste is packaged and could be eaten.** If commercial food waste is included in the estimate, the total per-capita disposal rate is 300 pounds of wasted food per Iowan per year. Iowa's per-capita food waste disposal rate is lower than the national average: the EPA estimates that the **U.S. wastes 492 to 1,032 pounds of food per person per year.**[10,11]

[10] U.S. Environmental Protection Agency. 2023. "From Farm to Kitchen: The Environmental Impacts of U.S. Food Waste." Accessed April 2025. https://www.epa.gov/system/files/documents/2021-11/from-farm-to-kitchen-the-environmental-impacts-of-u.s.-food-waste_508-tagged.pdf

[11] Note from the EPA's From Farm to Kitchen Report, referenced above: "Given the size and dynamic complexity of the U.S. food system, no single agreed-upon comprehensive estimate of the total amount of U.S. FLW [Food Loss and Waste] exists. Instead, the literature includes multiple credible estimates, which differ in scope and methodology, that together provide insights into the magnitude and distribution of U.S. FLW. Estimates that include food lost or wasted during all stages of the food supply chain (from primary production to consumption) range from 73 to 152 million metric tons (161 to 335 billion pounds) per year, or 223 to 468 kg (492 to 1,032 pounds) per person per year, equal to approximately 35 percent of the U.S. food supply."

Current State: Food Rescue and Donation

Food donation can reduce food waste while also providing a critical service to Iowans that are hungry. The Food Bank of Iowa estimates that **1 in 8 Iowans and 1 in 6 Iowa children face food insecurity.** In 2025, approximately 385,000 Iowa residents do not know where they will find their next meal. This is the highest food insecurity rate since 2019, based on a study by the Food Bank of Iowa, and the problem is getting worse.[12]

What is food insecurity?

Food insecurity is "the limited or uncertain availability or nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways." – USDA

Food insecurity can vary in severity. The USDA uses the following conditions to assess whether a household is food insecure, and to what extent:[13] Households that report at least three conditions are classified as food insecure.

- Household members worry whether available food will run out before they get money to buy more.
- Purchased food does not last until there is money to buy more.
- Residents cannot afford to eat balanced meals.
- Household members cut the size of meals or skip meals because there is not enough money to buy more food.
- Adults or children have not eaten for an entire day because there was not enough money for food at some point during the past year.
- Residents lost weight because they could not afford food.

Food banks, food pantries, and food advocacy groups (hereafter referred to collectively as food rescue groups) were interviewed to evaluate how excess food is distributed throughout the State.

The goals of this task were to identify:

- Quantity of food being distributed to Iowans in need.
- Sources of donated or purchased food and primary recipients of food.
- Trends observed in the quantity of food available and in the number of residents requesting food assistance.
- Barriers and opportunities for growth of these programs.

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[12] Food Bank of Iowa. May 14, 2025. "'Feeding America study: Food insecurity has increased in every Iowa county." Accessed June 2025. Feeding America study: Food insecurity has increased in every Iowa county - Food Bank of Iowa

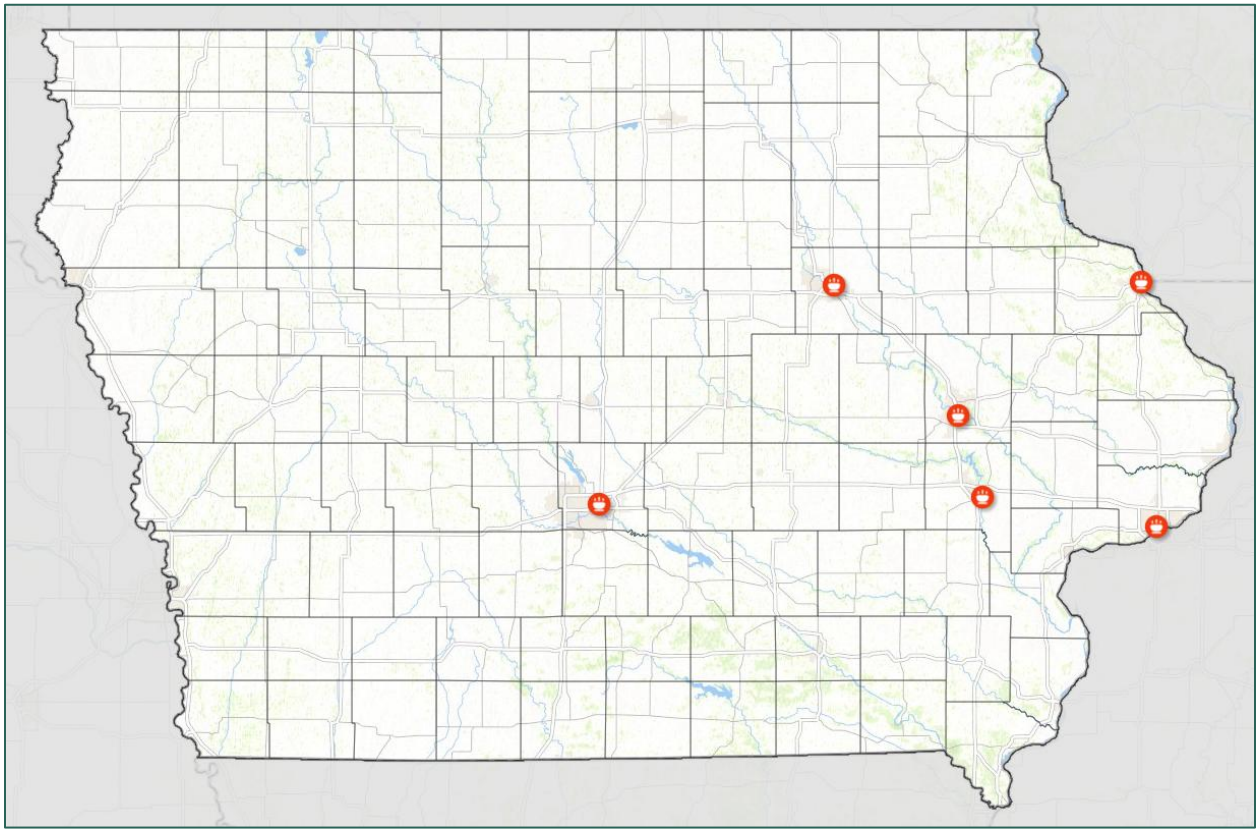
[13] U.S. Department of Agriculture Economic Research Service. 2025. "Food Security in the U.S.-Measurement." Accessed April 2025. Food Security in the U.S. - Measurement | Economic Research Service

- Quantity of food that is accepted and then discarded due to spoilage.

KEY FINDINGS

Six organizations that provide food rescue services were interviewed. The interviews included questions on the data collection and tracking methods, quantity of food accepted, quantity of food distributed, food sources and recipients, trends observed, barriers, and quantities of food accepted that could not be distributed. Food rescue service organizations located in western Iowa were contacted for this study, but were unable to respond during the study period.

Figure 2: Food Rescue Organizations Interviewed[14]



Sources and Recipients of Donated or Purchased Food

Food rescue organizations use a variety of methods to obtain food for distribution, including the following:

- Purchase from food wholesalers.
- Purchase from food banks.

[14] The following facilities were interviewed for this Study: Dubuque Food Pantry, Dubuque; Feed Iowa First, Cedar Rapids; Food Bank of Iowa, Des Moines; Northeast Iowa Food Bank, Waterloo; Quad Cities Food Rescue Partnership, Davenport, and Table to Table, Iowa City.

- Accept donations from the following:
  - Grocery chains, food wholesalers, and food manufacturers.
  - Refused food deliveries.
  - Farmers markets.
  - Prepared foods from national chains, catering companies, university dining halls, and events.
  - Farmers and gardening groups.
  - Individual residents.
  - Businesses, places of worship, and school events.
- Grow produce for distribution.
- Glean food from fields.

Typically, food rescue organizations operate locally, providing food to food pantries, mobile food pantries, senior or assisted living facilities, meal sites, and other entities in their local and surrounding communities. Food Bank of Iowa works statewide and provides food to pantries and meal sites in 55 counties.

Quantities of Food Distributed in Iowa by Surveyed Organizations

Table 1 shows quantities of food distributed by the food rescue organizations interviewed for this study. Each organization is structured differently and has different sources of food and methods for tracking quantities of food accepted and distributed. For example, the Quad Cities Food Rescue Partnership facilitates food rescue with partners but does not directly accept or store food.

The quantities shown in **Table 1** include food that is sourced through purchasing; purchased through the USDA's The Emergency Food Assistance Program (TEFAP); donated by retail and wholesale businesses; donated by or rescued from residents and community groups; grown by the organization or its partners; or gleaned.

Table 1: Food Accepted and Distributed by Surveyed Food Rescue Organizations

Area	Quantity Accepted	Quantity Distributed
Dubuque Food Pantry, Dubuque	80,000 lb.	Not separately tracked
Feed Iowa First, Cedar Rapids	45,000-58,000 lbs./year	Not separately tracked
Food Bank of Iowa, Des Moines	26,000,000 lb.	25,300,000 lb.
Northeast Iowa Food Bank, Waterloo	11,000,000 lb.	8,700,000 lb.
Quad Cities Food Rescue Partnership, Davenport	0 lb.	58,330 lbs. since fiscal year (FY) 2017
Table to Table, Iowa City	2,700,000 lb.	2,700,000 lb.

Note: Quantities are for the most recent year (typically 2023 at time of interviews) unless otherwise noted.

Discarded Food

- Food rescue organizations use most of the food that is donated or purchased. A small amount of food is thrown away, most commonly spoiled produce or bread.
- Some food rescue organizations compost spoiled or unusable foods to avoid landfilling food waste.

Trends Observed

- There has been an increase in need due to an increase in food insecurity since the Covid-19 pandemic.
- Some residents require food more often than food reuse groups are able to distribute to them.
- Retail store donation programs are growing. Some large retail stores have well-established food donation programs.
- Food and beverage manufacturers are getting more creative in using as much of their product as possible, resulting in less waste. Consequently, food rescue groups reported that they purchase more food instead of relying on donations.
- Local farmers have shifted to a community-supported agriculture (CSA) model, which drastically cut excess food available for gleaning from farms.

Barriers

- Food insecurity and reuse groups receive "fragmented funding" and may spend significant time applying for grants, including federal grants.
- Federal, state, and local programs support food insecurity organizations, and therefore organizations are at risk if funding expires or programs are discontinued.
- Providing culturally relevant foods can be a challenge, particularly if they are foods that are not easily grown in Iowa's climate.
- Residents and businesses may avoid food donation out of concern that they could be held liable if they inadvertently donate expired or spoiled food.

Current State: Composting in Iowa

The composting capacity task focused on understanding the existing operations for the state's composting facilities. It also researched the potential capacity and desire to increase food waste processing.

The goals of this task were to identify:

- Quantities of food waste being managed in the state.
- Current food waste processing capacity.
- Successes in the industry within Iowa.
- Barriers to expanding food waste processing.

What is composting?

Composting is the process that breaks down organic material (such as food waste and yard waste) in the presence of oxygen. Some composting facilities in Iowa accept unsold or spoiled food from retail stores or restaurants, plate waste, uneaten prepared food, and kitchen trimmings. The facilities break down these food scraps and yard waste by exposing it to oxygen and adding water periodically to maintain optimal conditions. The byproduct is finished compost, a nutrient-rich soil amendment that can be used in gardening and landscaping.

What is organic material?

Organic material, sometimes called "organics" or "organic waste," is material that is carbon-based. This includes yard waste, materials from plants and animals, food scraps, biosolids, and manure.

