Organics Management Plan

SMM Vision for Iowa

Iowa Department of Natural Resources
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SCS ENGINEERS

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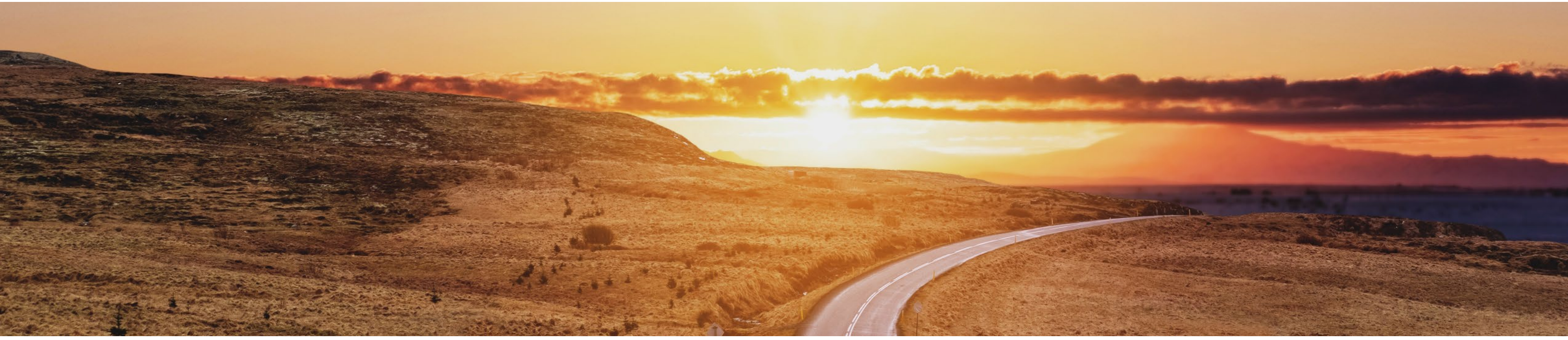


1.0 EXECUTIVE SUMMARY

This Organics Management Plan (Plan) was developed to build upon the previous research and planning efforts led by the Iowa Department of Natural Resources (DNR). Previous research and planning include statewide waste characterization efforts and sector-specific studies such as Iowa's recent Food Waste Prevention and Management Study, and stakeholder driven strategic planning efforts.

The purpose of this Plan is to evaluate current conditions and to develop practical strategies to improve the management of organic materials across the state. This Plan includes the following targeted organic materials:

- **Wasted Food**
  Food that is not used for its intended purpose, including edible and inedible materials generated across the food supply chain.

- **Yard Waste**
  Vegetative materials generated from landscape management activities, including grass clippings, leaves, garden waste, brush, and trees.

- **Wood Waste**
  Clean, untreated wood such as dimensional lumber, pallets, and land clearing debris, as well as treated or engineered wood products that may contain coatings, adhesives, or preservatives.

- **Biosolids**
  Stabilized organic solids produced during the treatment of wastewater at municipal and industrial water resource recovery facilities (WRRFs).

- **Agricultural Waste**
  Manure and ancillary wastes such as bedding, spoiled feed, and animal mortalities.

1.1 SUMMARY OF PLAN RECOMMENDATIONS

This Plan outlines recommendations for the strategies prioritized through stakeholder engagement events and informed by prior statewide planning efforts. Table 1 (next page) summarizes the strategies discussed in this Plan, including partnerships and general potential implementation timeframes. It is intended to provide a high-level overview of roles and sequencing across all strategy areas. Further details on the recommended strategies can be found in Section 4 of this report.

ICON LEGEND

Icons were utilized throughout this report to indicate the topic of discussion in each section. The following corresponds each icon to a type of organics management strategy.

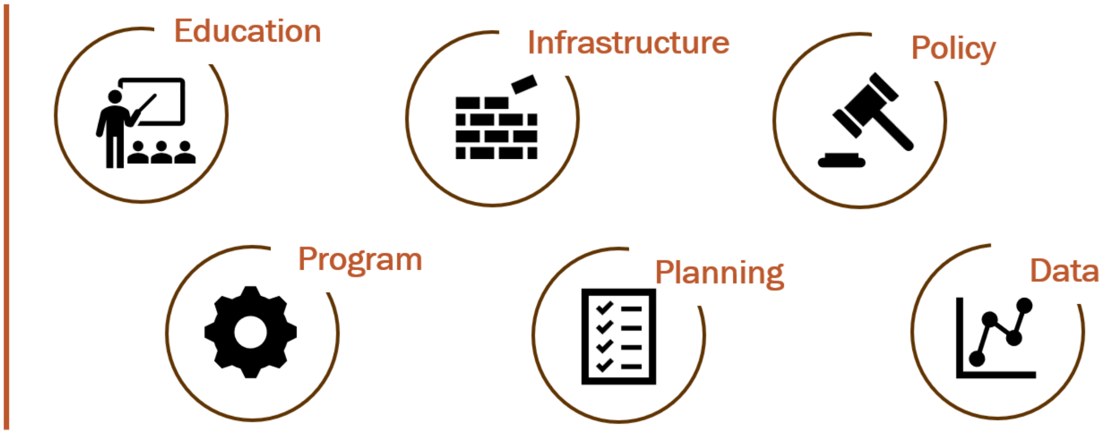


Table 1. Summary of Organics Management Strategies and Implementation Roles

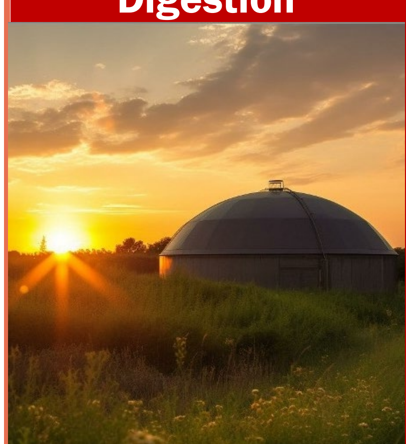
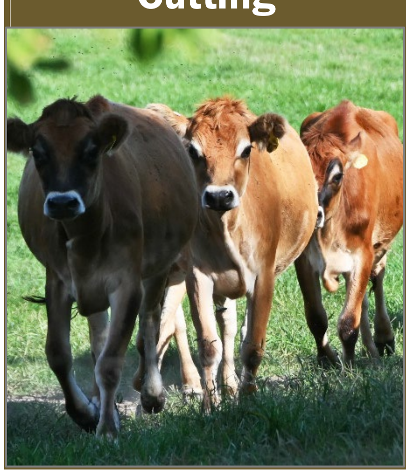
Group	Strategy	Type	Key Partners	Timeline	Impact
Prevention and Rescue	Food waste education campaign		Iowa DNR, ISU Extension, schools	Short–Medium	▲▲▲
	Expand donation storage capacity		Iowa DNR, food banks, nonprofits	Short–Medium	▲▲▲
	Food labeling & waste education		Iowa DNR, USDA, ISU Extension	Short–Medium	▲▲▲
	Special waste authorization (food waste)		Iowa DNR, industry, landfills	Medium–Long	▲▲△
	Grocery coordination		Iowa DNR, retailers, nonprofits, IRA	Short–Medium	▲▲△
Composting	Compost infrastructure incentives		Iowa DNR, private sector, IACC, local gov	Medium–Long	▲▲▲
	Compost/AD education		Iowa DNR, ISU Extension, IACC, local gov	Short–Medium	▲▲△
	Municipal organics programs		local gov, Iowa DNR, IACC, haulers	Medium–Long	▲▲▲
	On-site composting		Iowa DNR, ISU Extension, IACC, ISOSWO	Short–Medium	▲▲△
	Compost standards & definitions		Iowa DNR, IACC, industry, regulators	Medium–Long	▲▲△
Anaerobic Digestion	AD education		Iowa DNR, utilities, industry	Short–Medium	▲▲△
	Cost modeling for diversion		Iowa DNR, consultants	Short–Medium	▲▲▲
	Preprocessing & AD incentives		Iowa DNR, private sector, WWTPs	Medium–Long	▲▲▲
	Procurement & tipping policies		Iowa DNR, policy partners, ISOSWO	Medium–Long	▲▲△
	Public-private partnerships		Iowa DNR, private sector, local gov	Medium–Long	▲▲▲
Ag & Cross-Cutting	Strengthen recovery partnerships		Iowa DNR, ISU Extension, USDA, ISOSWO, IRA	Short–Medium	▲▲△
	Evaluate existing programs		Iowa DNR, agencies, partners	Short–Medium	▲▲△
	Municipal programs (cross-cutting)		local gov, Iowa DNR	Medium–Long	▲▲▲
	Monitor other states		Iowa DNR, national orgs	Ongoing	▲△△
	Waste characterization studies		Iowa DNR, consultants	Ongoing	▲▲▲
	Waste sheds (regional systems)		Iowa DNR, local/regional partners, ISOSWO	Medium–Long	▲▲▲

Table Notes:

- *Organizations identified in this table are potential implementation partners. Lead responsibility may vary by action and will be determined during implementation.*
- *Implementation types are categorized as Education, Program, Infrastructure, Policy, or Planning/Data; some strategies span multiple categories where appropriate.*

2.0 INTRODUCTION

Organic materials, including food waste, yard and agricultural residues, biosolids, and other compostable materials, represent a significant portion of Iowa's waste stream and a substantial opportunity for improved resource management. These materials are generated across all sectors of the economy, from households and restaurants to farms, food processors, and wastewater treatment systems. How they are managed has direct implications for landfill capacity, environmental quality, economic development, and community well-being.

This Organics Management Plan (Plan) was developed to support the Iowa Department of Natural Resources (DNR) in evaluating current conditions and identifying practical, implementable strategies to improve the management of organic materials across the state. This Plan builds on prior research and data, including statewide waste characterization efforts and sector-specific studies such as Iowa's recent Food Waste Prevention and Management Study, while incorporating targeted stakeholder input to ground recommendations in real-world conditions.

The final strategies presented in this Plan are intended to be actionable and grounded in Iowa's regulatory, economic, and geographic context. Rather than presenting broad concepts, the Plan emphasizes specific next steps that can be advanced by the DNR and its partners, including opportunities for policy refinement, targeted investments, pilot programs, education, and expanded coordination.

2.1 WHY ORGANICS MANAGEMENT MATTERS

The case for improving organics management in Iowa is multifaceted and grounded in environmental, economic, and social considerations:

Resource Conservation and Highest-Value Use:
Organic materials contain valuable nutrients, energy, and carbon. When diverted from disposal and managed appropriately, these materials can be converted into compost, soil amendments, animal feed, renewable energy, and other beneficial products—keeping resources in productive use.

Environmental Benefits:
Improved management of organic materials can conserve landfill capacity, return nutrients and organic matter to soils, and help reduce runoff impacts to waterways, an important consideration given Iowa's agricultural landscape.

Economic Opportunities:
Expanding organics management systems can support new and existing businesses, including composting operations, anaerobic digestion facilities, hauling services, and end-product markets. It can also provide cost-effective alternatives for farmers and municipalities, extend landfill lifespan, and help manage long-term system costs.

Social and Public Health Considerations:

Food waste reduction and edible food recovery efforts can improve food access and reduce food insecurity. In addition, improved management of organic materials can reduce odors, air pollutants (e.g., particulates and volatile organic compounds), and localized nuisance conditions.

Alignment with State Goals and Priorities:

Iowa has established waste diversion and materials management goals that emphasize reducing reliance on landfilling and increasing recycling and recovery. Organics represent one of the largest remaining opportunities to make meaningful progress toward these goals.

2.2 STATEWIDE ORGANIC WASTE BASELINE

A central objective of this Plan is to move from understanding current conditions for each of the identified organic materials above to identifying actionable next steps. The approach is structured around three core questions:

Generation

- What exists?
- How much organic material is generated, where, and from which sectors?

Management

- How is it currently handled?
- What collection systems, infrastructure, and end uses are in place today?

Opportunities

- What could change?
- Where are the gaps, inefficiencies, or unrealized opportunities in the current system?

These questions form the backbone of the material assessments presented in this Plan and directly inform the development of recommendations.

This Plan establishes a statewide baseline of organic material generation and management in Iowa. It describes the types and quantities of organic materials generated, where they originate, and current known management practices. This baseline provides the foundation for identifying practical opportunities to improve organics management across the state.