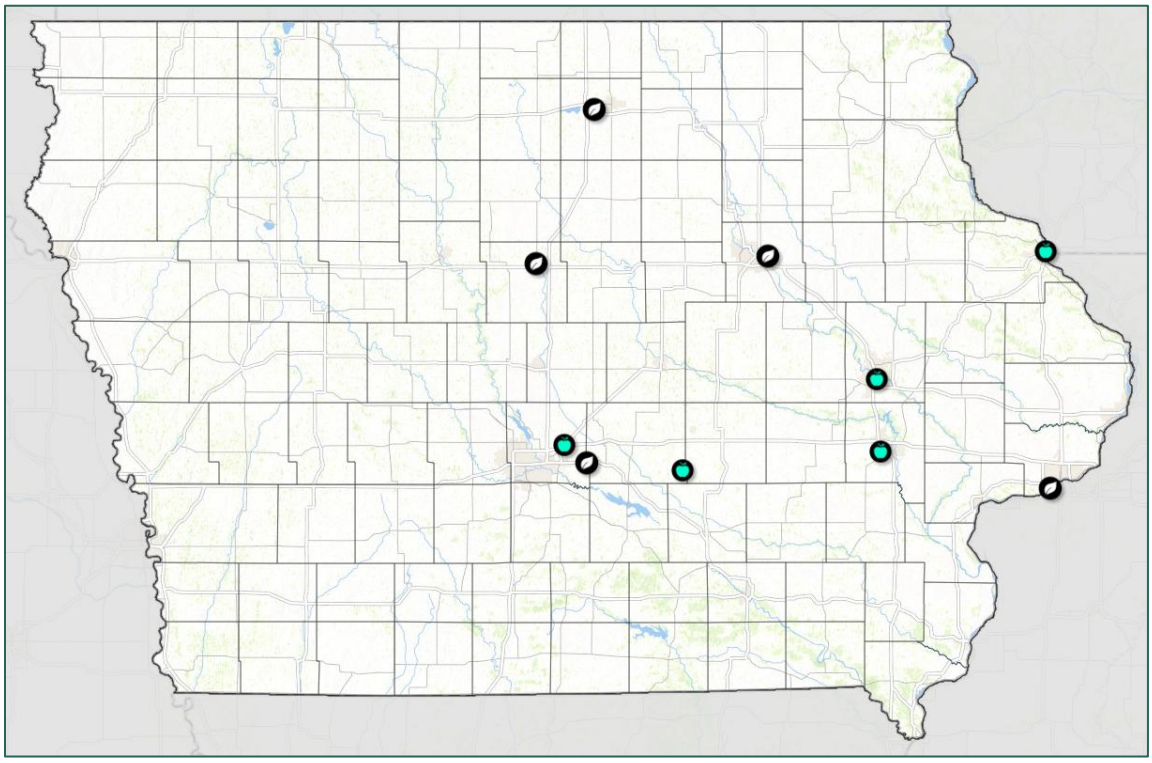
What is depackaging equipment?

Most food comes in packaging that is not compostable or biodegradable, such as pouches, boxes, and plastic films. It is necessary to separate food waste from packaging so the food can be broken down in a composting operation or digestor. Depackaging equipment removes food from the package, usually by mechanical force (like shredders, screening grates, etc.).

KEY FINDINGS

Ten composting facilities were interviewed. Some of these facilities currently accept food waste, while others do not. Facilities that do not accept food waste provided valuable insight on opportunities and perceived barriers to expanding food waste composting. Facilities were interviewed on facility operations, materials accepted (feedstock), sources of feedstock, service area, costs, end markets, contamination, and potential barriers to increasing capacity.

Figure 3: Composting Facilities Interviewed[15]



Note: Composting facilities that accept some quantity of residential or ICI food waste (including poultry residuals) are designated with a green apple icon. Facilities that do not currently accept food waste are designated with a white leaf icon.

Quantities of Food Waste Being Managed in the State

- In fiscal year (FY) 2024, five composting facilities in Iowa accepted residential or ICI food waste (including poultry residuals).
- The volumes these facilities accepted vary widely – between 1 to 2,075 tons per year in FY2024.
- Based on this study, it was determined that in 2024, approximately 2,925 tons of food waste were managed via composting in Iowa.
- Composting facilities that accept food waste are managing approximately 87,320 tons of material per year; only 2,925 tons (about 3%) of that is food waste.

Current Food Waste Processing Capacity

- The state's food waste composting capacity is not being fully utilized, with most facilities operating well below permitted limits.

[15] The following facilities were interviewed for this Study: Cedar Rapids / Linn County Solid Waste Agency (CRLCSWA) Compost Facility, Dubuque Landfill Compost Facility, Iowa City Compost Facility, Landfill of North Iowa (LNI) Compost Facility, Skunk River Compost, City of Davenport Sludge Composting Facility, J. Petticord Earlham Compost Facility, Red Barn Acres, Metro Park East Landfill, and Black Hawk County Landfill.

- The total permitted capacity of all compost facilities in the state is over 300,000 tons/year. However, not all facilities accept food waste. Furthermore, the permitted capacity is not equal to the total quantity of food waste that could be accepted for processing; nitrogen-rich food waste must be mixed with a carbon source, such as yard waste or woody waste, to compost effectively.
- The operational changes, food waste collection processes, and technology required to expand food waste processing capacity within composting programs may limit growth.
- Facilities have customers that are interested in food waste processing.

A newly implemented curbside collection program for food waste in Iowa City greatly increased food waste quantities.

Barriers to Expanding Food Waste Processing

Facilities were asked to rank barriers to accepting food waste from most significant to least significant. The most significant barriers were contamination, cost, and "other." The "other" category included site location, infrastructure and equipment, obtaining enough food waste material for an efficient operation, finding markets for finished compost, and Per- and Polyfluoroalkyl Substances (PFAS). Facilities also shared the following insights.

- Challenges and concerns to adding food waste or expanding food waste programs were unique to each facility based on their current operations, facility location, and staffing. However, permitting and contamination were cited as two of the main barriers by facilities that have considered accepting food waste.
- Permitting challenges
  - Permitting was noted to be cumbersome as it involves both the Department and Iowa Department of Agriculture and Land Stewardship (IDALS). The Department oversees permitting and compliance for the composting process, while IDALS has compost sale requirements. This challenge is currently being addressed by the Department.
  - IDALS stockpile rules are limiting for compost end use options and prevent agricultural beneficial use of product.
  - Potential compost operators may be hesitant to begin food waste composting because the additional permitting requirements could lead to increased regulatory scrutiny.
- Contamination challenges
  - Contamination (plastics, glass, etc.) caused by accepting food waste, especially from residential sources, was a concern.
  - Facilities noted the need for public education about materials accepted. In some cases, municipal or county public relations staff may also need to be educated on composting, as they provide education to residents.
  - Biodegradable or compostable plastics are sometimes collected with food waste and can be difficult to manage. Furthermore, accepting additional food waste may

increase non-compostable plastic contamination, as residents may not understand which food packaging is certified compostable and which is not.

  - Facilities that accept some food waste items but not others (for example, excluding milk and dairy) noted that prohibited items are included in incoming feedstock as contamination, which can cause issues with vectors.

- Other limiting factors to expanding food waste processing included:
  - Equipment and location constraints.
  - Current permitted capacity of facility.
  - Cost.
  - Availability of food waste for processing.
  - Adding food waste collection to community's waste collection system.
  - Regulatory issues, including managing contact water and stormwater as leachate.
- Depackaging equipment needed to process waste from commercial sources is cost prohibitive.
  - Depackaging and screening material will cause compostable packaging material and tableware to be removed and incorporated into residuals.
  - Several facilities expressed interest in leasing or partnering to purchase equipment for food waste composting.

Current State: Food Waste at Water Resource Recovery Facilities

Currently, some food waste in the State is being managed at wastewater treatment plants (also known as Water Resource Recovery Facilities, or WRRFs).

This task focused on surveying existing water resource recovery facilities to identify what infrastructure is needed for these types of facilities to accept and process food waste.

The goals of this task were to identify:

- Quantities of food waste being managed in the state.
- Current food waste processing capacity.
- Successful case studies and models.
- Barriers to expanding food waste processing.

What is a water resource recovery facility? How do they process food waste?

Water resource recovery facilities treat wastewater from homes, commercial buildings, and industrial facilities. As a result of the wastewater treatment processes, there is some organic material pulled from the sewage that needs to be disposed or managed. This can be done through anaerobic digestion (AD), which is a biological process that breaks down food waste in the absence of oxygen. These facilities can also accept other materials, such as food waste, industrial hauled waste, and fats, oils, and greases (FOG). Food waste can be disposed of through the AD process, creating byproducts like digestate (which can be used as a soil conditioner) and biogas to use for energy.

What are the benefits of processing food waste at WRRFs?

Since WRRFs are already processing organic materials, some WRRFs accept material from other sources that would otherwise be sent to the landfill. Processing this waste through AD rather than landfilling it allows gases to be fully captured and used for energy, providing beneficial byproducts.

What is the difference between composting and processing at a water resource recovery facility?

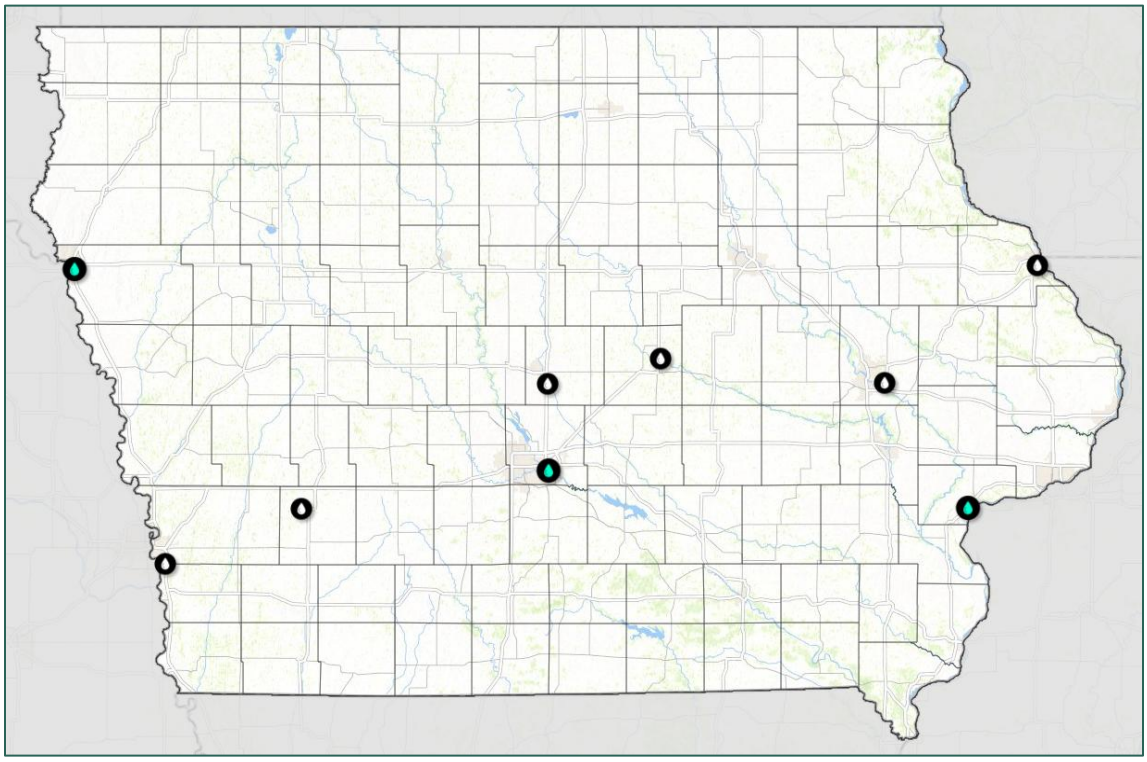
Both composting and anaerobic digestion at water resource recovery facilities break down organic material using biological processing. However, composting facilities break down the food waste in the presence of oxygen, while anaerobic digestion breaks down food in the absence of oxygen in a

sealed container and produces gases that can be captured for energy. Composting and anaerobic digestion at WRRFs both have beneficial end products.

KEY FINDINGS

Nine WRRFs were interviewed for this portion of the study. Facilities were selected based on whether they accepted food waste, size of operations, and proximity to population centers. Facilities that accept food waste or industrial food byproducts were prioritized for interviews. Facilities that do not currently accept food waste were also included, as they provided valuable insight on potential barriers and opportunities for food waste management. The interviews included questions on facility operations, service area, feedstocks accepted, plans for upgrade and expansion, barriers to accepting food waste, contamination, equipment needed to process outside wastes, and biogas production and processing.

Figure 4: WRRFs Interviewed[16]



Note: WRRFs accept some quantity of residential or ICI food waste are designated with a green water drop. Facilities that do not currently accept food waste are designated with a white water drop.

[16] The following facilities were interviewed for this Study: Des Moines Metropolitan Wastewater Reclamation Authority (WRA), City of Sioux City Wastewater Treatment Plant, City of Muscatine Water & Resource Recovery Facility, City of Council Bluffs Water Pollution Control Plant, City of Atlantic Wastewater Treatment Plant, City of Ames Water & Pollution Control, City of Marshalltown Water Pollution Control Plant, Cedar Rapids Water Pollution Control Division, and City of Dubuque Water & Resource Recovery Center.

Quantities of Food Waste Being Managed by WRRFs

Facilities that accept food waste accept the following types:

- Food industry byproducts.
- Food waste rejects from businesses.
- Post-consumer/residential food waste.
- Agricultural residue.

In 2024, three WRRFs accepted industrial food waste. The facilities reported that the following total quantities were accepted in 2024:

- 2,500 tons of food waste.
- 24.4M gallons of commercial FOG from food service establishments.
- 47 M gallons of food manufacturing waste from industrial facilities.
- Additional food manufacturing waste may be processed at other facilities.

Current Food Waste Processing Capacity

- Facilities that accept food waste primarily accept materials from businesses, including food industry byproducts and food waste rejects from businesses due to the consistency in the feedstock stream makeup which limits challenges for their system.
- Only one facility, Muscatine WRRF, accepts post-consumer or residential food scraps.
- Facilities that accept food waste noted that there is significant demand for processing food waste.

One facility noted that they accept material from six states and have more than 100 industrial customers, and another accepts material from more than 500 miles away.

- Facilities that accept food waste are generally interested in accepting more food waste material, but capital upgrades to purchase new equipment may be required to accept more food waste.
- Facilities that do not accept post-consumer or residential food waste had concerns about contamination and consistency associated with this feedstock.
- Overall, most facilities surveyed do not currently accept food waste. Capital costs of adding food waste were at least $2M. One facility is investing over $200M in facility improvements but noted that these capital costs were not exclusively for food waste processing.
- The facilities that accept food waste noted that additional staff time is needed. Up to two full-time staff were added to process additional food waste.

Case Studies and Models

- In general, WRRFs that currently accept food waste have successfully incorporated it into their system and do not report major issues with it. They were interested in increasing capacity for food waste and accepting larger quantities of material in the future.

- Facilities that accept food waste require pre-screening of material from new customers. They may request photos, liquid content, and other parameters, and some facilities report that they take smaller quantities of the material as a "test" prior to accepting larger quantities of the material.

Barriers to Expanding Food Waste Processing

Facilities interviewed were asked to rank barriers to accepting food waste from most significant to least significant. The most significant barriers were equipment capacity, concerns about impact on facility operations, cost (including labor, equipment, and staff time), and the logistics of adding new feedstocks. Facility staff also shared the following insights:

- Some facilities reported that they have had outside waste, including food waste, cause processing challenges, such as changes to temperature and pH, digester upsets, and reduced biogas production rates. Facilities that do not accept food waste may see these experiences as a potential barrier to expanding their operations to include food waste.
- Facilities that are not currently accepting food waste identified the following primary barriers:
    - Equipment capacity.
    - Concerns about impact on facility operations (i.e., concerns that accepting food waste would disrupt their existing system).
    - Cost (e.g., labor, equipment, staff time). Most facilities anticipated needing to hire additional staff to accept food waste.
    - Logistics of adding new feedstocks (i.e., additional steps to pre-screen or pre-analyze waste, separate entrances or additional tanks and training/hiring staff).
- At least one facility reported that they have accepted high-strength wastewater from industrial plants in the past, and that they encountered processing challenges (such as upsets) and logistical challenges (such as coordinating with packing plant staff) that made it difficult to work with new customers or industry groups.

Current State: End Markets for Organics Processing Products

This task assessed existing end markets for finished compost, digestate, and recovered digester gas, and identified opportunities to expand those markets. Additionally, the team researched best management practices from the organics industry that could be incorporated in Iowa's end markets. Results from interviews with composting facility operators and WRRFs were incorporated where relevant.

The goals of this task were to identify:

- End markets active in Iowa.
- Best management practices for development, marketing and procurement of recovered end market products.
- Processing requirements, sales price per unit and end use markets for each product.

What is an end market?

An end market is the point where a product or service is sold to the end user or customer.

What is an end market product?

An end market product is the final product of a value chain. For the purposes of this study, end market products include finished compost, biogas, and digestate from composting and AD of food waste.

KEY FINDINGS

Key findings are listed below by end market product, including finished compost, digestate, and recovered digestate gas.

What is finished compost?

Finished compost is a soil amendment, or additive, that is manufactured through the controlled aerobic, biological decomposition of biodegradable materials.

Finished Compost

Existing Markets

Composting facilities in Iowa typically sell or give away their composting product. Composting facilities that process food waste reported that they do not have trouble selling or giving away compost. Several facilities reported that they sell out their compost product annually. Compost end use markets can include residential landscaping use; agriculture; construction and highway projects; as a soil amendment in drought-prone regions; and green infrastructure, landscaping, and park preservation.

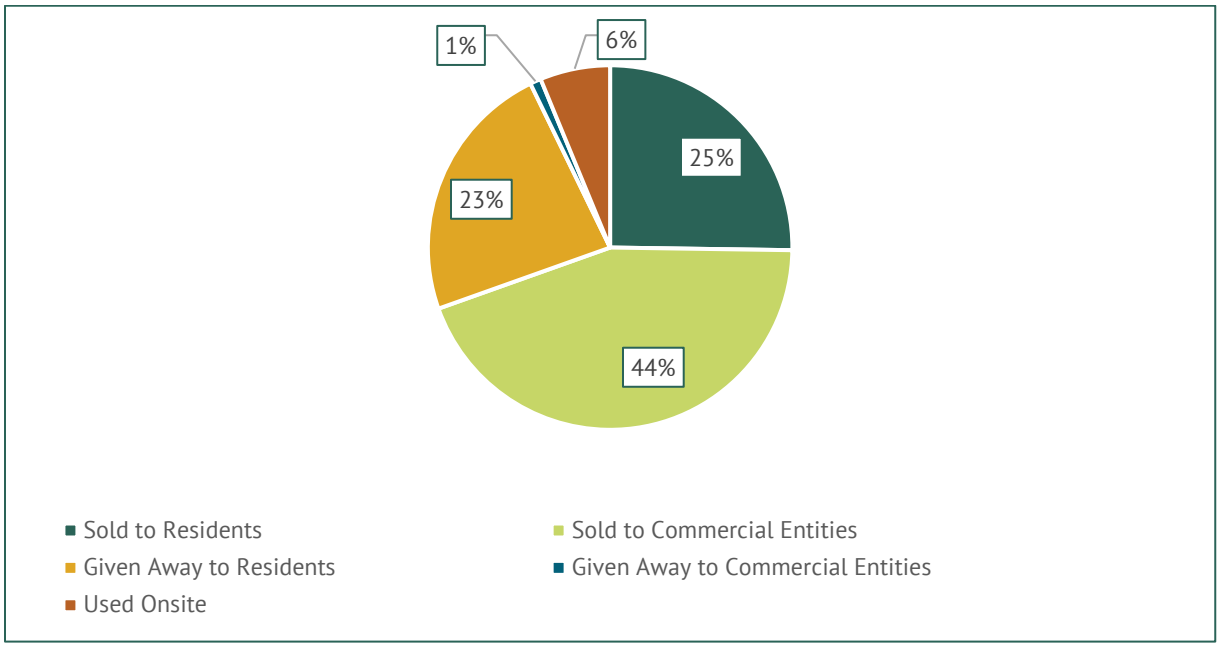
Composting operations that sell compost as a soil amendment are required to register with the IDALS Feed and Fertilizer Division.[17,18] The total amount of compost being produced per facility ranged from approximately 400 tons per year (TPY) to approximately 17,000 TPY. In total, the seven facilities interviewed produced approximately 32,000 tons of compost in fiscal year 2023.

Sale Price per Unit

Based on survey data, finished compost in Iowa ranges in cost from about $10 per ton to $30 per ton, with an average of $20 per ton. As shown in **Figure 5**, approximately 44% of the finished compost produced by the interviewed facilities is sold to commercial entities. About half the compost produced by the interviewed facilities is either sold or given away to residents. A small quantity of compost is given away to commercial entities or used onsite.

[17] Iowa Waste Reduction Center. 2023. "Iowa Regulatory Composting ToolKit for Small Compost Sites." Accessed April 2025. https://iwrc.uni.edu/sites/default/files/inline-files/usda-toolkit-2023.pdf
[18] Iowa Department of Agriculture and Land Stewardship. "Distributing a Fertilizer or Soil Conditioner in Iowa." Accessed April 2025. https://iowaagriculture.gov/sites/default/files/Distributingfertilizerorsoilconditionerinlowa.pdf

Figure 5: End Markets for Finished Compost



Development, Marketing, and Procurement

In general, composting operators reported that they do not struggle to market compost products. There appears to be sufficient demand for more compost in Iowa. However, if more compost capacity is developed in Iowa, additional marketing of compost may be required. The U.S. Composting Council (USCC) recommends the following best practices may be considered to market and develop end markets for finished compost:

- Develop a brand for finished compost with product specifications and a recognizable logo.
- Create brochures and other educational materials on the benefits of using compost.
- Test finished product using an established testing method to promote quality and safety of compost.
- Share testing results with customers.
- Hire marketing personnel to promote compost product.
- Continuously evaluate market and compost quality.
- Incentivize compost application by farmers.
- Provide education on the uses of compost in construction, landscaping, roads and highways, and green infrastructure.
- Establish requirements for compost use in government funded projects.
- Require recordkeeping and reporting of compost use, volume purchased, source, and use.

Digestate and Recovered Digester Gas

What is digestate?

Digestate is a nutrient-rich residual of the anerobic digestion process which is composed of liquid and solid portions.

What is recovered digester gas?

Recovered digester gas is commonly referred to as "biogas." Biogas is generated during anaerobic digestion and composed of various gases. Biogas can be used for electricity, heat, vehicle fuel, or processed further to generate renewable natural gas (RNG).

Existing Markets

Iowa WRRFs that accept and do not accept food waste were interviewed about end markets for the biogas that the facilities produce. Some facilities use biogas onsite, while others sell biogas. Key findings include the following:

- Of the nine facilities in Iowa interviewed, four use biogas onsite. Onsite uses include heating digesters, heating boilers, incineration, and electricity generation.
- Two facilities sell biogas for offsite use.
- Two facilities report they are considering selling biogas in the future.
- Biogas produced at WRRFs in Iowa typically requires pretreatment, which can include:
  - Removing moisture.
  - Chemical scrubbing of sulfides.
  - Chemical scrubbing of siloxanes.
- In some cases, facilities have onsite biogas treatment systems, whereas others send biogas to a third-party vendor for treatment and processing to pipeline quality.
- Facilities reported that it can be financially beneficial to sell biogas rather than using it onsite, as there are periods when other fuels can be purchased at a lower price than the biogas can be sold.
- Biosolids from the anaerobic digestion process are typically land applied, although some facilities use other methods such as incineration and quarry fill.