This Plan includes the following organic materials:

- **Wasted Food**
  Food that is not used for its intended purpose and is instead managed through donation, recycling, or disposal pathways.

- **Yard Waste**
  Vegetative materials generated from landscape management activities, including grass clippings, leaves, garden waste, brush, and trees.

▶ Wood Waste

Clean, untreated wood such as dimensional lumber, pallets, and land clearing debris, as well as treated or engineered wood products that may contain coatings, adhesives, or preservatives.

▶ Biosolids

Stabilized organic solids produced during the treatment of wastewater at municipal and industrial water resource recovery facilities (WRRFs).

▶ Agricultural Waste

Manure and ancillary wastes such as bedding, spoiled feed, and animal mortalities.

2.3 MANAGEMENT ALTERNATIVES

Management pathways for individual organic material streams are presented in Appendix A through Appendix E of this report. This section synthesizes those pathways into a common, cross-cutting framework to support statewide planning. Rather than repeating material-specific details, it highlights how different management approaches compare across materials, where they are currently utilized in Iowa, and where opportunities exist to expand or better integrate existing systems.

Across all material types, organic materials in Iowa are managed through a consistent set of pathways that can be broadly categorized as source reduction, reuse or redistribution (where applicable), collection and transfer, processing, energy recovery, and disposal. Processing pathways include composting, anaerobic digestion, land application, and rendering, depending on the material type. While not all pathways apply to every material, this standardized framework allows for comparison across sectors and helps identify system-wide strengths and gaps.

Three key patterns emerge when evaluating these management alternatives across materials.

1. **Infrastructure limitations** tend to be regional rather than material-specific. Rural areas of the state often face limited access to processing facilities, affecting the management of food waste, yard waste, and other organics in similar ways.

2. **Preprocessing capacity**, particularly for materials such as food waste that may contain packaging or contamination, represents a consistent bottleneck that can limit the viability of downstream processing options.

3. **Existing systems**, including wastewater resource recovery facilities, composting operations, and land application networks may offer additional capacity or opportunities for expanded use, particularly where co-management of materials can improve efficiency.

Below provides a **cross-material comparison of organics management pathways in Iowa**, highlighting current use, infrastructure availability, and key constraints to help identify where targeted investments and strategies may support expanded diversion and resource recovery.

Source Reduction/Prevention

Applicable Materials:
- Food waste (all sectors)

Current Use in Iowa:
- Limited, but growing in focus

System Maturity & Infrastructure:
- Emerging; programmatic rather than infrastructure-based

Key Constraints:
- Behavioral change
- Limited coordination
- Lack of measurement

Expansion Potential:
- High – cost effective with immediate impact

Reuse/Redistribution

Applicable Materials:
- Edible food

Current Use in Iowa:
- Established but uneven regionally

System Maturity & Infrastructure:
- Developing; relies on food banks and logistics networks

Key Constraints:
- Cold chain capacity
- Participation
- Liability concerns

Expansion Potential:
- High – scalable with coordination

Collection & Transfer Systems

Applicable Materials:
- All materials (varies)

Current Use in Iowa:
- Strong for yard waste
- Limited for food waste

System Maturity & Infrastructure:
- Developing; uneven in rural areas

Key Constraints:
- Distance
- Cost
- Contamination
- Participation

Expansion Potential:
- Moderate to High – regional optimization

Composting

Applicable Materials:
- Yard
- Food
- Some ag
- Biosolids (limited)

Key Constraints:
- Contamination
- Siting
- Permitting
- Seasonality

Current Use in Iowa:
- Established for yard waste
- Limited for food waste

Expansion Potential:
- High – especially co-composting for food waste

System Maturity & Infrastructure:
- Mature for yard waste
- Developing for food waste
- Uneven distribution

Anaerobic Digestion

Applicable Materials:
- Food
- Biosolids
- FOG
- Some Ag

Key Constraints:
- Processing
- Capital cost
- Feedstock consistency

Current Use in Iowa:
- Limited, but present

Expansion Potential:
- High – co-digestion opportunities

System Maturity & Infrastructure:
- Emerging; available at select WWTPs and private sites

Land Application

Applicable Materials:
- Biosolids
- Agricultural materials

Key Constraints:
- Regulations
- Seasonal limits
- Perception

Current Use in Iowa:
- Widely practiced

Expansion Potential:
- Moderate – optimization opportunities

System Maturity & Infrastructure:
- Mature; supported by agricultural networks

Rendering

Applicable Materials:
- Animal byproducts
- FOG

Current Use in Iowa:
- Established in specific sectors

System Maturity & Infrastructure:
- Mature, but regionally concentrated

Key Constraints:
- Transport distance
- Acceptance criteria

Expansion Potential:
- Low to Moderate – market dependent

Energy Recovery

Applicable Materials:
- Limited organics

Current Use in Iowa:
- Minimal use

System Maturity & Infrastructure:
- Emerging; limited infrastructure

Key Constraints:
- Economics
- Technology fit

Expansion Potential:
- Low to Moderate – niche

Disposal (Landfilling)

Applicable Materials:
- All materials

Current Use in Iowa:
- Dominant for many streams

System Maturity & Infrastructure:
- Mature; statewide access

Key Constraints:
- Loss of resources
- Emissions
- Cost

Expansion Potential:
- Decreasing – diversion opportunities

2.4 BUILDING ON PREVIOUS WORK

The analysis and strategies presented in this Plan are informed by, and build upon, prior statewide planning efforts. In particular, this work draws from Iowa's Sustainable Materials Management Plan ("A Vision for Iowa"), statewide material characterization studies, stakeholder led strategic planning sessions, and the state's recent food waste prevention planning initiatives. These efforts establish a strong programmatic foundation for advancing organics management in the state.

Across these efforts, several consistent themes emerge that are directly relevant to organic materials management:

- **Waste Reduction and Material Recovery:** Emphasis on reducing disposal and increasing recovery of valuable materials, including expanding diversion opportunities and prioritizing higher-value uses of materials.
- **Food Waste Prevention and Recovery:** Focus on reducing wasted food at the source, expanding edible food recovery systems, and supporting partnerships that improve food access while reducing disposal.
- **Infrastructure Development and Access:** Recognition of the need to expand and better distribute infrastructure for composting, anaerobic digestion, and related processing systems, particularly to improve access in underserved or rural areas.
- **Market Development and End Uses:** Support for strengthening markets for compost, soil amendments, renewable energy, and other end products to create stable, long-term demand for recovered organic materials.
- **Education, Outreach, and Technical Assistance:** Continued need for education and engagement across generators, haulers, processors, and end users to improve participation, reduce contamination, and support adoption of best management practices.
- **Data, Measurement, and Program Evaluation:** Identification of ongoing challenges related to data availability and consistency, and the importance of improving measurement systems to better track progress and inform decision-making.

This Plan incorporates and expands upon these themes by applying them across a broader set of organic material types and by linking them more directly to implementation considerations. The intent is to maintain alignment with established state priorities while identifying practical, near-term opportunities to advance organics management systems in Iowa.

3.0 PREVIOUS AND ONGOING EFFORTS

While Section 2 establishes the overall planning context, this section summarizes the specific state-led efforts, stakeholder engagement activities, and ongoing initiatives that directly informed the recommendations presented later in this Plan.

3.1 STATE-LED PLANNING AND POLICY FOUNDATIONS

Iowa has established a strong foundation for advancing sustainable materials management (SMM) through a series of state-led planning efforts and supporting analyses. The DNR has conducted statewide waste characterization studies since 1998, providing a consistent baseline for understanding material generation and disposal trends.

Building on this foundation, the DNR initiated the SMM Vision for Iowa project, beginning with Phase I in 2018. This phase introduced the transition from a traditional waste management framework toward a broader SMM approach and incorporated early stakeholder input to assess system conditions and opportunities.

Phase II, launched in 2020 and completed in 2022, expanded this work through a series of stakeholder meetings and subcommittee efforts, resulting in the identification of priority material categories, including organics, and a set of recommended strategies across short, medium, and long-term timeframes with a focus on the following materials:

In parallel, targeted analyses such as the Iowa Food Waste Prevention Management Study have provided additional detail on specific material streams, particularly wasted food, including generation characteristics, management pathways, and opportunities for diversion.

Together, these efforts established a policy and planning framework for organics management in Iowa, including defined priorities, initial strategies, and a foundation for continued stakeholder engagement. These efforts established the planning and policy context for the recommendations that follow.

3.2 STAKEHOLDER LANDSCAPE AND EXISTING CAPACITY

Organics management in Iowa is supported by a diverse network of stakeholders involved in policy development, program implementation, research, and outreach. These stakeholders include state and local agencies, regional planning organizations, private-sector service providers, nonprofit organizations, and academic institutions.

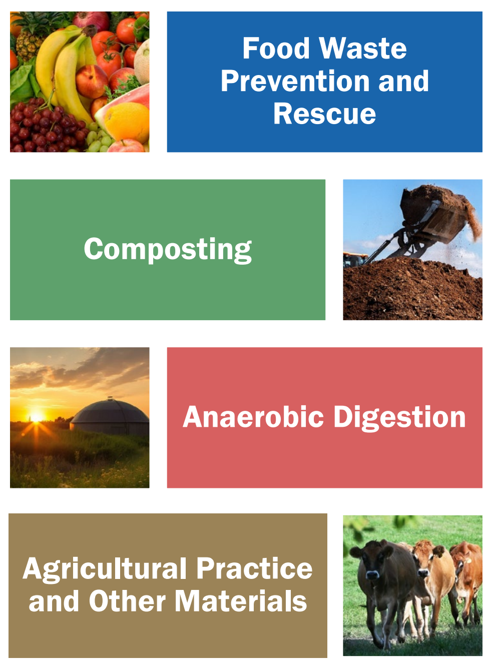
Key contributors include organizations such as the Iowa Composting Council, which supports composting infrastructure and policy development, and Iowa State University Extension and Outreach, which provides research, technical assistance, and education related to agricultural and organic material management. Additional stakeholders include food rescue organizations, compost facility operators, the retail and hospitality industries, Iowa Grocery Industry Association, food warehouse and transportation entities, Iowa's State Veterinarian Department, wastewater treatment utilities, and local governments implementing collection and diversion programs.

This existing network reflects a baseline level of capacity and engagement across the state. While the level of activity and infrastructure varies by region and material type, these stakeholders provide a strong platform for advancing the strategies identified in this Plan.

3.3 STAKEHOLDER ENGAGEMENT FOR THIS PLAN

Stakeholder engagement conducted as part of this Plan was designed to build on prior efforts and validate existing recommendations. A virtual stakeholder event was held with participation from a range of sectors, including **food systems**, **composting**, **anaerobic digestion**, **agriculture,** and **local government.**

Participants were organized into breakout groups aligned with key organics management pathways:

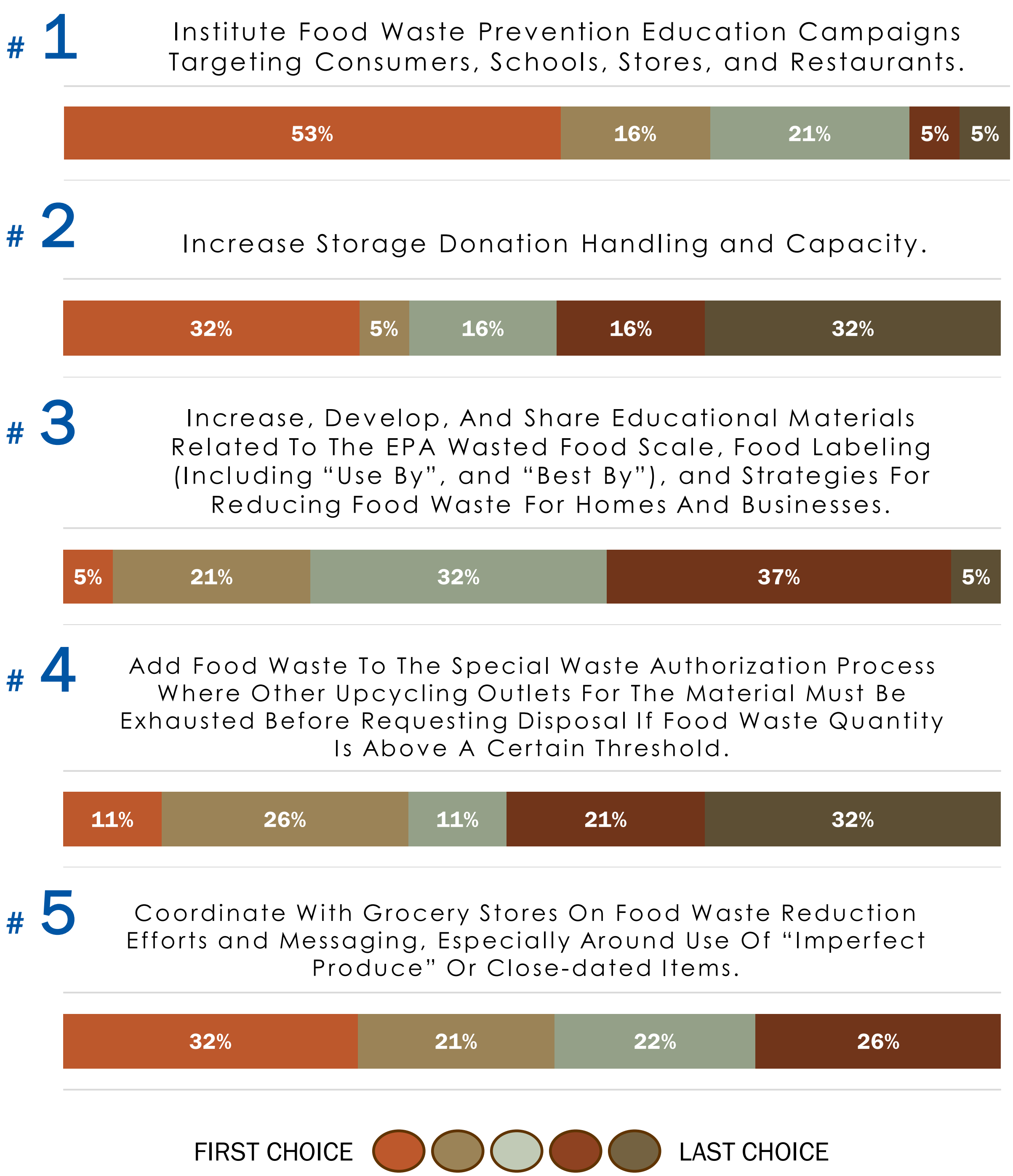


Within each breakout session, participants reviewed and discussed strategies identified in previous planning efforts, including the Phase II SMM Vision and the Iowa Food Waste Prevention and Management Study. Participants then identified and ranked priority strategies based on **feasibility, impact,** and **relevance** to Iowa's current system.

Figure 1 through Figure 4 on the next pages show the results for the top five identified priorities as ranked by each breakout room.