Sale Price per Unit

The sale price for biogas is anticipated to vary based on contracts with third-party vendors for treatment and processing; proximity to existing pipeline infrastructure; and gas quantity and quality. As of December 2024, the price of natural gas on the open market was between $2.99 and $4.09 per MMBtu (Million British Thermal Unit), according to the US Energy Information Administration. Biogas produced by AD facilities may also be eligible for renewable energy tax

credits, such as the federal Clean Electricity Production Tax Credit (CETC)[19] and Investment Tax Credit (ITC),[20] Renewable Energy Certificates (RECs),[21] or carbon offset credits.[22]

Digestate can be directly land applied for use as a fertilizer, used in the composting process as a soil amendment, and used to create horticultural products such as planter pots.[23] However, markets for digestate are less readily available than markets for biogas.[24] There may be future concerns for land application of digestate, given potential concentrations of PFAS in the material and pending related federal cleanup levels.

Development, Marketing, and Procurement

The American Biogas Council, a non-profit trade association that represents the biogas supply chain, estimates that the state of Iowa has the potential to produce up to 50.3 billion ft^3 of biogas per year. They estimate that there are currently 45 operational biogas capture systems in Iowa (21 wastewater facilities, 11 agricultural facilities, and 7 landfill facilities). The American Biogas Council estimates that there is additional potential for new biogas production, primarily in the agricultural sector.[25]

The following best practices may also be considered when promoting and developing markets for biogas and digestate:

- Develop additional systems near sources of organic material and near potential end markets when possible.
- Conduct community outreach when developing new AD facilities, addressing the following topics:[26,27]
    - Benefits of AD/biogas systems.
    - Benefits of digestate, including replacement of synthetic fertilizers.

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[19] U.S. Internal Revenue Service. 2025. "Clean Electricity Production Credit." Accessed April 2025. https://www.irs.gov/credits-deductions/clean-electricity-production-credit
[20] U.S. Internal Revenue Service. 2024. "About Form 3468, Investment Credit." Accessed April 2025. https://www.irs.gov/forms-pubs/about-form-3468
[21] U.S. Environmental Protection Agency. 2025. "Renewable Energy Certificates (RECs)." Accessed April 2025. https://www.epa.gov/green-power-markets/renewable-energy-certificates-recs
[22] U.S. Environmental Protection Agency. 2020. "AgSTAR Project Development Handbook." Accessed April 2025. AgSTAR Project Development Handbook
[23] U.S. Environmental Protection Agency. 2021. "AgSTAR Focus." Accessed April 2025. making-use-of-digestate-and-its-nutrients_august-2021.pdf
[24] U.S. Environmental Protection Agency. 2020. "AgSTAR Project Development Handbook." Accessed April 2025. AgSTAR Project Development Handbook
[25] American Biogas Council. "Biogas State Profile: Iowa." Accessed June 2025. Iowa Biogas and Energy Potential | American Biogas Council
[26] U.S. Environmental Protection Agency. 2020. "AgSTAR Project Development Handbook." Accessed April 2025. AgSTAR Project Development Handbook
[27] American Biogas Council. "Harness the Benefits of Biogas." Accessed April 2025. Benefits of Biogas | American Biogas Council

  - Air quality improvements associated with closed AD systems.
  - Project timeline and process.
  - Anticipated project outcomes and impacts.
- Develop an approach to collect multiple types of revenues from such projects, including tipping fees; biogas sales; tax credits; RECs; carbon offset credits; and sale of soil amendment or organics products.

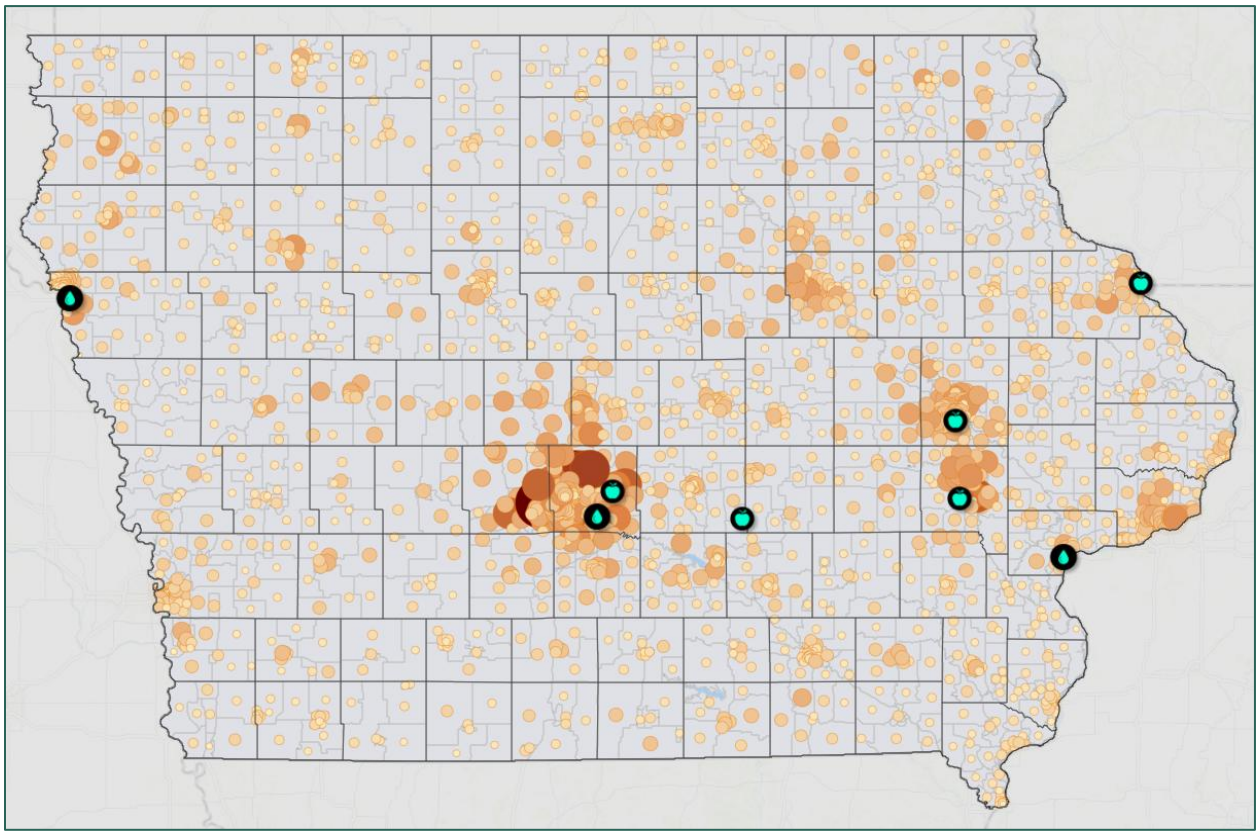
Current State: Gap Analysis

Food waste can be challenging to transport long distances, as it may include some wet and heavy materials. Therefore, it is important to consider distances food waste would be hauled from generators to processors (such as compost facilities, AD facilities, and WRRFs) when investing in new infrastructure.

RESIDENTIAL SOURCES OF FOOD WASTE

Food waste is generated by both commercial and residential entities, so ideally, both sets of generators would have access to a food waste processing facility. **Figure 6** shows the locations of composting facilities and WRRFs that accept food waste, in correlation to residential food waste disposal density. The per-capita residential food waste disposal rate was compared with population to show areas with dense populations that would be anticipated to generate larger quantities of food waste.

Figure 6: Residential Food Waste Disposal Density and Processing Facilities



Note: Composting facilities that accept some quantity of residential or ICI food waste (including poultry residuals) are designated with a green apple icon. WRRFs accept some quantity of residential or ICI food waste are designated with a green water drop. Areas that are shaded darker have high population densities, and therefore areas where larger quantities of residential food waste are expected to be produced.

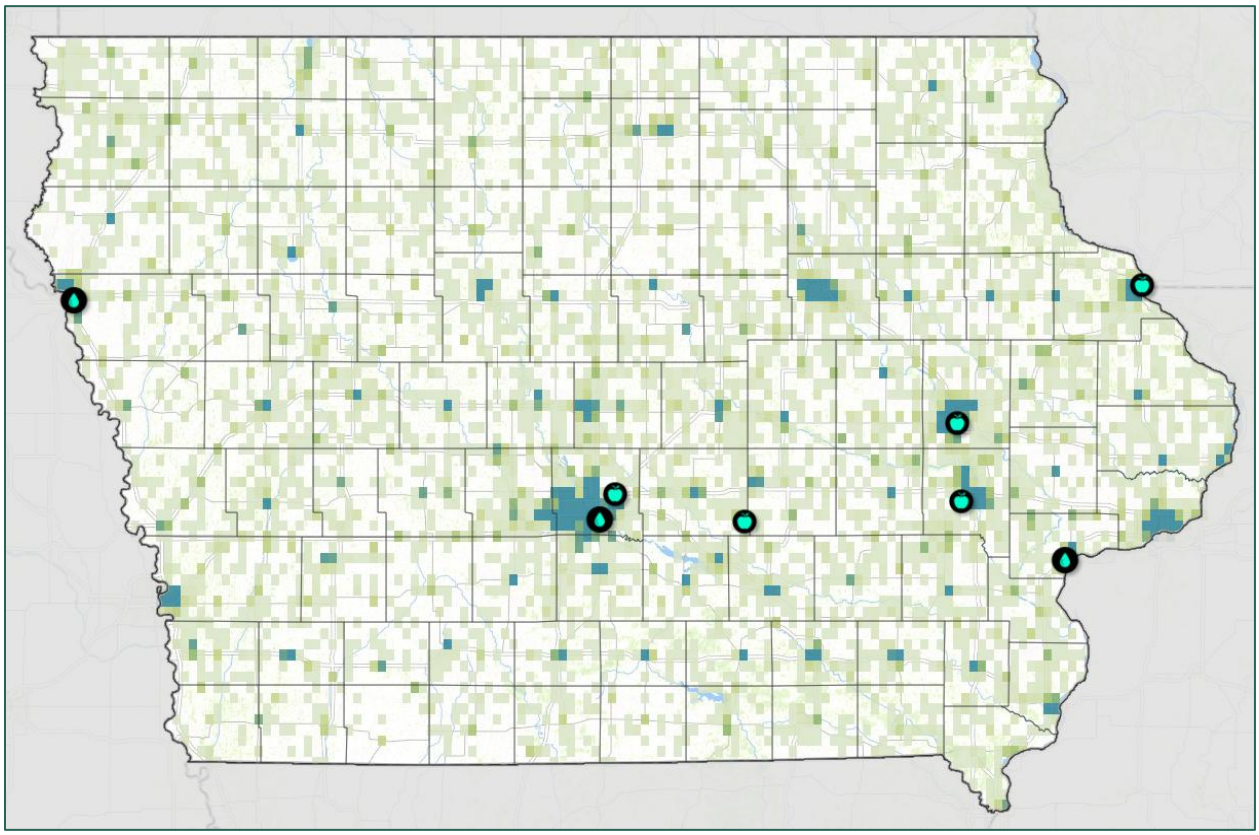
INSTITUTION, COMMERCICAL OR INDUSTRIAL SOURCES OF FOOD WASTE

Figure 7 shows the density of businesses that may produce food waste. Density of businesses that may generate food waste was determined by gathering Iowa businesses with relevant North American Industry Classification System (NAICS) codes, including the following:

- Food and beverage manufacturing.
- Food wholesale and retail.
- Superstores.
- Food services (i.e., restaurants).
- Educational services.
- Correctional facilities.

Businesses included in the map do not necessarily produce food waste, but they are classified in sectors that are likely to produce some quantity of food waste based on the US EPA's Excess Food Opportunities Map Technical Methodology.

Figure 7: Density of Businesses that May Produce Food Waste and Processing Facilities



Note: Composting facilities that accept some quantity of residential or ICI food waste (including poultry residuals) are designated with a green apple icon. WRRFs accept some quantity of residential or ICI food waste are designated with a green water drop. Areas that are shaded darker have a higher density of businesses that may produce food waste.

REGIONAL INFRASTRUCTURE REVIEW

As shown in **Figure 6** and **Figure 7**, composting and Water Resource Recovery Facilities that accept food waste tend to be located in areas with higher residential populations and areas with higher densities of businesses that may generate food waste. The communities of Sioux City, Des Moines, Cedar Rapids, Iowa City, Dubuque, and Muscatine have access to either residential or commercial food waste processing via composting or WRRFs.

However, there are some communities that have comparatively large residential and business populations that do not have access to composting or food waste processing at WRRFs. These include Council Bluffs, Clear Lake, Mason City, and Davenport. Furthermore, the facilities that process food waste near Des Moines and Sioux City accept commercial rather than residential feedstocks, and therefore, residents of those areas do not have access to residential food waste management at a WRRF or compost facility.

There are opportunities to add food waste processing capacity near Des Moines, Sioux City, and Council Bluffs, as these are large population centers that are only managing a fraction of their generated food waste. Based on the 2022 Iowa Statewide Materials Characterization Study, the average Iowan wastes approximately 200 pounds of food per year at home (i.e., food that is disposed in the residential waste stream at local landfills). Of that 200 pounds, approximately 50 pounds was packaged food that could have been eaten. The quantities of food waste in those areas was assessed in **Table 2**. It was assumed that the food scraps could be composted or processed in an AD facility, and that the packaged food could have been rescued and donated to Iowans in need. **Table** 2 shows the food waste quantities generated in the following regions, as identified for this study:

- **Des Moines Region:** Includes Metro Waste Authority Planning Area, Central Iowa Solid Waste Management Association [CISWMA] Planning Area, South Central Iowa Landfill Agency [SCILA] Planning Area, and Newton Planning Area.
- **Sioux City Region:** Includes Plymouth County Solid Waste Agency, City of Sioux City Solid Waste Planning Area, and Woodbury County Solid Waste Planning Area.
- **Council Bluffs Region:** Includes Iowa Waste Services Planning Area.

Table 2: Estimated Quantity of Food Available for Processing or Donation in Selected Regions

Area	Population	Quantity of Food Scraps Available for Composting (lbs.)	Quantity of Packaged Food Available for Donation (lbs.)
Des Moines Region	860,200	135,049,000	43,869,000
Sioux City Region	217,400	34,132,000	11,087,000
Council Bluffs Region	118,000	18,518,000	6,016,000

COMPOST UPGRADE COSTS

New composting infrastructure could be added in the state by either upgrading yard waste composting facilities to accept food waste or building new composting facilities that manage food and yard waste. Upgrading an existing yard waste facility would require investing in the following:

- Site work and permitting.
- Compost system.
- Drainage improvements.
- Equipment.
- Engineering design and construction administration.

High-level cost estimates were developed to assess potential costs to upgrade an existing system and to build a new food waste and green waste composting facility. A "small" facility was defined as accepting up to 1,000 TPY of food waste. A "medium" facility was defined as accepting up to 10,000 TPY of food waste. **Table 3** shows estimated capital costs to upgrade a green waste facility to compost food waste.

These cost estimates are anticipated to be used for planning purposes only. Costs are anticipated to vary by facility depending on facility size, equipment size and manufacturer selected, type of composting used, and other factors.

Table 3: Estimated Capital Costs to Upgrade Green Waste Facility to Compost Food Waste

Small Facility (1,000 TPY Food Waste)		Medium Facility (10,000 TPY Food Waste)	
Item	**Estimated Cost**	**Item**	**Estimated Cost**
SITE WORK		**SITE WORK**	
Compost Pad Improvements	$30,000	Compost Pad Improvements	$30,000
Concrete Receiving Pad	$5,000	Concrete Receiving Pad	$5,000
COMPOST SYSTEM		**COMPOST SYSTEM**	
Temperature Probes	$750	ASP Compost System	$750,000
-		Control System	$500,000
DRAINAGE		**DRAINAGE**	
Drainage Improvements	$25,000	Drainage Improvements	$50,000
Lined Pond	$100,000	Lined Pond	$300,000
EQUIPMENT		**EQUIPMENT**	
Loader	$20,000	Depackager	$200,000
-		Loader	$250,000

Small Facility (1,000 TPY Food Waste)		Medium Facility (10,000 TPY Food Waste)	
SUBTOTAL	**$180,800**	**SUBTOTAL**	**$2,955,000**
Engineering Design and Permitting	$5,500	Engineering Design and Permitting	$295,500
Construction Administration and Inspection	$7,500	Construction Administration and Inspection	$236,400
Planning Contingency (30%)	$52,225	Planning Contingency (30%)	$886,500
TOTAL	**$246,100**	**TOTAL**	**$4,373,400**

Notes:
1. This table shows a high-level cost estimate for planning purposes only, and includes a planning contingency to reflect variability in cost.
2. Blank rows were intentionally left blank.

Assumptions:
1. Assumes food waste is mixed with a bulking agent (green waste) at an appropriate ratio.
2. Aggregate Base Course for compost pad.
3. Drainage Improvements to improve flow to pond.
4. Lined Pond assumed 100 year 24-hour intensity for Cedar Rapids, Iowa.
5. Assume existing facility has grinder, screen, water truck, truck scales, office building, internal roads, and fencing.

Adding a new facility is anticipated to cost more than upgrading an existing facility, as additional site preparation, environmental controls, and equipment is anticipated. **Table 4** shows high-level cost estimates for a new composting facility.

Table 4: Estimated Capital Costs for New Food Waste and Green Waste Compost Facility

Small Facility (1,000 TPY Food Waste)		Medium Facility (10,000 TPY Food Waste)	
Item	**Estimated Cost**	**Item**	**Estimated Cost**
LAND ACQUISITION		**LAND ACQUISITION**	
Purchase	$15,000	Purchase	$2,000,000
SITE WORK		**SITE WORK**	
Earthwork	$40,000	Earthwork	$80,000
Grading & Compaction	$130,680	Grading & Compaction	$442
Compost Pad	$27,778	Compost Pad	$1,125,000
Organics Receiving Pad	$3,750	Organics Receiving Pad	$30,000
COMPOST SYSTEM		**COMPOST SYSTEM**	
Probes and Sensors	$750	ASP Compost System	$750,000
	-	Control System	$500,000

Small Facility (1,000 TPY Food Waste)		Medium Facility (10,000 TPY Food Waste)	
DRAINAGE		**DRAINAGE**	
Drainage System	$50,000	Drainage System	$75,000
Lined Pond	$100,000	Lined Pond	$300,000
EQUIPMENT		**EQUIPMENT**	
Front End Loader	$20,000	Front End Loader	$500,000
Screen	$75,000	Screen	$500,000
Grinder	$80,000	Grinder	$700,000
Water Truck	$25,000	Water Truck	$25,000
	-	Depackager	$200,000
SUPPORT FEATURES		**SUPPORT FEATURES**	
Admin Trailer	$10,000	Admin Trailer	$10,000
Truck Scale	$200,000	Truck Scale	$200,000
Site Lighting	$5,000	Site Lighting	$10,000
Landscaping and Signage	$10,000	Landscaping and Signage	$25,000
Internal Roads	$300,000	Internal Roads	$1,000,000
Fencing	$59,400	Fencing	$112,500
SUBTOTAL	**$1,152,400**	**SUBTOTAL**	**$8,143,000**
Engineering Design and Permitting	$34,500	Engineering Design and Permitting	$815,000
Construction Administration and Inspection	$46,000	Construction Administration and Inspection	$651,000
Planning Contingency (30%)	$345,707	Planning Contingency (30%)	$2,442,883
TOTAL	**$1,578,700**	**TOTAL**	**$12,051,900**

Notes:
1. This table shows a high-level cost estimate for planning purposes only, and includes a planning contingency to reflect variability in cost.
2. Blank rows were intentionally left blank.

Assumptions:
1. Assumes food waste is mixed with a bulking agent (green waste) at an appropriate ratio.
2. Aggregate Base Course for compost pad.
3. Drainage Improvements to improve flow to pond.

Considerations: Kitchen Food Waste Prevention

Residents and businesses can promote responsible management of food by reducing food waste in their homes, food service providers, and restaurants. In addition to the potential solutions listed here, many entities publish guides to promote food waste reduction, including the EPA,[28] U.S. Food and Drug Administration (FDA),[29] National Restaurant Association,[30] ReFED,[31] and others.

STRATEGIES FOR REDUCING FOOD AT HOME

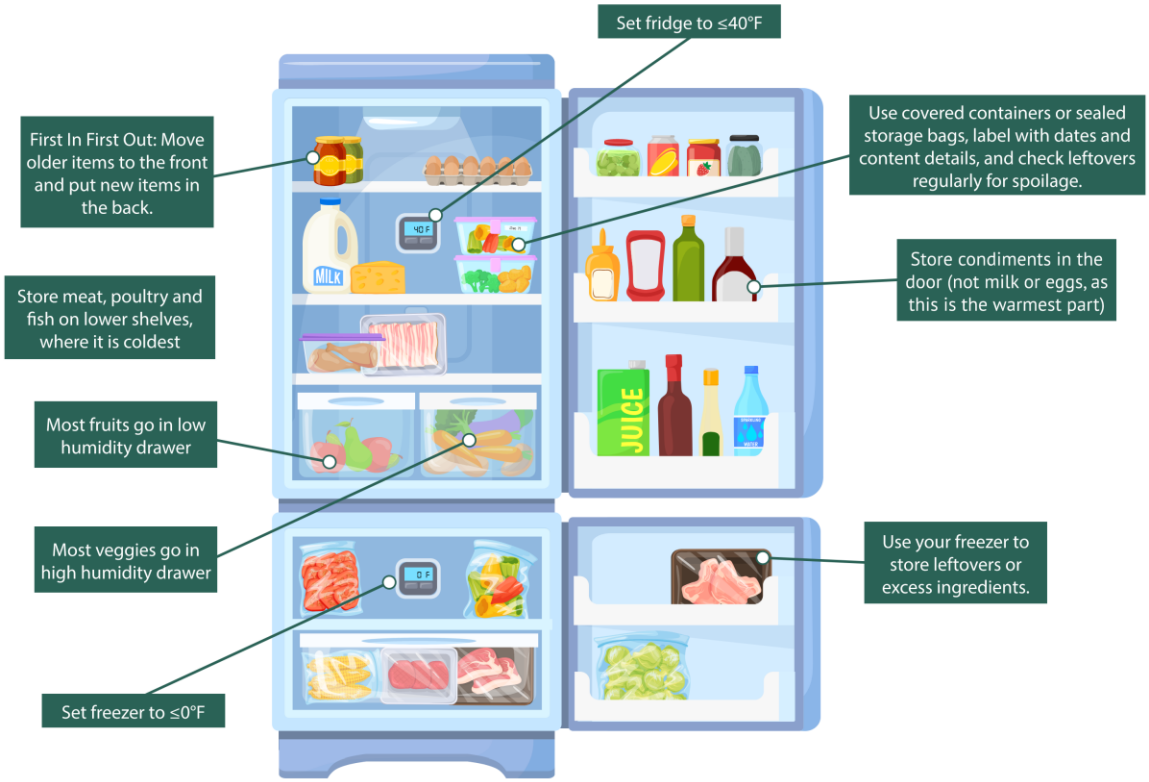
There are many options for reducing food waste in homes. Residents can save food and money by conscientiously planning and shopping, storing food properly, and being creative with cooking and preparation. The USDA estimates that the average American family spends nearly $3,000 per year on uneaten food.[32] Some strategies for reducing food waste can include the following:

- **Eat leftovers.** Bring them to work for lunch to save time and money.
- **Keep track** of leftovers or ingredients to use up. This can be as simple as posting a whiteboard or Post-It note on the refrigerator, using an app for notes on a phone, or storing leftovers on a dedicated shelf in refrigerators.
- **Take inventory** of fridge, freezer, and pantry items before shopping.
- **Plan meals.** Consider which items need to be used up, when you'll eat out, and which leftovers are already in the fridge.
- **Be creative.** Use ingredients for multiple days in different recipes.
- **Buy quantities you can use before they spoil.**
- **Store food properly** using refrigerator zones (see **Figure 8**).