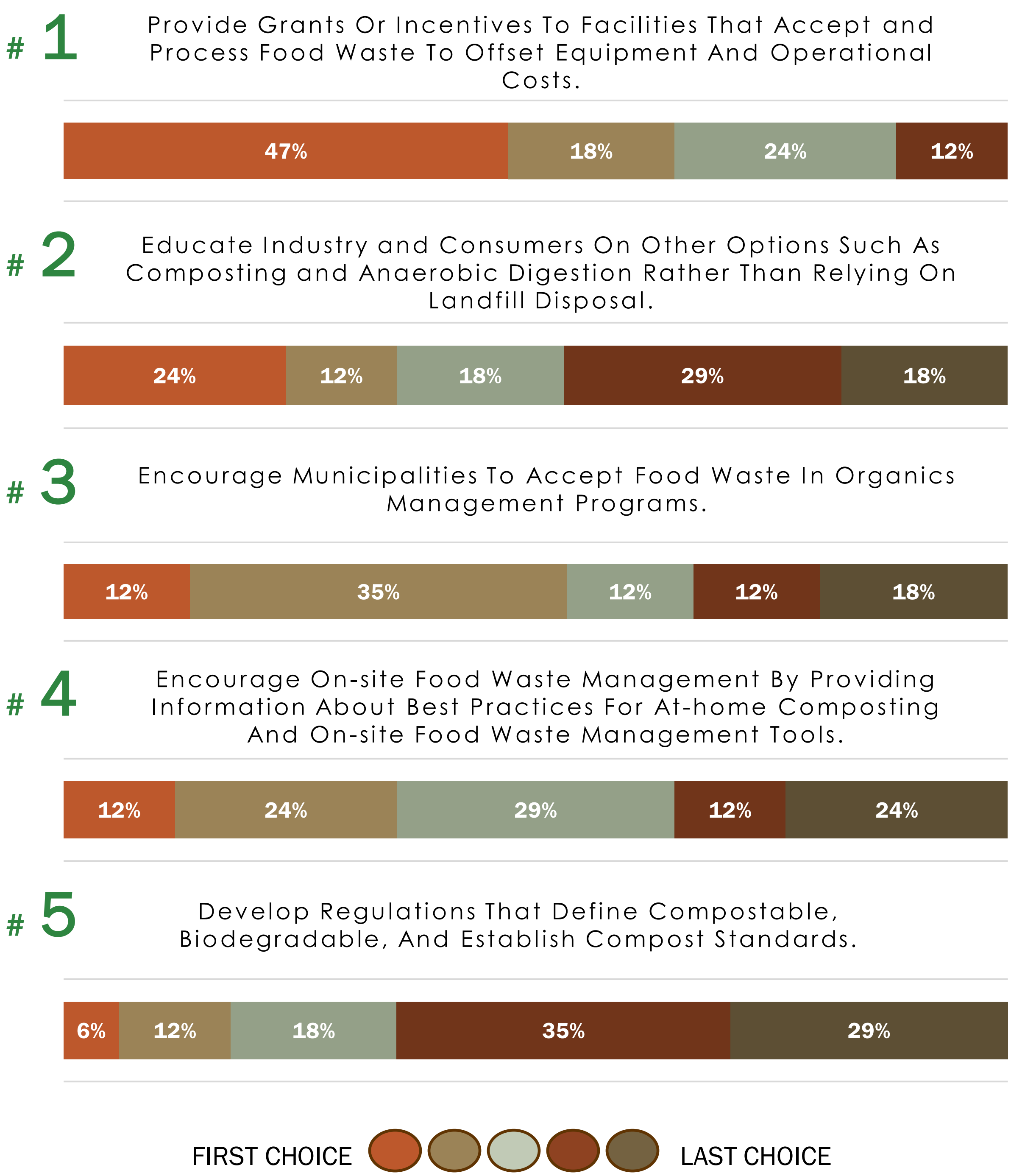
Food Waste Prevention and Rescue

Figure 1. Food Waste Prevention and Rescue Priorities



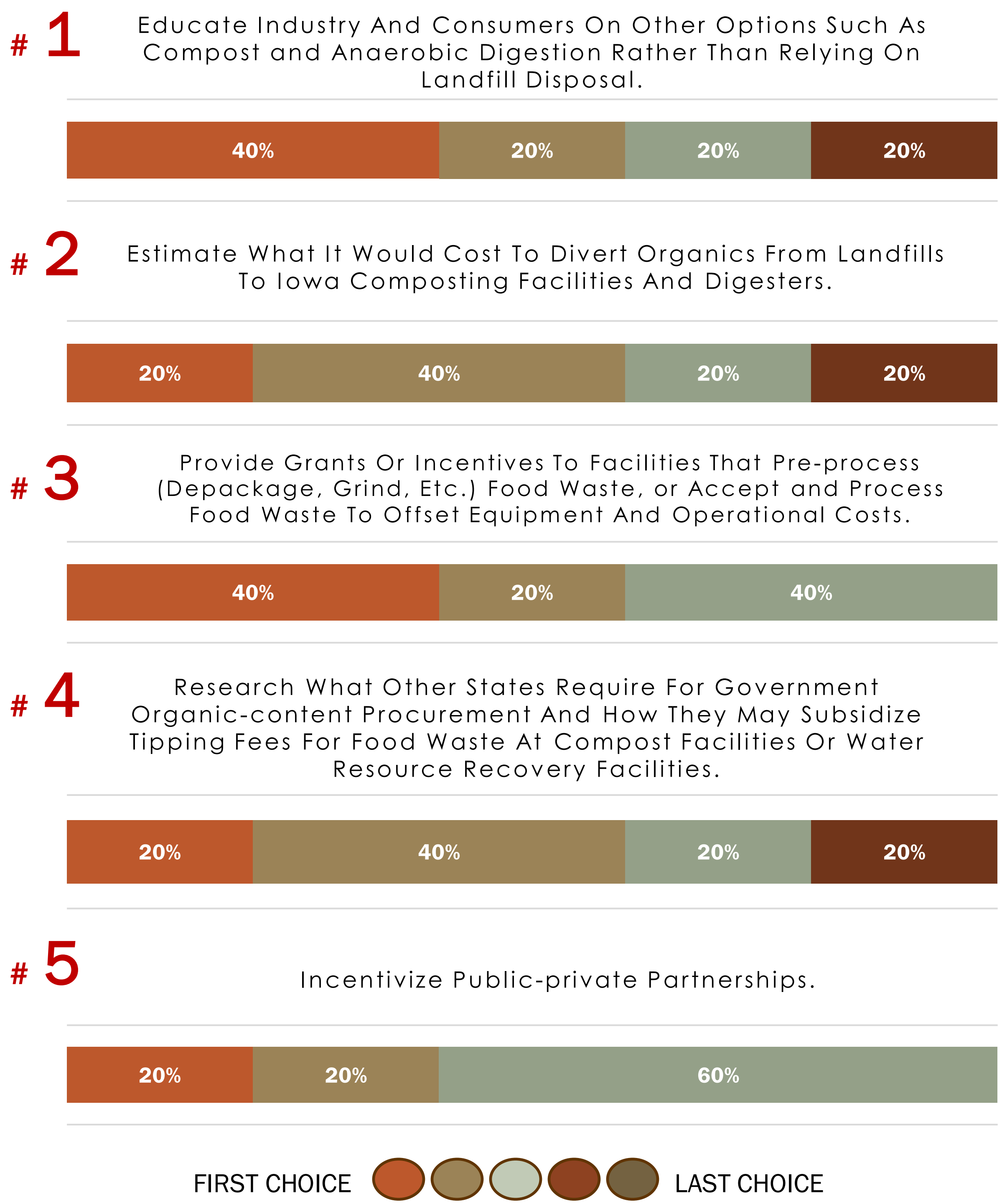
Composting

Figure 2. Composting Priorities



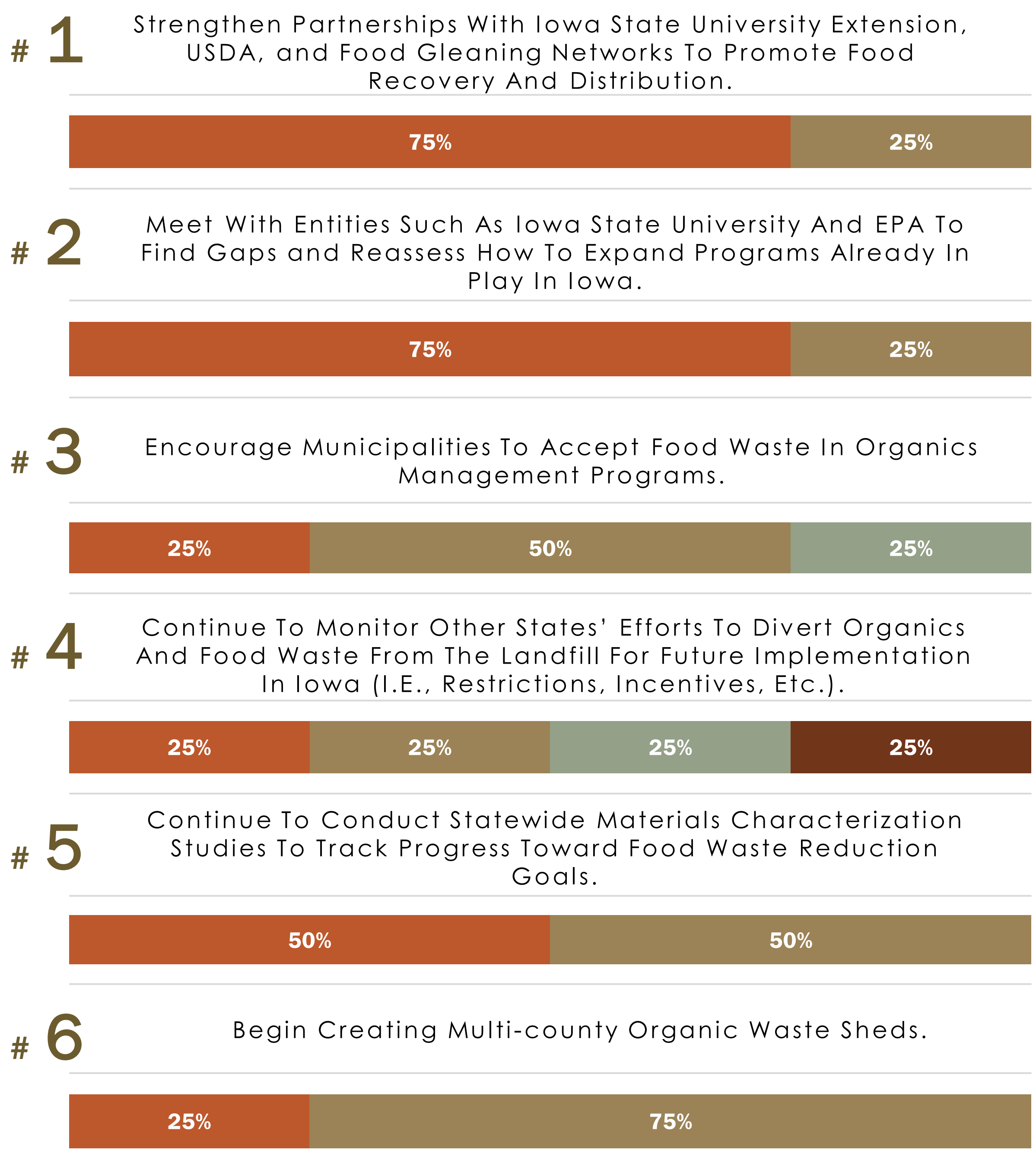
Anaerobic Digestion

Figure 3. Anaerobic Digestion Priorities



Agricultural Practice and Other

Figure 4. Agricultural Practices and Other Priorities



** There was a tie for the top five recommendations. Therefore, participants were asked to rank their top six recommendations.*

FIRST CHOICE LAST CHOICE

Across all groups, several consistent themes emerged. Stakeholders emphasized the importance of education and outreach to reduce contamination and increase participation, the need for financial incentives to support infrastructure development and operations, and the value of expanding food rescue and donation systems. Participants also identified gaps in processing capacity and regional access, particularly for food waste diversion, and highlighted opportunities for improved coordination among stakeholders. These cross-cutting themes directly informed the strategy framework presented in Section 4.

3.4 ALIGNMENT WITH EXISTING RECOMMENDATIONS

The strategies presented in this Plan are not entirely new; rather, they represent a refinement and prioritization of recommendations identified through prior statewide efforts. The Phase II SMM Vision established a broad set of strategies across material categories, while the Iowa Food Waste Prevention and Management Study provided additional detail specific to wasted food.

Stakeholder engagement conducted for this Plan served to validate these earlier recommendations, identify priority actions, and highlight areas requiring additional coordination or investment. In this way, the Plan reflects both continuity with previous efforts and a progression toward implementation.

By aligning with existing recommendations and incorporating updated stakeholder input, this Plan provides a cohesive and actionable framework for advancing organics management in Iowa.

Table 2 below summarizes how prior statewide efforts and stakeholder input informed the development and prioritization of strategies presented in Section 4.

Table 2. Alignment of Prior Efforts with Plan Strategies

Source of Prior Work	Type of Input	How It Informed This Plan	Role in Section 4 Strategies
Phase II SMM Vision for Iowa	State-led planning framework	Identified initial strategy areas and material priorities	Forms the foundation of the strategy framework
Iowa Food Waste Prevention and Management Study	Material-specific analysis (wasted food)	Provided detailed insights on generation, management, and diversion opportunities	Informed wasted food–related strategies and actions
Stakeholder Engagement (This Plan)	Strategy validation and prioritization	Confirmed feasibility, refined priorities, and identified implementation barriers	Prioritized and refined strategies for implementation
Statewide Waste Characterization Studies	Data and trend analysis	Established baseline understanding of material generation and disposal	Supports need and justification for diversion strategies

As shown in the table above, the strategies in this Plan are grounded in prior analyses and have been further refined through stakeholder input. This alignment ensures that the recommended actions are both consistent with earlier planning efforts and responsive to current system needs. Section 4 builds on this foundation by translating these aligned strategies into a set of prioritized, actionable implementation steps.

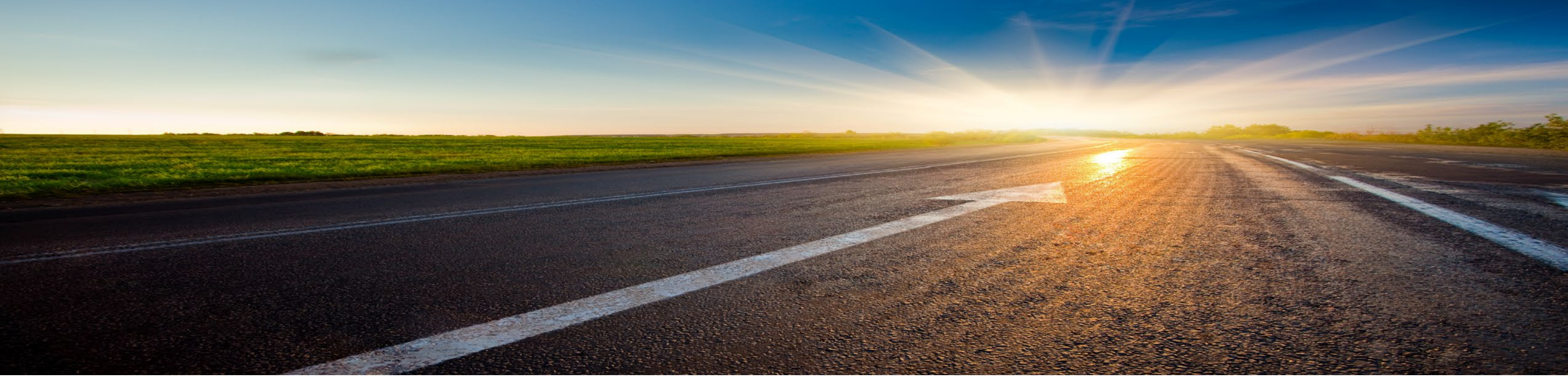
3.5 ONGOING AND EMERGING EFFORTS

In addition to formal planning efforts, Iowa continues to advance organics management through a range of ongoing and emerging activities. These include continued statewide waste characterization studies to track material trends, ongoing discussions related to composting regulations and program expansion, and growing interest in food rescue, donation infrastructure, and alternative processing technologies such as anaerobic digestion.

Academic institutions and extension programs continue to support **research** and **outreach**, while local governments and private-sector operators explore opportunities to **expand collection programs and processing capacity.** These efforts, while varied in scale and maturity, indicate continued momentum toward improved organics management across the state.

Collectively, these ongoing activities provide opportunities to advance the strategies outlined in this Plan and support Iowa's continued transition toward a sustainable materials management system.

Together, these prior efforts, stakeholder perspectives, and ongoing activities provide the foundation for the recommendations presented in Section 4. The following section translates this context into a set of prioritized strategies intended to support practical implementation of organics management improvements across Iowa.



4.0 RECOMMENDATIONS

4.1 RECOMMENDATIONS AND APPROACH

This section outlines recommendation approaches for the strategies prioritized through stakeholder engagement and prior statewide planning efforts. For consistency with the stakeholder process, recommendations are organized into the same four topic areas used during the stakeholder breakout discussions: Food Waste Prevention and Rescue, Composting, Anaerobic Digestion, and Agricultural Practices and Other.

The recommendations included in this section vary in scale and complexity. Some can be advanced in the near-term through education, coordination, and program support, while others will require longer-term planning, funding, infrastructure development, or policy changes. To provide a consistent and practical framework, each strategy is presented using the same set of elements:

- **Key implementation actions**
- **Potential leads and partners**
- **An indicative timeline**
- **Key considerations**

Together, these elements are intended to clarify what each strategy could involve in practice, who may help move it forward, and what factors may influence implementation in Iowa.

The timeframes used in this section are indicative only and are intended to distinguish between actions that could begin in the near-term and those that would likely require sustained effort over multiple years. In many cases, implementation will depend on funding availability, staff capacity, local interest, and alignment with existing programs and infrastructure.

Table 3 (next page) summarizes the strategies discussed in this section, including potential **key partners** and general potential **implementation timeframes.** It is intended to provide a high-level overview of roles and sequencing across all strategy areas. Additional information about the strategies and potential key partners are presented following Table 3. Potential key partners were identified through industry knowledge and informed by stakeholders during the July 30, 2026 meeting.

Table 3. Summary of Organics Management Strategies and Implementation Roles

Group	Strategy	Type	Key Partners	Timeline	Impact
Prevention and Rescue	Food waste education campaign		Iowa DNR, ISU Extension, schools	Short–Medium	▲▲▲
	Expand donation storage capacity		Iowa DNR, food banks, nonprofits	Short–Medium	▲▲▲
	Food labeling & waste education		Iowa DNR, USDA, ISU Extension	Short–Medium	▲▲▲
	Special waste authorization (food waste)		Iowa DNR, industry, landfills	Medium–Long	▲▲△
	Grocery coordination		Iowa DNR, retailers, nonprofits, IRA	Short–Medium	▲▲△
Composting	Compost infrastructure incentives		Iowa DNR, private sector, IACC, local gov	Medium–Long	▲▲▲
	Compost/AD education		Iowa DNR, ISU Extension, IACC, local gov	Short–Medium	▲▲△
	Municipal organics programs		local gov, Iowa DNR, IACC, haulers	Medium–Long	▲▲▲
	On-site composting		Iowa DNR, ISU Extension, IACC, ISOSWO	Short–Medium	▲▲△
	Compost standards & definitions		Iowa DNR, IACC, industry, regulators	Medium–Long	▲▲△
Anaerobic Digestion	AD education		Iowa DNR, utilities, industry	Short–Medium	▲▲△
	Cost modeling for diversion		Iowa DNR, consultants	Short–Medium	▲▲▲
	Preprocessing & AD incentives		Iowa DNR, private sector, WWTPs	Medium–Long	▲▲▲
	Procurement & tipping policies		Iowa DNR, policy partners, ISOSWO	Medium–Long	▲▲△
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Ag & Cross-Cutting	Strengthen recovery partnerships		Iowa DNR, ISU Extension, USDA, ISOSWO, IRA	Short–Medium	▲▲△
	Evaluate existing programs		Iowa DNR, agencies, partners	Short–Medium	▲▲△
	Municipal programs (cross-cutting)		local gov, Iowa DNR	Medium–Long	▲▲▲
	Monitor other states		Iowa DNR, national orgs	Ongoing	▲△△
	Waste characterization studies		Iowa DNR, consultants	Ongoing	▲▲▲
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Table Notes:

- *Organizations identified in this table are potential implementation partners. Lead responsibility may vary by action and will be determined during implementation.*
- *Implementation types are categorized as Education, Program, Infrastructure, Policy, or Planning/Data; some strategies span multiple categories where appropriate.*

With this common framework in place, Sections 4.2 through 4.5 present the prioritized strategies in greater detail by topic area. Together, these sections move from the overall recommendations approach to specific implementation considerations for food waste prevention and rescue, composting, anaerobic digestion, and agricultural practices and other cross-cutting opportunities.

4.2 FOOD WASTE PREVENTION AND RESCUE

Strategy 1.

Institute Food Waste Prevention Education Campaigns Targeting Consumers, Schools, Stores, and Restaurants

Description

Reducing wasted food at the source provides the greatest environmental, social, and economic benefit. A coordinated education effort can help households, schools, food service establishments, institutions, and retailers reduce the amount of food that becomes waste in the first place.

Key Implementation Actions

- Compile and adapt existing outreach materials from EPA, USDA, ReFED, and other organizations for Iowa audiences.
- Develop audience-specific messaging for households, schools, grocery stores, restaurants, and institutional food service operations.
- Coordinate with Iowa State University Extension, schools, and local partners to distribute materials through existing education and outreach channels.
- Develop a statewide campaign that may include online content, printed materials, presentations, and social media messaging.
- Incorporate practical prevention strategies such as meal planning, storage practices, inventory management, and portion control.
- Evaluate whether materials should be translated or otherwise adapted to improve accessibility and broader public use.