Every household is different, so residents can find what works for them and begin to reduce food waste.

[28] U.S. Environmental Protection Agency. 2025. "Preventing Wasted Food at Home." Accessed June 2025. Preventing Wasted Food At Home | US EPA
[29] U.S. Food and Drug Administration. 2024. "Tips to Reduce Food Waste." Accessed June 2025. Tips to Reduce Food Waste | FDA
[30] National Restaurant Association, WWF, and Tork. 2021. "86 Food Waste." Accessed June 2025. 2021_86FoodWaste_Report_Update.pdf
[31] ReFEd. 2025. "Explore Solutions to Food Waste." Accessed June 2025. ReFED - Solution database
[32] U.S. Environmental Protection Agency. 2025. "Estimating the Cost of Food Waste to American Consumers." Accessed May 2025. Estimating the Cost of Food Waste to American Consumers

Figure 8: Refrigerator Storage Zones



STRATEGIES FOR FOOD SERVICE PROVIDERS AND RESTAURANTS

Restaurants manage large amounts of food and therefore have an opportunity to reduce food waste. However, they also face unique challenges compared to residential households. ReFED, a non-profit focused on food waste, estimates that 70% of the food waste at restaurants is plate waste from customers (or post-consumer waste), which restaurants have limited ability to control.[33]

Many restaurants already have practices in place to prevent and reduce food waste, and the following recommendations are intended to supplement those strategies.

Reducing Pre-Consumer Waste

Restaurants can manage pre-consumer food waste by considering the following practices:

- **Conduct a waste audit** to identify major sources of food waste.

[33] ReFed. "What is Food Waste." Accessed April 2025. https://refed.org/food-waste/the-problem/

- **Work with suppliers** to buy the quantities needed to meet customer demand and use smaller case or pack sizes if needed.
- **Manage and track inventory** to reduce the amount of time food is stored, if possible.
- **Work with staff to repurpose ingredients** that would otherwise go to waste.
- **Use specials to feature ingredients that will spoil first.**
- **Consider donating prepared, pre-consumer food**.

What is pre-consumer waste?

Pre-consumer waste is food wasted in a restaurant before it reaches guests. This includes food scraps such as fruit and vegetable trimmings, bones, and food that spoils before it can be served to customers.

Reducing Post-Consumer Food Waste

Restaurants have less control over post-consumer food waste, as it is food that is thrown out after it is delivered to guests. However, restaurants can use some practices to reduce the amount of food left uneaten on plates, including the following:

- **Keep track of which dishes are most popular** and remove unpopular items.
- **Allow customers to split entrees** or sides without added fees.
- **Offer multiple portion sizes,** if feasible.
- **Offer takeout containers** to customers that have not finished their meal.
- **Include storage and reheat instructions** on takeout containers.

What is post-consumer waste?

Post-consumer waste is food that gets thrown out after it reaches guests. It may include non-edible components such as bones and fruit or vegetable rinds, or uneaten edible prepared food.

Use the Department as a Resource!

The Department is committed to reducing food waste throughout the state and acting as a partner to find solutions. Department staff are available to consult with restaurants and other entities to identify practical, business-led solutions. The Department also offers the following programs to support businesses in their efforts to reduce waste.

Iowa Waste Exchange (IWE): The IWE keeps waste out of landfills by diverting potential waste into production of other materials. IWE staff are available to support restaurants with things like food waste audits.

Solid Waste Alternatives (SWAP) Program: The Department provides financial assistance through a competitive process for projects that use source reduction, recycling, and education to reduce the amount of waste generated and landfilled in Iowa. Financial assistance is offered in the form of forgivable loans, zero interest loans, and 3% interest loans.

Please contact the Department's Financial and Business Assistance team for more information.

Considerations: Onsite Management of Food Waste

The Department understands that facilities that currently process food waste are spread across the State, and that it may be challenging to move some food waste from its source to an existing compost or WRRF facility. Small-scale, on-site food waste management can supplement Iowa's existing food waste processing infrastructure. This has many benefits, including:

- Addressing food waste on-site, reducing disposal and transportation costs.
- Reducing work time dedicated to transporting food waste.
- Reducing hazardous air pollutants associated with transporting food waste.
- Diverting material from the landfill.

On-site food waste management technologies are potentially useful for facilities that handle large quantities of food scraps, including schools and universities, food and beverage manufacturers, nursing homes, assisted living facilities, hospitals, hotels, and grocery stores.

The goals of this task were to:

- Review existing technology options for on-site food waste management for residential, industrial, commercial, and institutional sectors.
- Identify companies that currently offer on-site food waste solutions.
- Identify space, utility, and permitting needs for various technologies.

What is a non-biological system?

Non-biological systems reduce the weight and volume of organic waste via several methods. Pulpers and shredders grind organic waste and reduce water content. Dehydrators use heat and mechanical processes to turn organic waste into a dry biomass product with the consistency of sawdust. These processes typically reduce volume and weight by 80 to 90 percent. Non-biological systems were not considered in this study, as the outputs are still food waste and cannot be beneficially reused without further processing.

KEY FINDINGS

This study included research on vendor websites and information collected from interviews with vendors. Vendors were identified by researching a variety of search terms, including technology types and preferred sizes. There may be vendors that provide similar products or services that are not included on this list. The approach was not exhaustive and did not necessarily include every product on the market at this time and instead includes examples of technology types that were readily available in online research.

Key findings for the technology options reviewed are below. This list is intended to be a review of the technology options that were currently available during the food waste study period, and information listed here is current as of 2024. The Department does not recommend or endorse one specific technology, product, or business.

ICI Options

Photo credit: BioGreen 360.

- **BioGreen 360:** BioGreen 360 manufactures in-vessel dry composters. The company offers use of their machine as a subscription contract: customers pay a monthly fee with a one-time fee for installation and staff training. The subscription cost includes the equipment, tracking and reporting system, equipment maintenance, and pick-up of the end product. The end product is not immediately ready for reuse; instead, BioGreen 360 partners with local composters for further processing. Customers do not keep the food waste output from the dry composters. Subscription costs range from approximately $1,700 per month for less than 100 pounds per day to $3,200 per month for 450 to 600 pounds per day of food waste processing. BioGreen 360's machines are similar in size to a typical dishwasher and do not require water inputs or outputs. BioGreen 360 units are currently in use at Marriott hotel locations; various restaurants; Chateau Elan, a luxury hotel in Georgia; and a golf course.

What is an in-vessel dry composter?

In-vessel dry composters use heat and oxygen to break down organic waste into a nutrient-rich product that can be used as a soil amendment. The end product is finished compost, a nutrient-rich soil amendment that can be used in gardening and landscaping.

- **Chomp:** Chomp manufactures mini anaerobic digesters. They offer various models that can process approximately 25 to 4,500 tons per year (TPY), depending on the model selected. Chomp systems accept a wide range of food waste, yard waste, paper products, and grease/oil. Costs range from $209,000 to $5.3M.

Photo credit: Chomp.

These systems have additional siting requirements and utilities compared to the other systems addressed. For example, a building permit and fire safety inspection is typically required, and the biogas safety flare requires a permit. Other utility agreements and environmental reviews may be necessary. The systems require access to power, water, sewer, and communications. Chomp units are used at the University of California-Davis campus, at Vashon Bioenergy Farm, and Forest Garden Farm in Washington State.

What is anaerobic digestion?

Anaerobic digestion breaks down food in the absence of oxygen in a sealed container and produces gases that are captured and used to generate energy.

- **ORCA:** ORCA manufactures biological liquefication systems that are available in a range of sizes. These systems can process 65 to 1,500 TPY, depending on the model. ORCA models accept food waste but does not accept bones, liquids, paper, or biodegradable plastic items. Models range in cost from approximately $21,000 to $42,000, depending on model size. They require a 2-inch floor sink drain, connection to a grease line, cold water input, power connection, and 24 inches of space on both sides. ORCA's customers include the Edmonton EXPO Centre, Shaw Centre, BLOOM Plant Based Kitchen, and DoubleTree by Hilton.

Photo credit: ORCA.

- **PowerKnot:** PowerKnot manufactures nine models of biodigesters (also referred to as liquefiers). The models range widely in size; the smallest model can process 20 to 165 pounds per day, while the largest can process 1,540 to 13,200 pounds per day. PowerKnot models accept food waste without bones or large amounts of liquid. Models range in cost from $12,000 to $200,000. They require hot and cold water inputs and a drain for output. PowerKnot's customers include Qatar Airways, Montanya Distillers in Colorado, and the University of Nebraska-Lincoln.

Photo credit: PowerKnot.

- **ReCoup Technologies, Inc.:** ReCoup manufactures biological liquefication systems that can process between 500 and 2,400 pounds per day of food waste, depending on the selected model. ReCoup's systems cannot accept large bones, mussel and clam shells, pineapple tops, packaging, general waste, or cutlery. The seven models range in cost between approximately $32,945 and $59,500. They require hot and cold water inputs, power connection, an ethernet port, and cable for data access. ReCoup Technologies' units are in use on Carnival cruise line ships and in food service locations, healthcare facilities, and government offices.

Photo credit: ReCoup Technologies, Inc.

What are biological liquefaction systems?

Biological liquefaction systems use tap water to optimize decomposition of food waste. The output from these systems is an effluent, or liquid waste, which can be discharged through a facility's existing plumbing infrastructure into a municipal sewer system.

- **Rocket Composter:** Rocket Composter manufactures in-vessel dry composters. Models range in size from 80 gallons a week of food scraps to 3.3 tons per day (TPD) of processing capacity. Rocket Composters can accept food waste that is high in moisture content, and wood chips are added as a bulking agent. Rocket Composters do not accept packaging products, bones, milk, yogurt, soups, sauces, or gravy. The models range in cost from approximately $29,800 to $191,200. The equipment requires access to a power source and an additional fan for moisture control. Rocket Composter customers include IKEA, MERCK, the U.S. Army, and Texas A&M University.

Photo credit: Tidy Planet.

- **BIOvator:** Nioex Systems Inc. manufactures BIOvator in-vessel dry composters. Models range in size from 60 to 1,400 pounds of material per day of processing capacity. BIOvator can accept poultry, turkey and hog and organic waste, as well as fish and marine waste. BIOvator models can be purchased from Bierman Equipment, located in Larrabee, Iowa. The in-vessel

dry composters require a power connection. BIOvator customers include Bobcat Farms, T&D Neufeld Farms, The Forks Market, Paustian Enterprises, and Sunnydale Farms.

The models listed above are appropriate for ICI sectors.

Photo credit: Biermann Equipment.

Figure 9: Typical Backyard Composter

Residential Options

Residential backyard composting options were also reviewed. Tumbler-style composters and composter bins are most commonly available. They are typically inexpensive, ranging in cost between approximately $100 and $300. The material types accepted varies, but at least one manufacturer recommended avoiding adding meat or high protein foods, such as dairy, to avoid attracting vermin. These systems do not have permit requirements and require limited maintenance. A typical backyard compost tumbler is shown as **Figure 9**.

Photo credit: FCMP Outdoor.

Considerations: Policy & Data Collection

Policies that govern the donation, processing, and disposal of food waste can promote practices that reduce food waste or inadvertently discourage those practices. Food waste plans and policies implemented in other states can provide insight into potential options for Iowa.

OTHER STATES' FOOD WASTE PLANS AND POLICIES

The Department identified states that have established food waste management plans or regulations to review how these states are setting goals for food waste reduction and management, tracking progress, and evaluating successful actions for food waste reduction.