Key Partners

- Iowa DNR, Iowa State University Extension, Iowa Department of Education, schools, local governments, nonprofits, food rescue organizations, industry associations, Iowa Restaurant Association, Iowa Waste Exchange (IWE), Iowa Waste Reduction Center (IWRC), Iowa Food Bank Association

Indicative Timeline

- Short-term (0–12 months): Compile materials, identify audiences, develop core messaging, and conduct pilot education campaigns to finalize campaign messaging
- Medium-term (1–3 years): Launch and expand statewide campaign
- Long-term (3+ years): Refresh materials and integrate into ongoing education efforts

Key Considerations

- Prevention messaging should be practical and tailored to each audience.
- Existing trusted networks, such as ISU Extension and school systems, may be more effective than creating entirely new outreach channels.
- Campaign success will be stronger if paired with simple tools and repeated reinforcement over time.

Strategy 2.

Increase Storage Donation Handling and Capacity

Description

A significant barrier to food rescue and redistribution is the limited capacity to safely store, transport, and handle perishable donated food. Increasing donation infrastructure can help more edible food remain available for human use.

Key Implementation Actions

- Identify regional gaps in refrigerated storage, freezer capacity, transportation, and handling infrastructure used by food banks, pantries, and food rescue organizations.
- Evaluate whether capital grants, mini-grants, or equipment assistance programs could support refrigerators, freezers, mobile cold storage, or transport vehicles.
- Support coordination between generators and rescue organizations to improve the consistency and timing of donations.
- Explore opportunities to strengthen hub-and-spoke models in which larger organizations provide support or aggregation capacity for smaller partners.
- Consider whether training or technical assistance is needed to support food safety, handling, and distribution logistics.

Key Partners

- Iowa DNR, Food banks, food rescue organizations, pantries, local governments, philanthropy, private donors, USDA partners, Iowa Grocery Industry Association, Iowa Restaurant Association, schools, Iowa Department of Education

Indicative Timeline

- Short-term (0–12 months): Assess gaps and identify priority regions or organizations
- Medium-term (1–3 years): Develop funding support and expand storage and handling capacity
- Long-term (3+ years): Build more durable regional recovery and redistribution networks

Key Considerations

- Capital investment alone may not be sufficient; organizations may also need operational funding and staffing support.
- Needs are likely to differ by region, especially between urban areas with larger networks and rural areas with fewer facilities.
- Any expansion of storage and handling capacity should be coordinated with food generators and rescue partners to ensure consistent use.

Strategy 3.

Materials Related to the EPA Wasted Food Scale, Food Labeling, and Strategies for Reducing Food Waste for Homes and Businesses

Description

Confusion about food labeling and limited public awareness of preferred management pathways contribute to avoidable food waste. Clear education can help residents and businesses understand both how to prevent food waste and how to manage it more beneficially when it occurs.

Key Implementation Actions

- Develop Iowa-specific educational materials that explain the EPA Wasted Food Scale and the relative benefits of prevention, donation, animal feed, composting, anaerobic digestion, and disposal.
- Create clear explanations of common food date labels, including "best by," "use by," and similar terms.
- Incorporate practical prevention guidance for households and businesses, such as food storage, inventory control, portion planning, and donation practices.
- Distribute materials through retailers, schools, Iowa State University Extension, local governments, and business associations.
- Consider integrating this strategy with broader statewide prevention messaging to improve consistency.

Key Partners

- Iowa DNR, USDA, EPA, ISU Extension, retailers, schools, local governments, trade associations, Iowa Grocery Industry Association, Iowa Restaurant Association

Indicative Timeline

- Short-term (0–12 months): Develop and pilot education campaign materials
- Medium-term (1–3 years): Distribute widely and integrate into prevention campaigns
- Long-term (3+ years): Update materials as guidance or policy evolves

Key Considerations

- The materials should be easy to understand and usable by both residential and commercial audiences.
- This strategy is most effective when the messaging is consistent across agencies and partner organizations.
- Education should not focus only on disposal alternatives; it should reinforce prevention and rescue first.

Strategy 4.

Add Food Waste to the Special Waste Authorization Process Where Other Upcycling Outlets Must Be Exhausted Before Requesting Disposal if Food Waste Quantity Is Above a Certain Threshold

Description

This strategy would create a policy mechanism to encourage generators managing larger amounts of food waste to evaluate higher and better uses before disposal. The purpose would not necessarily be to prohibit disposal in all cases, but to ensure that diversion options are considered before landfilling.

Key Implementation Actions

- Review the existing Special Waste Authorization process and determine whether, and how, food waste could be incorporated.
- Define the scope of materials and generators that might be covered, including potential volume thresholds or types of food waste.
- Evaluate what alternative management pathways should be considered acceptable, such as donation, animal feed, composting, anaerobic digestion, or other outlets as well as accessibility of these options to the generator.
- Consult with stakeholders, including generators, landfill operators, food rescue groups, composters, and digesters, to assess feasibility and likely effects.
- If pursued, develop guidance, criteria, and administrative procedures for implementation.
- Consider whether a phased or pilot-based approach would be more practical than immediate statewide application.

Key Partners

- Iowa DNR, Landfill operators, large food waste generators, food rescue organizations, composting operators, AD operators, industry associations, legal and policy staff, food pantires, retail stores

Indicative Timeline

- Short-term (0–12 months): Policy review and stakeholder consultation
- Medium-term (1–3 years): Develop criteria, guidance, and any needed administrative changes
- Long-term (3+ years): Phase in implementation and refine based on results

Key Considerations

- This strategy would likely require careful design to avoid creating unintended burdens where diversion options do not yet exist.
- Thresholds, exemptions, and definitions would need to be clear. The strategy may be most effective if implemented alongside expanded diversion infrastructure.

Strategy 5.

Coordinate with Grocery Stores on Food Waste Reduction Efforts and Messaging, Especially Around Use of "Imperfect Produce" or Close-Dated Items

Description

Retail grocery stores are an important point of intervention for both prevention and rescue. Coordinating with retailers can help reduce edible food loss, improve donation practices, and encourage consumer acceptance of food that is still usable but may be cosmetically imperfect or nearing a date label.

Key Implementation Actions

- Engage grocery stakeholders to identify current practices, barriers, and opportunities related to inventory management, markdowns, donation, and consumer education.
- Develop messaging and educational materials related to imperfect produce, close-dated products, and food labeling.
- Highlight best practices for donation, discounting, inventory control, and public messaging.
- Explore opportunities to pilot retailer-focused initiatives in partnership with local or regional food rescue organizations.
- Consider recognizing participating retailers through voluntary programs, case studies, or public-facing success stories.

Key Partners

- Iowa DNR, grocery associations, individual retailers, food rescue organizations, chambers of commerce, local governments, IWRC, event location and planners, produce distributors

Indicative Timeline

- Short-term (0–12 months): Stakeholder outreach and development of retailer messaging
- Medium-term (1–3 years): Pilot and expand retailer coordination efforts
- Long-term (3+ years): Integrate retailer engagement into ongoing prevention and rescue work

Key Considerations

- Retail coordination efforts should support, rather than compete with, donation programs.
- Retailers may vary widely in scale, operational flexibility, and willingness to participate.

4.3 COMPOSTING

Strategy 1.

Provide Grants or Incentives to Facilities That Accept and Process Food Waste to Offset Equipment and Operational Costs

Description

Expanding composting capacity for food waste will likely require targeted financial support. Many existing composting operations are set up primarily for yard waste and may need equipment, site improvements, operational changes, or regulatory support to accept food waste safely and effectively.

Key Implementation Actions

- Conduct a statewide assessment of existing composting facilities, including their current accepted materials, permitted capacity, operational constraints, and geographic coverage.
- Identify facilities that may be able to expand into food waste acceptance with targeted investment.
- Develop criteria for grant or incentive programs, such as regional need, readiness, contamination management plans, available end markets, and demonstrated feedstock access.
- Consider funding eligible costs such as pad improvements, stormwater controls, grinders, mixers, aeration systems, covered storage, site access improvements, and contamination management equipment.
- Pilot support for a limited number of projects to evaluate performance, operating costs, and replicability.
- Use lessons from early projects to refine future funding programs and identify where additional policy or technical support is needed.
- Evaluate procurement incentives to encourage the purchase and use of finished compost in municipal and state projects.

Key Partners

- Iowa DNR, IACC, compost facility operators, local governments, private sector operators, agricultural partners, funding agencies, trade associations, state universities

Indicative Timeline

- Short-term (0–12 months): Infrastructure assessment and program design
- Medium-term (1–3 years): Launch incentives and support pilot expansions
- Long-term (3+ years): Expand successful models and align with regional systems

Key Considerations

- Food waste acceptance introduces new operational and contamination issues that not all facilities are prepared to manage.
- Financial assistance should be paired with technical assistance where possible.
- End market development for compost remains important alongside processing capacity.

Strategy 2.

Educate Industry and Consumers on Other Options Such as Composting and Anaerobic Digestion Rather Than Relying on Landfill Disposal

Description

Many generators may be unfamiliar with the available alternatives to landfill disposal, the types of materials appropriate for composting or anaerobic digestion, or how to access those services. Education can help create demand and improve participation in diversion programs.

Key Implementation Actions

- Develop outreach materials that explain the role of composting and anaerobic digestion within the broader organics management system.
- Clarify what materials are acceptable for each management pathway and why proper separation matters.
- Provide region-specific information, where available, on existing facilities or service providers.
- Tailor materials for different audiences, including households, local governments, institutions, restaurants, and food manufacturers.
- Integrate this messaging with other prevention and rescue education to reinforce the hierarchy of preferred options.

Key Partners

- Iowa DNR, ISU Extension, composters, AD operators, local governments, business associations, schools, Iowa Composting Council (IACC), landfills

Indicative Timeline

- Short-term (0–12 months): Develop and organize materials
- Medium-term (1–3 years): Deliver outreach and incorporate into broader campaigns
- Long-term (3+ years): Maintain and update as infrastructure changes

Key Considerations

- Education will be more effective if participation options actually exist within reasonable distance of generators.
- Messages should distinguish clearly between composting, digestion, and disposal.
- This strategy overlaps with AD outreach and should use consistent messaging across sections.

Strategy 3.

Encourage Municipalities to Accept Food Waste in Organics Management Programs

Description

Municipal governments can play a central role in expanding organics diversion by incorporating food waste into existing yard waste or organics systems, establishing new drop-off programs, or supporting curbside collection where feasible.

Key Implementation Actions

- Develop practical guidance for municipalities on different program models, such as curbside collection, seasonal or permanent drop-off, subscription service support, or hybrid approaches.
- Compile information on program design considerations, including accepted materials, cart or container options, contamination control, outreach, staffing, and procurement.
- Identify communities that may be good candidates for pilot or demonstration programs based on existing infrastructure, local interest, and proximity to processing facilities
- Provide technical assistance and, where possible, financial support to communities piloting food waste collection.
- Evaluate pilot programs for participation, contamination, costs, and diversion results, and use findings to improve future guidance.
- Encourage regional coordination where neighboring jurisdictions may benefit from shared hauling, shared drop-off infrastructure, or common processing arrangements.

Key Partners

- Local governments, Iowa DNR, haulers, composting operators, AD operators, regional planning organizations, IACC, council of governments, Iowa League of Cities

Indicative Timeline

- Short-term (0–12 months): Develop guidance and identify pilot candidates
- Medium-term (1–3 years): Launch and evaluate pilot programs
- Long-term (3+ years): Expand successful models and integrate regionally

Key Considerations

- Municipal readiness and local conditions will vary significantly.
- Programs are more likely to succeed where processing capacity is nearby or regional partnerships reduce transportation costs.
- Public education and contamination control are essential to program performance.

Strategy 4.

Encourage On-Site Food Waste Management by Providing Information About Best Practices for At Home Composting and On-Site Food Waste Management Tools

Description

On-site management can reduce collection and transportation needs while giving residents and some businesses practical options for managing organics locally. This strategy is particularly relevant where collection or processing infrastructure is limited.