When possible, states that have similar characteristics to Iowa, such as region, climactic conditions, and population density were selected. The following states with food waste plans were selected and evaluated:

- Massachusetts
- Oregon
- Washington
- Vermont
- Michigan

Major aspects of each plan are outlined in **Table 5** in this section. When these food waste plans were selected, other Midwestern states did not have statewide food waste plans. Several states near Iowa, including Wisconsin and South Dakota, have obtained funding for or initiated preparation of food waste plans. However, results of those planning efforts were not available at the time of this study and are therefore not discussed here.

Massachusetts

Solid waste management policy in Massachusetts is established by the Massachusetts Department of Environmental Protection (MassDEP), and Massachusetts has been working on zero waste efforts since 2010. Their 2010-2020 Solid Waste Master Plan set a goal of reducing the total tons disposed of annually by 30% from 2008 to 2020. This goal was not reached, but MassDEP released its latest Organics Action Plan in November 2023 to address the disposal rate reduction of organic material.

Oregon

The Oregon Department of Environmental Quality (DEQ) focused on waste recovery and disposal in the 1980s and 1990s. Between 2000 and 2008, they provided funding for food waste prevention projects. Pilot projects, research, and legislative advancements provided the foundation for Oregon's development of *Materials Management in Oregon: 2050 Vision and Framework for Action*, which includes their *Strategic Plan for Preventing the Wasting of Food*.

Washington

The Washington Department of Ecology (Ecology) partnered with subject matter expert groups and the public to address critical areas of focus for their Use Food Well Washington Plan, before passing the statewide Food Waste Reduction Act in 2019. Ecology developed the 2015 baseline, developed food waste reduction goals, and tracks progress toward the reduction goals annually.

Vermont

Solid waste management in Vermont is overseen by the State of Vermont's Agency of Natural Resources (ANR) and Solid Waste Management Entities (SWMEs), which include solid waste districts, alliances, and independent towns. The most recent version of their solid waste management plan is the 2019 Vermont Materials Management Plan (MMP): Reducing Solid Waste & Increasing Recycling and Composting.

The Vermont legislature first passed the Universal Recycling Law (Act 148) in 2012 to increase the diversion of the following materials by banning them from disposal:[34]

- "Blue bin" recyclables, such as bottles, cans, jars, paper, boxboard, and cardboard.
- Leaf and yard debris.
- Clean wood.
- Food scraps (including organics and compostable kitchen wastes).

The law included a waste management hierarchy for food scraps and included a phased approach to banning the disposal of all food residuals by 2020.[35]

Michigan

The Michigan Food Waste Reduction Roadmap (Roadmap) provides a plan for Michigan to reduce food loss and waste by 50 percent compared to a 2021 baseline, as defined by the ReFED Insights Engine. Based on statewide studies, food waste is the most prevalent material disposed of in Michigan's landfills and at their waste-to-energy (WTE) facilities.

[34] Vermont Department of Environmental Conservation. 2025. "Vermont's Universal Recycling Law." Accessed April 2025. https://dec.vermont.gov/waste-management/solid/universal-recycling
[35] State Government of Vermont. 2012. "No. 148: An act relating to establishing universal recycling of solid waste." Accessed April 2025. Microsoft Word - GENERAL-#281054-v1-Act_No__148_-_2012_-_H_485_-_establishing_universal_recycling_of_solid_waste.DOC

Table 5: Summary of Targets, Actions, and Data Tracking by State

State	Targets	Actions	Data Tracking and Reporting
Massachusetts	Achieve annual diversion rate of 780,000 tons of organics by 2030.	• Preventing food waste at the source. • Food donation and rescue. • Food diversion from medium generators. • Food diversion from small businesses and residents. • Infrastructure and market development.	Frequency of measurement and updates not listed in plan.
Oregon	• Reduce generation of wasted uneaten food by 15% by 2025. • Reduce generation of wasted uneaten food by 40% by 2050. • Achieve 25% food waste recovery by 2020. • Compare to 2012 baseline data.	• Conduct wasted food measurement study. • Develop effective messaging around food waste prevention. • Reach out to consumers to encourage behavior change. • Teach students about food waste in schools. • Reduce food waste in the commercial sector. • Inform future food rescue efforts. • Consider legislation to improve food labeling. • Develop coalition of interested parties. • Analyze which initiatives have the greatest impact and economic analysis of food waste reduction.	Frequency of measurement and updates not listed in plan. The Wasted Food Measurement Study identified in the plan was published in 2019.[36]
Washington	• Reduce food waste generated by 50% in 2030. • Reduce at least half of edible food waste by 2030. • Compare to 2015 baseline data.	• Federal policy recommendations including national date labeling and improving federal tax incentives. • State policy recommendations including collecting and reporting food waste reduction data to ReFED annually.	Track progress annually.

[36] Oregon Department of Environmental Quality. 2019. "Oregon Wasted Food Study." Accessed April 2025. https://www.oregon.gov/deq/mm/Documents/ORWastedFoodMeasStudySummary.pdf

State	Targets	Actions	Data Tracking and Reporting
		• Dedicate state grant funding for food waste reduction. • Develop and maintain statewide food waste reduction campaigns. • Develop infrastructure to increase food waste data tracking and develop food waste flow maps.	
Vermont	Increase diversion of organic materials.	Ban disposal of food residuals by 2020.	Track progress annually and publish in annual report.
Michigan	• Reduce food loss and waste sent to landfills and WTE facilities by 50% by 2030 • Reduce 25% total wasted food in the food system through prevention and rescue • Achieve 50% total reduction in food loss and waste compared to a 2021 baseline	• Eighteen (18) priority recommendations for grants, technical assistance, and programs; agency leadership and collaboration; and legislation. • Approximately fifty (50) aggregate recommendations for community engagement and collaboration; technology and infrastructure; technical assistance, practice improvements and employee training; date labeling and packaging; promote secondary markets; and increasing donations for food rescue.	Roadmap recommends grant funding to promote data tracking.

OTHER POTENTIAL POLICIES

Several states have implemented food waste bans at landfills to prevent food waste from being disposed and promote food rescue and diversion. However, food waste bans may not be politically, logistically, or financially feasible in all states. The following policies could be used to support food rescue and food waste diversion in the absence of, or in addition to, a ban.[37]

- **Use grants to support food waste diversion.** Such grants could be used to promote education about food waste, reuse or rescue programs, infrastructure development for food waste collection, infrastructure development for food waste processing (e.g., composting, AD), and other projects.

Iowa Department of Natural Resources Grant Programs

The Department has multiple grant programs devoted to promoting diversion, including food waste diversion.

Solid Waste Alternatives Program (SWAP): SWAP provides financial support for developing projects that focus on waste reduction and landfill diversion. SWAP has supported food waste composting pilot programs, educational programs, food waste depackaging, and other projects.

Food Storage Capacity Grant: This grant is offered to non-profit entities such as food banks and food pantries. Grant recipients can buy refrigerators, freezers, or shelving to expand storage for food that is distributed to food insecure Iowans.

- **Develop food donation partnerships.** States can develop guidance for food donation and facilitate partnerships between food generators and rescue organizations.
- Encourage municipalities that provide curbside collection to residents to offer combined food waste and yard waste collection.
  - The City of Iowa City offers subscription curbside collection of commingled food waste and yard waste, which is composted at the Iowa City Landfill's Compost Facility.[38]
  - The City of Dubuque offers weekly curbside collection of yard waste and food scraps seasonally.[39]
- **Promote end markets for organic waste processing byproducts.** States and municipalities could require that compost be used in state-funded landscaping or construction projects.

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[37] Harvard Law School Food Law and Policy Clinic. 2019. "Bans and Beyond: Designing and Implementing Organic Waste Bans and Mandatory Organics Recycling Laws." Accessed April 2025. https://chlpi.org/wp-content/uploads/2013/12/Organic-Waste-Bans_FINAL-compressed.pdf
[38] Iowa City. "Curbside Collection." Accessed April 2025. Curbside Collection | Iowa City, IA
[39] City of Dubuque. "Composting (Food Scraps & Yard Waste)." Accessed April 2025. Composting (Food Scraps & Yard Waste) | Dubuque, IA - Official Website

- **Review siting, zoning, and permitting process for organics facilities and remove barriers.** Streamlining permitting regulations can promote development of new facilities and expansion of capacity.
- **Use tipping fees to provide financial incentives for diversion.** Lower tipping fees at compost and AD facilities compared to landfills can promote diversion.
- **Provide education on food waste diversion for residents and businesses.** Educational campaigns can be used to share strategies for reducing food waste at home, provide how-to information on separating food scraps, promote existing diversion programs, and show how to get started with at-home composting, among other topics. For example, Vermont's DEC provides educational information for a variety of stakeholders on their website.[40]

OPTIONS FOR DATA COLLECTION

One of the challenges facing food waste reduction efforts in Iowa is collecting sound data in a process that is repeatable, easily replicated across jurisdictions and organization types, and does not result in undue burden on solid waste facilities or organizations. A high-level review of data collection strategies identifies approaches that vary depending on goals and the regulatory framework for data collection.

Iowa's Current State

As of February 2025, the Department requires registered and permitted composting facilities to file an Annual Composting Facility Report,[41] which collects a variety of data, including:

- **Quantities of materials** accepted on site by type (permitted facilities only).
- **Total tonnage** of material composted.
- **Total capacity** of facility.
- **Amount of compost products** sold, used, or given away.

Stakeholder recommendations for revisions to the current composting administrative rules include requiring certain tiers of composting facilities and to submit an annual report using a form prescribed by the Department.

KEY FINDINGS

Key findings of the data collection frameworks used by other states are presented below. Incorporating reporting requirements into annual permitting is an effective way to receive reliable and consistent data. Voluntary reporting can provide useful data collection, particularly from non-regulated entities like food rescue organizations. Waste characterization studies provide data

[40] Agency of Natural Resources Department of Environmental Conservation. 2025. "Vermont's Universal Recycling Law." Accessed April 2025. https://dec.vermont.gov/waste-management/solid/universal-recycling
[41] Iowa Department of Natural Resources. 2024. "Solid Waste Programs." Accessed April 2025. https://www.iowadnr.gov/environmental-protection/land-quality/waste-planning-programs/solid-waste/programs

broadly and can help supplement other sources and track progress over time. All approaches have drawbacks and opportunities.

This list is intended to highlight the range of requirements found across states and is not meant to be a comprehensive list, nor an evaluation or recommendation of any specific reporting requirements.

Mandatory Reporting

The most common data collection method for food waste on the state level is through required reporting from solid waste processing facilities, usually composting facilities.

Reporting requirements can be tied to issuing and renewing permits for facilities, ensuring a greater level of compliance of data tracking and submittal, as has been the practice in Iowa. Other states have mandatory reporting requirements for composting facilities as well.

- **California:** California's Department of Resources Recycling and Recovery (CalRecycle) collects data on food waste rescue, recycling, and disposal through reporting requirements included in various regulations established through state legislation. Senate Bill 1383 established statewide goals for reducing the disposal of organic waste by 75% by 2025 and includes reporting requirements for transfer and processing facilities, jurisdictions, self-haulers, and food recovery organizations and donors. Annual reports from jurisdictions include organic waste collection, contamination monitoring, education and outreach, edible food recovery, capacity planning, and more. SB 1383 also includes mandatory reporting through the Recycling and Disposal Reporting System (RDRS) to track material quantities accepted and recycled, as well as organics disposed of in the waste stream. Commercial edible food generators are required to establish contracts with food recovery organizations and services, and track types of food collected, schedules, and related logistics for food recovery. Food recovery organizations are required to maintain records of food received.[42]
- **Massachusetts:** MassDEP utilizes a variety of data sources to track disposal and diversion of organic waste, including annual reports from composting facilities accepting food waste and hauler data for customers receiving food waste collection. Annual report requirements vary by permit type and include amounts and types of organic materials received and composted, amount of residual managed, and sources and amount of material received from out of state.[43]
- **Michigan:** The Department of Environment, Great Lakes, and Energy (EGLE) requires registered composting facilities to submit annual reports to the Materials Management Division (MMD). The owner and operator of a composting facility must report the amount of

[42] CalRecycle. 2025. "SB1383 Recordkeeping Requirements." Accessed April 2025. https://calrecycle.ca.gov/organics/slcp/recordkeeping/
[43] Commonwealth of Massachusetts. 2025. "Annual Report & Certification: Permitted Recycling, Composting or Conversion." Accessed April 2025. https://www.mass.gov/how-to/annual-report-certification-permitted-recycling-composting-or-conversion

compostable materials brought to site by county of origin, quantity of finished compost removed from the site, amount of unfinished compost removed from the site, volume of residuals removed, and total quantity of compostable material, compost and residuals on site at the end of the fiscal year.[44]

Voluntary Reporting

Some states collect data provided voluntarily from various entities, at times relying on efforts from nonprofits or other groups advocating for food waste recovery.