Key Implementation Actions

- Develop or adapt guidance on backyard composting, home food scrap management, and small-scale onsite systems.
- Identify which tools, systems, or practices are most appropriate for residential settings and which may be suitable for schools, institutions, or businesses.
- Partner with ISU Extension, Master Gardener programs, local governments, or community organizations to provide training and outreach.
- Develop clear messaging on what onsite systems can and cannot manage, and what constitutes good practice.
- Consider whether demonstration projects, workshops, or community composting models could support broader adoption.

Key Partners

- Iowa DNR, ISU Extension, Master Gardener programs, local governments, community organizations, landfills, IWRC, local community gardens, schools, food cooperatives, Practical Farmers of Iowa

Indicative Timeline

- Short-term (0–12 months): Develop materials and identify outreach partners
- Medium-term (1–3 years): Launch training and demonstration efforts
- Long-term (3+ years): Maintain outreach and refine based on participation

Key Considerations

- On-site management is not a replacement for broader infrastructure, but it can be a useful part of the overall system.
- Participation may depend on housing type, local ordinances, and resident interest.
- Messaging should be realistic and avoid overpromising the scale of diversion achievable through home systems alone.

Strategy 5.

Develop Regulations That Define Compostable, Biodegradable, and Establish Compost Standards

Description

Clear standards and definitions can improve consistency, reduce confusion, support end-market confidence, and help ensure that materials marketed as compostable or biodegradable are compatible with actual processing systems.

Key Implementation Actions

- Review definitions, standards, and labeling approaches used in other states and by national organizations.
- Assess Iowa's existing regulatory framework to determine where clarification or new standards may be appropriate.
- Engage processors, local governments, businesses, and product users to identify practical concerns and implementation needs.
- Determine whether Iowa should establish definitions, guidance, or regulatory requirements related to compostable products, biodegradable claims, and compost quality standards.
- Consider phased implementation or guidance-first approaches before adopting more formal regulatory changes.

Key Partners

- Iowa DNR, IACC, compost facility operators, local governments, product manufacturers, retailers, standards organizations, legal and policy staff, AD operators, trade organizations, Iowa Department of Agriculture and Land Stewardship (IDALS)

Indicative Timeline

- Short-term (0–12 months): Review standards and engage stakeholders
- Medium-term (1–3 years): Develop guidance or proposed regulatory framework
- Long-term (3+ years): Implement, update, and align with market needs

Key Considerations

- Definitions should reflect what Iowa facilities can actually process.
- Standards may affect procurement, product labeling, and contamination management.
- Processor input will be critical to avoid creating expectations that exceed facility capabilities.

4.4 ANAEROBIC DIGESTION

Strategy 1.

Educate Industry and Consumers on Other Options Such as Compost and Anaerobic Digestion Rather Than Relying on Landfill Disposal

Description

Anaerobic digestion is an important organics management pathway for certain feedstocks, but it is not widely understood by many generators. Education can help clarify when digestion is appropriate, how it differs from composting, and what role it can play in Iowa's organics system.

Key Implementation Actions

- Incorporate anaerobic digestion into statewide organics education materials, with clear explanation of appropriate feedstocks and system benefits.
- Highlight where digestion may be particularly suitable, such as food processing residuals, source-separated commercial organics, wastewater co-digestion, and other high-moisture feedstocks.
- Develop messaging for industrial, institutional, and municipal audiences, not only residential audiences.
- Coordinate with WWTPs, digesters, and industry groups to provide practical examples of current and emerging use in Iowa.

Key Partners

- Iowa DNR, WWTP operators, AD operators, food manufacturers, ISU Extension, local governments, landfills

Indicative Timeline

- Short-term (0–12 months): Develop and organize AD-specific content
- Medium-term (1–3 years): Deliver targeted outreach to key generators and partners
- Long-term (3+ years): Update materials as facilities and programs expand

Key Considerations

- Education should clearly distinguish AD from composting and from disposal.
- Outreach is likely to be most effective when tailored to larger generators and institutional partners.
- The usefulness of outreach depends in part on whether access to AD infrastructure exists or can be developed.

Strategy 2.

Estimate What It Would Cost to Divert Organics From Landfills to Iowa Composting Facilities and Digesters

Description

Planning for large-scale diversion requires a realistic understanding of the costs associated with collection, preprocessing, hauling, facility development, and operation. Cost information can support funding decisions, phased implementation, and identification of priority opportunities.

Key Implementation Actions

- Define a set of diversion scenarios, such as different capture rates, material streams, or geographic scales.
- Develop conceptual system models that reflect Iowa conditions, including collection methods, preprocessing needs, transportation distances, and facility types.
- Estimate capital and operating costs for relevant system components, such as municipal collection, drop-off programs, composting expansions, preprocessing hubs, and digestion infrastructure.
- Evaluate how costs may differ in urban versus rural settings and under different regional approaches.
- Identify key cost drivers and potential funding mechanisms, including public, private, and federal sources.
- Update cost estimates over time using information from pilot efforts or actual Iowa projects as available.

Key Partners

- Iowa DNR, consultants, local governments, composting and AD operators, wastewater utilities, regional planning organizations, trade organizations, AD developers

Indicative Timeline

- Short-term (0–12 months): Define scenarios and data needs
- Medium-term (1–3 years): Develop and refine cost estimates
- Long-term (3+ years): Update models using implementation experience

Key Considerations

- Early cost estimates should be framed as planning-level estimates, not final budgets.
- Cost analysis should be closely tied to realistic feedstock availability and infrastructure assumptions.
- Results may help Iowa prioritize regional or phased implementation rather than attempting statewide rollout at once.

Strategy 3.

Provide Grants or Incentives to Facilities That Pre-Process (Depackage, Grind, Etc.) Food Waste, or Accept and Process Food Waste to Offset Equipment and Operational

Description

Preprocessing capacity is a key enabling component for broader food waste diversion, particularly for packaged, mixed, or contaminated food waste streams. Financial support may be needed to develop depackaging, grinding, slurrying, and related infrastructure, as well as to support facilities that accept and process those materials through anaerobic digestion or other pathways.

Key Implementation Actions

- Assess current and potential feedstock supply by region and sector to understand where preprocessing could be justified.
- Map existing infrastructure, including compost facilities, digesters, WWTPs, transfer stations, and landfills, to identify opportunities for co-location or integration.
- Identify priority regions where preprocessing hubs or related infrastructure may be most feasible based on waste density, transportation efficiency, and access to downstream processing.
- Develop funding criteria for grants or incentives, including project readiness, committed feedstock, contamination management, regional benefit, and downstream processing arrangements.
- Consider eligible support for equipment such as depackagers, grinders, pumps, tanks, slurry systems, receiving areas, storage improvements, and related site upgrades.
- Pilot support for regional or facility-based preprocessing projects and evaluate their costs, performance, contamination outcomes, and scalability.
- Use pilot results to inform broader statewide infrastructure planning and future rounds of funding.

Key Partners

- Iowa DNR, private sector operators, WWTPs, AD operators, local governments, landfill or transfer station operators, funding partners, trade organizations, AD developers

Indicative Timeline

- Short-term (0–12 months): Assess feedstock and infrastructure opportunities
- Medium-term (1–3 years): Design incentive program and support pilot projects
- Long-term (3+ years): Expand successful models and integrate regionally

Key Considerations

- Preprocessing only makes sense where reliable feedstock and viable downstream outlets exist.
- Co-location with existing infrastructure may improve cost-effectiveness.
- This strategy may be especially important for regions where source-separated food waste is not yet widespread but packaged or institutional streams are available.

Strategy 4.

Research What Other States Require for Government Organic-Content Procurement and How They May Subsidize Tipping Fees for Food Waste at Compost Facilities or Water Resource Recovery Facilities

Description

Policy and procurement mechanisms used in other states may offer useful models for supporting organics diversion, strengthening end markets, or reducing cost barriers to participation.

Key Implementation Actions

- Review examples from other states related to government procurement of compost or other organics-derived products.
- Assess how other jurisdictions structure tipping fee subsidies, incentives, or contracting approaches for food waste delivery to composting facilities, digesters, or water resource recovery facilities.
- Evaluate which policy tools may be relevant to Iowa's regulatory framework, infrastructure, and funding environment.
- Summarize findings in a way that can inform future policy decisions, pilot programs, or agency guidance.
- Consider whether selected approaches should be tested through pilot procurement or funding programs before broader application.

Key Partners

- Iowa DNR, policy organizations, academic institutions, procurement staff, local governments, compost and AD operators, WRRFs

Indicative Timeline

- Short-term (0–12 months): Conduct policy scan and identify relevant models
- Medium-term (1–3 years): Evaluate Iowa applicability and consider pilot use
- Long-term (3+ years): Integrate effective policy tools into future programming

Key Considerations

- Not all approaches used elsewhere will translate well to Iowa.
- Policy review should focus on practical applicability, not just compilation of examples.
- This strategy may be especially useful in supporting market development and improving project economics over time.

Strategy 5.

Incentivize Public-Private Partnerships Costs

Description

Public-private partnerships may help Iowa expand organics infrastructure and services more quickly by combining public goals with private operational capacity, investment, or technical expertise.

Key Implementation Actions

- Identify the types of partnerships most relevant to Iowa, such as municipal collection paired with private processing, co-located processing at publicly owned sites, or private investment supported by public grants.
- Review barriers to partnership formation, including procurement, contracting, liability, ownership, or operational concerns.
- Consider grant programs, tax incentives, pilot projects, or other tools that could encourage partnership-based projects.
- Highlight and share examples of successful models from Iowa or other states.
- Encourage partnership development in priority regions where infrastructure or service gaps have already been identified.

Key Partners

- Iowa DNR, Local governments, private composters, AD developers, haulers, WWTPs, landfill operators, regional planning entities, United States Department of Agriculture (USDA)

Indicative Timeline

- Short-term (0–12 months): Identify models and barriers
- Medium-term (1–3 years): Support partnership development and pilot efforts
- Long-term (3+ years): Expand partnership-based infrastructure and service models

Key Considerations

- Partnerships work best where roles, risks, and long-term responsibilities are clearly defined.
- Public-private approaches may be especially useful where public entities lack operating capacity but can support siting, contracting, or financing.
- This strategy aligns closely with regional planning, municipal programs, and infrastructure incentives.

4.5 AGRICULTURAL PRACTICES AND OTHER

Strategy 1.

Strengthen Partnerships with Iowa State University Extension, USDA, and Food Gleaning Networks to Promote Food Recovery and Distribution

Description

Agricultural and Extension partners can help expand food recovery, redistribution, and outreach, particularly in rural areas or settings where traditional food rescue infrastructure may be less developed.

Key Implementation Actions

- Identify relevant staff, programs, and networks within ISU Extension, USDA, and existing gleaning or farm-to-donation efforts.
- Convene partners to better understand current activity, geographic gaps, and opportunities for coordination.
- Explore how these partners can support outreach, technical assistance, training, or direct recovery efforts.
- Develop stronger communication channels and recurring coordination where useful.
- Consider whether additional support is needed for pilot projects, local program development, or volunteer coordination.

Key Partners

- Iowa DNR, ISU Extension, USDA, gleaning networks, food rescue organizations, agricultural groups, local nonprofits

Indicative Timeline

- Short-term (0–12 months): Identify partners and convene discussions
- Medium-term (1–3 years): Strengthen coordination and support local initiatives
- Long-term (3+ years): Maintain partnerships and integrate into ongoing food recovery work

Key Considerations

- Agricultural and food recovery networks may differ significantly across regions.
- The most useful role for each partner may vary, from outreach to direct logistical support.
- This strategy can complement broader rescue and rural implementation efforts.

Strategy 2.

Meet with Entities Such as Iowa State University and EPA to Find Gaps and Reassess How to Expand Programs Already in Play in Iowa

Description

Iowa already has a number of programs, partners, and outreach efforts related to waste reduction, composting, agriculture, and food systems. A deliberate review of these efforts may help identify where existing programs can be expanded, better coordinated, or adapted to support organics management goals.

Key Implementation Actions

- Convene relevant entities to review current programs, initiatives, and areas of overlap.
- Identify programmatic gaps, barriers, and missed opportunities in current outreach or implementation.
- Evaluate whether some organics-related work would be more effectively led by, or jointly implemented with, agricultural, educational, or federal partners.
- Summarize findings in a way that can guide future program development, funding priorities, or interagency coordination.
- Revisit this review periodically as Iowa's organics infrastructure and policy environment evolve.