- **Vermont:** Vermont ANR Waste Management and Prevention Division's Solid Waste Management Program publishes an annual report, which includes data provided voluntarily from the Vermont Foodbank, and includes annual required reports from facilities.[45]
- **Food rescue groups:** Entities such as the Food Bank of Iowa share annual reports with the amount of food distributed by year.

Waste Characterization and Case Studies

Waste characterization studies provide direct measurement of landfilled food waste from both residential and commercial sectors and can provide details about recoverable food, sources, quantities, and quality of food waste streams. Such studies, including case studies, may be performed at the state level or by individual jurisdictions or facilities. Data gathered can help estimate food waste generation and track progress towards waste diversion goals over time. State-wide waste characterization studies have been utilized by Washington and California to specifically track food waste.

[44] Department of Environment, Great Lakes, and Energy. 2025. "Commercial Composting." Accessed April 2025. https://www.michigan.gov/egle/about/organization/materials-management/composting/commercial
[45] Agency of Natural Resources: Department of Environmental Conservation. 2025. "Publications and Reports." Accessed April 2025. https://dec.vermont.gov/waste-management/solid/publications-and-reports

Path Forward: Targets and Considerations

Setting achievable goals and measuring progress toward those goals are important components to reducing food waste in the State of Iowa. Food is wasted in a variety of sectors throughout the state, including homes, workplaces, manufacturing facilities, retail businesses, restaurants, health care, hospitality, and other sectors. Therefore, all sectors can be part of the solution to reduce food waste, redirect edible food to Iowans in need, and redirect food waste from the landfill to composting and/or AD facilities.

The following options include potential considerations for various sectors and time frames for how long it may take to implement the actions. Actions were categorized based on the EPA Wasted Food Scale, and were designated as short term (0-3 years), medium term actions (4-10 years), and long term actions (10+ years). These timeframes are estimates, but actions may take more or less time to implement depending on available resources, time needed for relationship-building and strategic planning, political interest, and other factors. Potential considerations that are outside the control of the Department were not assigned time frames, as many factors may influence the timeline.

Measuring progress is an important component of food waste reduction. The Department has historically measured food waste during Material Characterization Studies and may elect to continue those efforts on a regular basis to assess effectiveness of the State's efforts to reduce food waste.

Table 6: Summary of Selected Targets and Considerations

Potential Consideration	Time Frame*
Prevent Wasted Food	
Reduce state business licensing fees for businesses that have food waste reduction plans.	-
Offer financial assistance to businesses for food reduction efforts.	Short term
Offer technical assistance to businesses for food reduction efforts.	Medium term
Develop and share educational materials related to the EPA Wasted Food Scale, food labeling (including "use by", "sell by", and "best by" dates), and strategies for reducing food waste for homes and businesses.	Short term
Focus reduction efforts on items that food banks and pantries do not want or that have limited nutritional value, such as bakery items and candy. Encourage grocery and retail stores to reduce cost of day-old bakery items rather than donating to food banks or food pantries (based on coordination and agreement with local food rescue organizations).	Short term
Coordinate with grocery stores on food waste reduction efforts and messaging, especially around use of "imperfect produce" or close-dated items.	Short term
Promote school conversations focused on food waste.	Short term

Potential Consideration	Time Frame*
Encourage the Iowa Department of Education to consider sharing table programs in schools to allow students to share uneaten packaged food.[46]	-
Donate or Upcycle	
Develop and share educational strategies related to food donation, including Good Samaritan laws, USDA's Food Keeper Guide, and ideas for residents who want to reduce food waste at home.	Medium term
Reinvigorate the Department's business and school engagement post-pandemic focused on options for reducing, donating, and upcycling food.	Short term
Partner with wholesalers and retailers to train staff on food rescue processes.	Short term
Continue the Department's Food Storage Capacity grants to support food rescue efforts.	Short term
Create a scholarship program for businesses or students to attend seminars, conferences, or webinars to learn about food waste reduction strategies that they can implement in their organization.	Short term
Establish requirements for businesses to donate food, based on their size.	-
Add food waste to the Special Waste Authorization process where other upcycling outlets for the material must be exhausted before requesting disposal if food waste quantity is above a certain threshold.	Long term
Increase the tax credit available for taxpayers that donate food to emergency feeding organizations and food banks (compared to the current tax credit valued at 15% of fair market value or up to $5,000 annually).[47]	-
Feed Animals or Leave Unharvested	
Evaluate animal feed policies currently in place in other Midwestern states to consider whether there may be best practices that Iowa could consider implementing.	Long term
Strengthen partnerships with Iowa State University Extension, USDA, and food gleaning networks to promote food recovery and distribution.	Short term
Compost or Anaerobic Digestion with Beneficial Use of Digestate/Biosolids	
Consider a legislative requirement that food waste generators submit information on food waste generation and reuse or disposal quantities.	-

[46] https://dpi.wi.gov/sites/default/files/imce/school-nutrition/sharing-no-thank-you-toolkit.docx

[47] https://www.legis.iowa.gov/law/iowaCode/sections?codeChapter=190B&year=2021;%20https://www.legis.iowa.gov/docs/code/2021/422.33.pdf

Potential Consideration	Time Frame*
Facilitate public-private partnerships to purchase or rent composting equipment.	Short term
Encourage municipalities to accept food waste in organics management programs.	Short term
Encourage participants in the DNR Solid Waste EMS program to select food waste projects to fulfill the Organics Management requirement.	Short term
Provide grants or incentives to facilities that accept and process food waste to offset equipment and operational costs.	Short term
Consider a legislative requirement for businesses to compost food waste if the entity is within a certain distance of a local food waste processing facility.	-
Encourage on-site food waste management by providing information about best practices for at-home composting and onsite food waste management tools.	Medium term
Incentivize public-private partnerships.	-
Consider incentives or funding to pre-process food waste (i.e., depackaged, ground, and flowable) and therefore suitable for WRRF and AD processing.	Short term
Consider a statewide hub and spoke system, where food waste from the eastern, central, and western portions of the state would be directed to a few dedicated facilities, including centralized pre-processing facilities.	Long term
Add food waste processing equipment to the recycling property tax exemption, with finished compost and beneficially-reused digestate as recycled finished products.	-
Send Down the Drain, Landfill, or Incinerate	
Consider preventing landfilling certain food wastes (for example, compostable items like fruits or vegetables) in Iowa landfills.	-
Continue to conduct Statewide Materials Characterization Studies to track progress toward food waste reduction goals.	Short term
Continue to monitor other states' efforts to divert food waste from the landfill for future implementation in Iowa (i.e., restrictions, incentives).	Medium term
Investigate state policies that subsidize tip fees for food waste processing at compost or WRRFs.	Short term
Adjust landfill disposal fees or a DNR surcharge on tip fees to incentivize diversion efforts and reduce environmental impacts.	Long term

* Potential considerations that are outside the control of the Department were not assigned time frames, as many factors may influence the timeline.

Definitions and Abbreviations

AD	Anaerobic Digestion
Anaerobic Digestion	A process that breaks down food in the absence of oxygen in a sealed container and produces gases that are captured and used to generate energy.
ANR	Vermont Agency of Natural Resources
ASP	Aerated Static Pile
Biological Liquefaction Systems	Type of food waste processor that uses tap water to optimize decomposition of food waste. The output from these systems is an effluent, or liquid waste.
CalRecycle	California's Department of Resources Recycling and Recovery
CETC	Clean Electricity Production Tax Credit
CISWMA	Central Iowa Solid Waste Management Association
Composting	The process that breaks down organic material (such as food waste and yard waste) in the presence of oxygen
CSA	Community-Supported Agriculture
Depackaging Equipment	Equipment that removes food from the package, usually by mechanical force such as shredders, screening grates, etc.
Department	Iowa Department of Natural Resources
Digestate	A nutrient-rich residual of the anaerobic digestion process which is composed of liquid and solid portions.
Ecology	Washington Department of Ecology
EGLE	The Department of Environment, Great Lakes, and Energy
EMS Program	Environmental Management System Program
End Market	The point where a product or service is sold to the end user or customer.
EPA	U.S. Environmental Protection Agency
ERS	U.S. Department of Agriculture Economic Research Service
Finished Compost	A soil amendment, or additive, that is manufactured through the controlled aerobic, biological decomposition of biodegradable materials.
FMI	FMI, The Food Industry Association
FOG	Fats, Oils, and Greases

Food Insecurity	The limited or uncertain availability or nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways.
Food Waste	Food that was not used or consumed. Examples include unsold food from retail stores; plate waste, uneaten prepared food, or kitchen trimmings from restaurants, cafeterias, and households; or by-products from food and beverage processing facilities.
FY	Fiscal Year
Gleaning	Harvesting remaining food items after commercial harvests are complete to recovery any remaining edible food.
IACC	Iowa Composting Council
ICI	Institutional, Commercial, or Industrial
IDALS	Iowa Department of Agriculture and Land Stewardship
In-Vessel Dry Composter	Type of food waste processor that uses heat and oxygen to break down organic waste into a nutrient-rich product that can be used as a soil amendment.
ITC	Investment Tax Credit
IWE	Iowa Waste Exchange
lb.	Pound
MassDEP	Massachusetts Department of Environmental Protection
MMBTU	Million British Thermal Unit
MMD	Materials Management Division
MMP	Materials Management Plan
MSW	Municipal Solid Waste
Non-Biological System	Type of food waste processor that reduces the weight and volume of organic waste.
NAICS	North American Industry Classification System
O&M	Operations and Maintenance
Oregon DEQ	Oregon Department of Environmental Quality
Organic Material	Carbon-based material that is sometimes called organics or organic waste. This includes yard waste, materials from plants and animals, food scraps, biosolids, and manure.
PAYT	Pay as You Throw
PFAS	Per- and Polyfluoroalkyl Substances

Post-Consumer Food Waste	Food that gets thrown out after it reaches guests. It may include non-edible components such as bones and fruit or vegetable rinds, or uneaten edible prepared food.
Pre-Consumer Food Waste	Food wasted in a restaurant before it reaches guests. This includes food scraps such as fruit and vegetable trimmings, bones, and food that spoils before it can be served to customers.
PTC	Production Tax Credit
RDRS	Recycling and Disposal Reporting System
REC	Renewable Energy Certificates
Recovered Digester Gas	Gas that is generated during anaerobic digestion, commonly referred to as "biogas".
ReFED	A U.S.-based non-profit focused on providing data on and promoting solutions to food waste.
RNG	Renewable Natural Gas
Roadmap	Michigan Food Waste Reduction Roadmap
SCILA	South Central Iowa Landfill Agency
Study	Statewide Material Characterization Study
SWAP	Solid Waste Alternatives Program
SWIFR	Solid Waste Infrastructure for Recycling
SWME	Solid Waste Management Entities
TPD	Tons per Day
TPY	Tons per Year
Upcycle	Finding new, higher-value uses for food waste that would otherwise go to downstream disposal.
USCC	U.S. Composting Council
USDA	U.S. Department of Agriculture
WRA	Wastewater Reclamation Authority
WRRFs	Water Resource Recovery Facilities
WRRFs	Facilities that treat wastewater from homes, commercial buildings, and industrial facilities.
WTE	Waste-to-Energy