Key Partners

- Iowa DNR, ISU Extension, EPA, USDA, local governments, nonprofits, agricultural and industry stakeholders, landfills, AD operators

Indicative Timeline

- Short-term (0–12 months): Convene partners and assess existing efforts
- Medium-term (1–3 years): Refine program roles and pursue identified improvements
- Long-term (3+ years): Continue coordination and periodic reassessment

Key Considerations

- This strategy is less about creating a new program and more about improving the effectiveness and communicating what already exists.
- Coordination may reveal opportunities to reduce duplication and focus on limited resources.
- A concise memo or summary document could be a practical early output.

Strategy 3.

Encourage Municipalities to Accept Food Waste in Organics Management Programs

Description

Municipal food waste collection is also a cross-cutting strategy relevant to agricultural and regional system development because local collection systems influence where food waste can be directed, including to composting, digestion, or other beneficial management pathways.

Key Implementation Actions

- Coordinate this effort with the municipal implementation steps described under the Composting section.
- Encourage municipalities to consider how food waste collection programs may connect with agricultural, regional, or shared processing systems.
- Highlight opportunities for local governments to participate in multi-jurisdictional approaches rather than pursuing only standalone systems.

Key Partners

- Local governments, Iowa DNR, regional planning entities, composting and AD operators, agricultural partners, haulers

Indicative Timeline

- Short-term (0–12 months): Align with existing municipal guidance development
- Medium-term (1–3 years): Coordinate local pilots with regional opportunities
- Long-term (3+ years): Integrate municipal programs into broader organics systems

Key Considerations

- This strategy overlaps intentionally with the Composting section because municipal collection affects multiple downstream pathways.
- Cross-referencing rather than duplicating detailed implementation may help keep the final plan readable.

Strategy 4.

Continue to Monitor Other States' Efforts to Divert Organics and Food Waste From the Landfill for Future

Description

Other states are continuing to test and refine policies, funding approaches, infrastructure models, and diversion requirements related to organics management. Monitoring these efforts can help Iowa identify lessons and avoid reinventing approaches that have already been tested elsewhere.

Key Implementation Actions

- Establish a process for periodically reviewing relevant developments in other states, especially those with organics diversion mandates, funding programs, procurement policies, or infrastructure incentives.
- Focus monitoring on practical lessons related to implementation, costs, market effects, enforcement, rural applicability, and stakeholder response.
- Summarize findings for internal planning or stakeholder discussion on a recurring basis.
- Use those findings to inform future updates to Iowa guidance, incentives, pilot efforts, or policy development.

Key Partners

- Iowa DNR, national organizations, academic institutions, peer agencies, policy partners, landfills, food banks, Zero Food Waste Coalition

Indicative Timeline

- Short-term (0–12 months): Establish review process and identify focus states
- Medium-term (1–3 years): Incorporate lessons into planning and pilot development
- Long-term (3+ years): Maintain as an ongoing adaptive management function

Key Considerations

- The value of this strategy lies in interpretation and application, not simply collecting examples.
- Iowa should focus on states or programs that offer lessons relevant to its scale, geography, and infrastructure conditions.

Strategy 5.

Continue to Conduct Statewide Materials Characterization Studies to Track Progress Toward Food Waste Reduction Goals

Description

Material characterization studies are one of the key tools Iowa has for understanding disposal trends, tracking changes over time, and informing planning for diversion infrastructure and policy.

Key Implementation Actions

- Continue conducting statewide material characterization studies on a regular schedule.
- Ensure that food waste and other relevant organic materials remain clearly represented in study design and reporting.
- Evaluate whether additional data collection methods are needed to better understand materials that are diverted before disposal, especially in commercial or institutional settings.
- Use study results to inform implementation priorities, infrastructure planning, education efforts, and progress evaluation.
- Consider how study findings can be communicated clearly to stakeholders and the public.

Key Partners

- Iowa DNR, consultants, local governments, facilities, regional agencies, academic partners

Indicative Timeline

- Short-term (0–12 months): Confirm future study needs and design priorities
- Medium-term (1–3 years): Conduct and report studies
- Long-term (3+ years): Maintain trend analysis and incorporate findings into plan updates

Key Considerations

- Characterization studies are valuable, but they do not capture all diverted materials or all sectors equally well.
- Complementary data sources may be needed to better understand rescue, composting, digestion, or agricultural management activity.

Strategy 6.

Begin Creating Multi-County Organic Waste Sheds Implementation in Iowa

Description

Regional or multi-county organics management areas can help align waste generation, collection, transfer, preprocessing, and processing infrastructure in a more efficient way than isolated local planning. This may be especially important in a state where infrastructure, population density, and material generation vary significantly across regions.

Key Implementation Actions

- Develop a framework for defining organics waste sheds using factors such as population, major generators, transportation corridors, existing facilities, and regional governance structures.
- Map generation sources, processing infrastructure, transfer opportunities, and transportation networks to identify where regional systems may be practical.
- Identify priority regions where a multi-county approach could improve cost-effectiveness or support needed infrastructure.
- Convene local governments, facilities, haulers, agricultural partners, and other regional stakeholders to discuss shared opportunities and constraints.
- Explore how regional planning could support shared drop-off infrastructure, preprocessing hubs, municipal collection programs, composting expansion, or AD development.
- Consider whether pilot waste shed planning efforts should be initiated in one or more regions before broader statewide rollout.

Key Partners

- Iowa DNR, local governments, regional planning entities, haulers, composters, AD operators, agricultural partners, landfill and transfer station operators, ISU, AD developers, crop and livestock producer organizations, trade organizations

Indicative Timeline

- Short-term (0–12 months): Develop framework and identify candidate regions
- Medium-term (1–3 years): Conduct regional planning and stakeholder coordination
- Long-term (3+ years): Formalize and implement regional systems where feasible

Key Considerations

- Waste sheds are a planning and coordination tool, not an end in themselves.
- Regional approaches may be particularly useful where no single jurisdiction generates enough material to support infrastructure independently.
- This strategy connects closely with municipal collection, preprocessing, infrastructure incentives, and agricultural partnerships.

4.6 RECOMMENDATION SUMMARY

The strategies prioritized by stakeholders reflect both near-term opportunities and longer-term system needs. Some actions, such as education, coordination, and review of existing programs, can begin relatively quickly and may help build momentum. Others, including municipal collection, preprocessing capacity, composting expansion, policy mechanisms, and regional waste shed development, will require more sustained planning and investment.

Taken together, these implementation strategies suggest that Iowa's next steps should focus on three parallel tracks:

1. Strengthening prevention and rescue efforts
2. Building the technical and financial foundation for expanded diversion infrastructure
3. Improving coordination across agencies, sectors, and regions

Continued data collection, periodic reassessment, and adaptation based on experience in Iowa and other states will be important to turning these strategies into effective long-term action.

Appendix A

Statewide Organic Waste Baseline

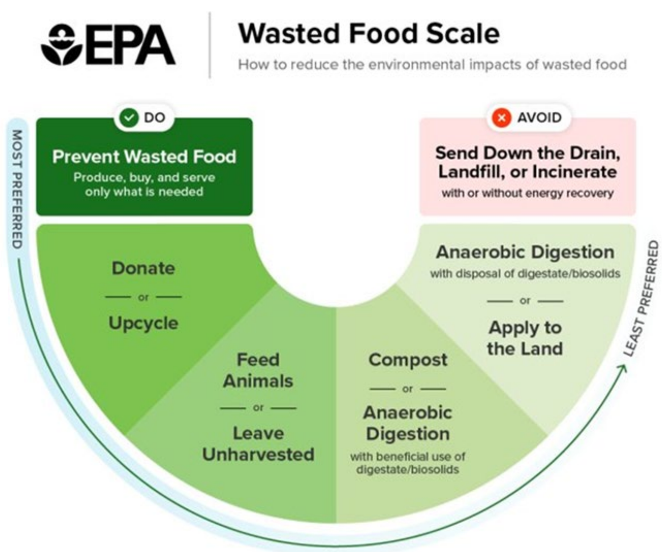
Wasted Food

1.0 WASTED FOOD

1.1 MATERIAL DESCRIPTION

The U.S. Environmental Protection Agency (EPA) uses the term "wasted food" to describe food that is not used for its intended purpose and is instead managed through donation, recycling, or disposal pathways. These pathways are ranked based on their environmental outcomes in the EPA Wasted Food Scale (see Figure 5 below), which prioritizes source reduction and food recovery over lower-value management options such as composting, anaerobic digestion, and landfill disposal.

Figure 5. Wasted Food Scale – U.S. Environmental Protection Agency



For the purposes of this Plan, wasted food includes materials generated across the food supply chain, including residential, commercial, institutional, and industrial sources. This section focuses on understanding how wasted food is generated and currently managed in Iowa to inform strategies for reduction and diversion.

1.2 WASTED FOOD CATEGORIES AND MANAGEMENT PATHWAYS

EPA categorizes wasted food into three primary types: excess food, food waste, and food loss. These categories provide a useful framework for understanding how different types of materials align with management pathways.

- Excess food refers to surplus food that is safe and suitable for human consumption but is not ultimately used (e.g., unsold inventory or prepared food). This material is best suited for higher-value recovery pathways such as food donation and redistribution.

- Food waste includes food that is not consumed due to spoilage, preparation discards, or plate waste. This material may be pre-consumer or post-consumer and is typically managed through composting or anaerobic digestion.

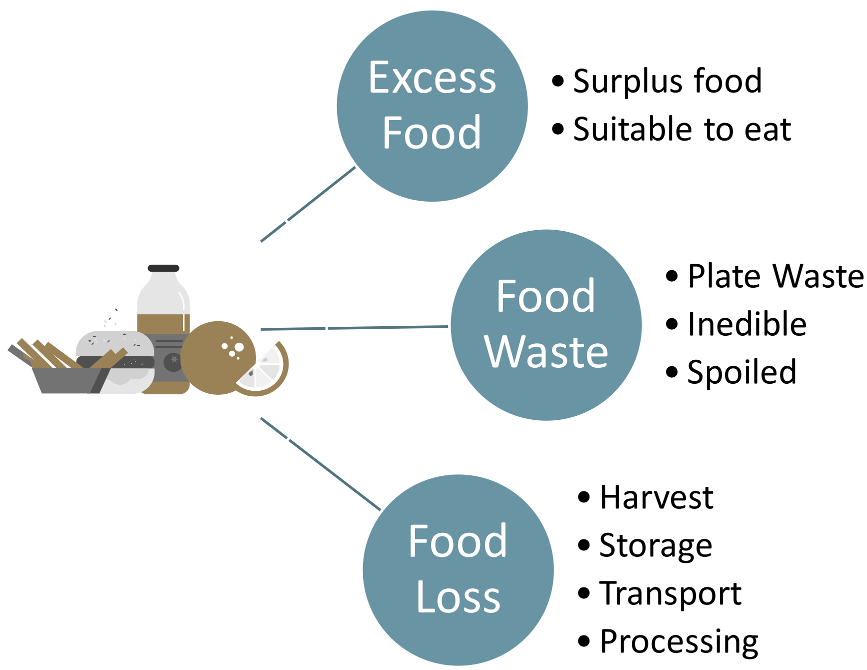
- Food loss occurs earlier in the supply chain during production, processing, or storage (e.g., agricultural losses or processing byproducts). These materials are often more homogeneous and may be suitable for pathways such as animal feed, industrial uses, or anaerobic digestion.

While all three categories can be managed through organics recycling pathways, the type and condition of the material strongly influence the most appropriate and highest-value management option.

Throughout this Plan, the EPA Wasted Food Scale is used as a consistent framework to describe and evaluate strategies, emphasizing prevention and recovery first, while recognizing that recycling and disposal pathways remain important for material that cannot be prevented or recovered.

While the three types of wasted food may all be considered for management through composting or anaerobic digestion, excess food and food loss are particularly suited for management pathways that have greater environmental benefits.

Figure 6. Types of Wasted Food



1.3 GENERATION (BASELINE CONDITIONS)

1.3.1 Characterization-Based Disposal Estimate

Quantifying wasted food generation across Iowa requires a combination of direct measurement and estimation. The most reliable Iowa-specific data source is the 2022 Iowa Statewide Material Characterization Study, which provides insight into the composition of disposed municipal solid waste (MSW). Because data on wasted food diversion are limited, statewide generation is most commonly estimated through back-calculation from disposal data, supplemented by national modeling datasets.

Based on the 2022 characterization study, wasted food represents approximately 19 percent of total MSW disposed in Iowa landfills, corresponding to an estimated 488,000 tons annually. Residential sources account for the majority of this disposed material, representing approximately 68 percent (330,000 tons), while industrial, commercial, and institutional (ICI) sources account for approximately 32 percent (158,000 tons). On a per-capita basis, this equates to approximately 200 pounds per person per year from residential sources, or approximately 300 pounds per person per year when ICI sources are included.

State-specific estimates are supplemented by national datasets, including the ReFED Insights Engine, which provides sector-based estimates of surplus food generation across the United States. While not Iowa-specific, these data are useful for analyzing sector-level patterns and confirm that wasted food generation is dominated by residential and consumer-facing sectors, with additional contributions from food manufacturing and distribution.

Wasted food generation in Iowa can be broadly categorized into two primary sectors:

- Residential: Primarily post-consumer food waste and excess food generated at the household level. These materials are geographically dispersed and variable in composition, which presents challenges for collection and diversion.

- Industrial, Commercial, and Institutional (ICI): Includes generators such as grocery stores, restaurants, schools, hospitals, and food manufacturers. These sectors may generate excess food, food waste, and food loss, often in more consistent and higher-volume streams.

The composition of wasted food has important implications for management. The 2022 characterization study identifies both packaged and unpackaged food materials in the disposed waste stream. As a planning-level proxy, packaged materials are more likely to represent excess food, while unpackaged materials are more likely to represent food waste. Approximately one-quarter of residential wasted food is packaged, indicating some potential for recovery at higher-value pathways if captured prior to disposal.

Several limitations affect the completeness of these estimates. Data on food waste managed through donation, composting, anaerobic digestion, and other pathways are incomplete, and upstream food loss is not fully captured in landfill-based studies. As a result, these values should be considered planning-level estimates appropriate for identifying trends and informing strategy development.

1.3.2 ReFED-Based Generation Analysis

In addition to Iowa-specific disposal-based estimates, national modeling datasets provide additional insight into how wasted food is generated across sectors.

Data Sources and Context

Food waste generation estimates presented in this section are derived from publicly available datasets, with primary reliance on the ReFED Insights Engine. These estimates reflect modeled results developed by ReFED using national datasets, industry data, and published research, scaled to state-level conditions. ReFED is a national nonprofit organization and an industry leader in conducting research, developing analytical reports, and collaborating with various industries to solve food waste challenges.

Because these data are not based on direct measurement within Iowa, they should be interpreted as planning-level estimates intended to illustrate the relative scale and distribution of surplus food across sectors, rather than precise quantities. The results presented here reflect the assumptions and methodologies embedded in the source datasets and have not been independently verified.

Data Limitations

Estimates derived from ReFED are subject to several limitations that should be considered when interpreting results:

- Modeled Data: Estimates are based on national datasets and modeling assumptions rather than direct measurement in Iowa.
- Sector-Level Aggregation: Data are presented at a sector level and do not capture variability among individual generators.
- Incomplete System Coverage: Certain upstream losses (e.g., on-farm losses) may not enter the waste management system and are difficult to quantify.
- Edible vs. Inedible Fractions: Data do not consistently distinguish between recoverable food and inedible materials.
- Temporal Variability: Underlying datasets reflect different timeframes and may not fully capture current conditions.

Taken together, these limitations indicate that the results should be used to inform planning and identify relative opportunities, rather than as precise measurements of food waste generation.

ReFED Sector Estimates

ReFED estimates quantify surplus food, defined as food that goes unsold or uneaten, across the food system. The dataset provides both a current snapshot (2024) and historical trends (2010–2024), allowing for evaluation of generation patterns over time.

For purposes of this analysis:

- Sector refers to the stage of the food system where surplus food is generated, including:
  - Farm (production);
  - Manufacturing (processing);
  - Retail (grocery and food retail);
  - Foodservice (restaurants and institutions); and
  - Residential (households).

- Food type refers to broad material categories such as produce, dairy and eggs, meat and seafood, grains and baked goods, prepared foods, and beverages.

In 2024, ReFED estimates indicate that hundreds of thousands of tons of surplus food are generated annually in Iowa, with the manufacturing sector representing the largest share of total generation (see Table 4). Other significant contributors include residential and foodservice, with smaller but still meaningful contributions from retail.

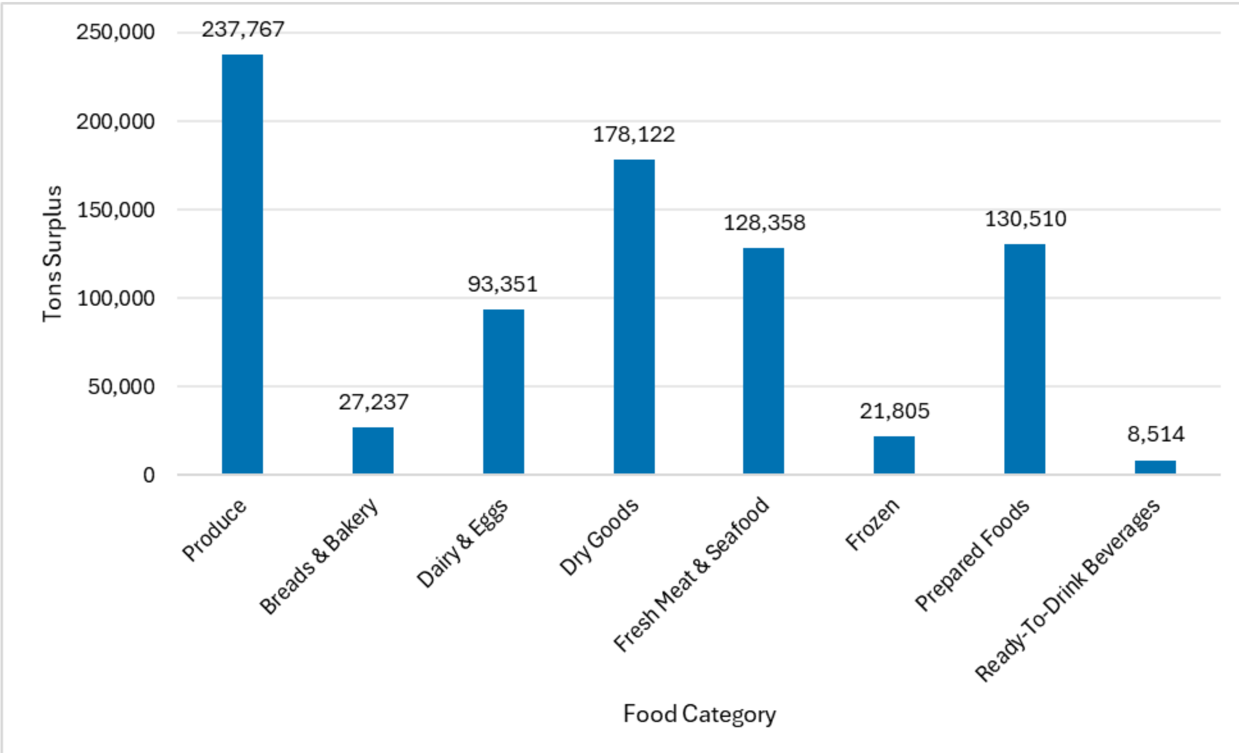
Table 4. ReFED Surplus Food Estimate for Iowa - 2024

Sector	Surplus Food Generated (tons)
Farm	1,256
Foodservice	110,449
Manufacturing	424,045
Residential	241,989
Retail	47,925
Total	**825,664**

This distribution differs from disposal-based estimates, where residential sources represent the largest share of wasted food. This distinction reflects the broader scope of ReFED data, which captures surplus food across the supply chain, including upstream manufacturing losses that do not fully enter the municipal waste stream.

In 2024, Iowa generated 825,664 tons of food surplus across eight categories (Figure 7 next page). Produce is the single largest contributor at 29%, followed by Dry Goods at 22%. Prepared Foods and Fresh Meat & Seafood each account for approximately 16% of the total, while Dairy & Eggs represents 11%. The remaining categories—Breads & Bakery (27,237 tons), Frozen (21,805 tons), and Ready-To-Drink Beverages (8,514 tons)—together comprise only 7% of total surplus. Focusing reduction efforts on the top four categories (Produce, Dry Goods, Prepared Foods, and Fresh Meat & Seafood) would address 82% of all food surplus in Iowa, maximizing impact with targeted interventions.

Figure 7. Surplus by Food Category - 2024

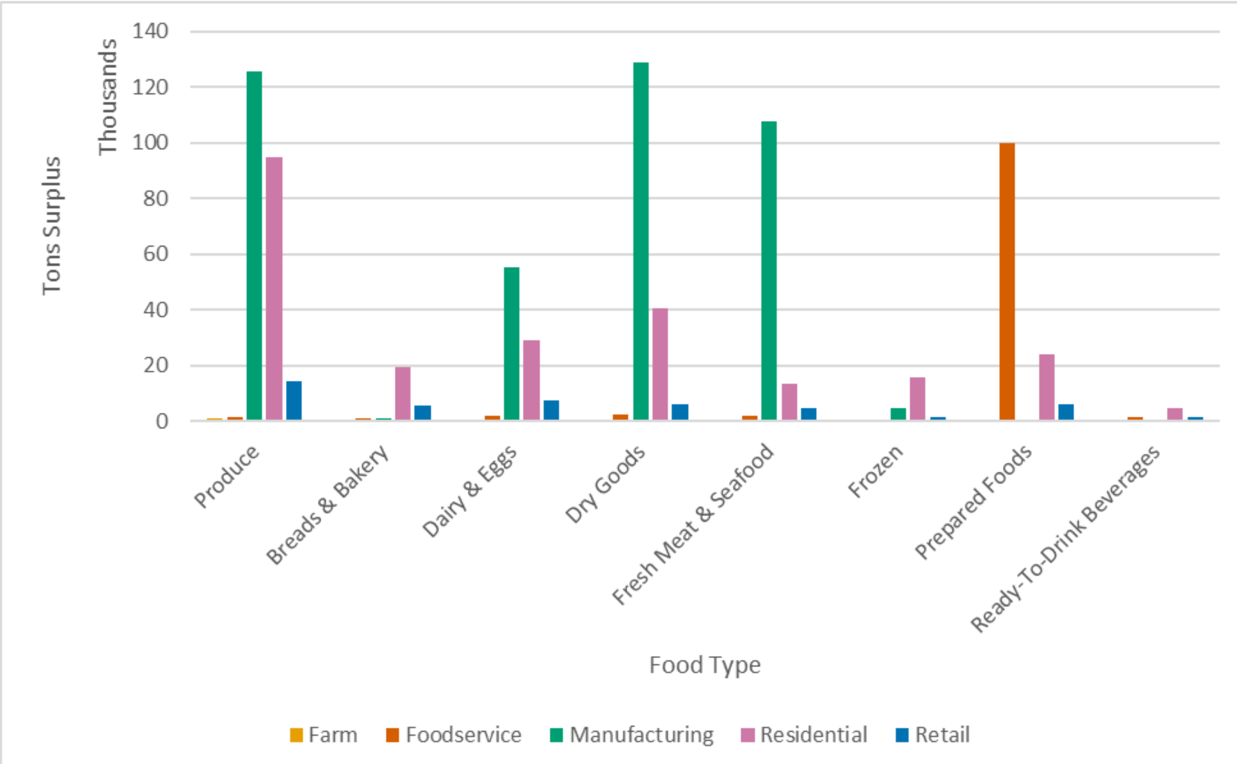


Across all sectors, produce represents the largest category of surplus food, consistent with national trends. Prepared foods are most prominent within the foodservice sector, while manufacturing tends to generate higher proportions of dairy, egg, and processed food byproducts. Retail and residential sectors generate a more diverse mix of food types.

When viewed together, sector and food-type data illustrate distinct generation patterns across the food system (see Figure 8 on next page):

- Agricultural production is dominated by surplus produce;
- Foodservice generates a high proportion of prepared foods;
- Manufacturing produces more uniform byproduct streams;
- Residential sources generate a mix of food types, with produce representing the largest share; and
- Retail generates a diverse and variable mix of surplus food types.

Figure 8. Food Surplus by Food Type and Sector - 2024



Historical Trends

An evaluation of ReFED data from 2014 through 2024 (see Figure 9 on next page) indicates that the relative distribution of surplus food among sectors has remained generally consistent over time, even as total volumes fluctuate:

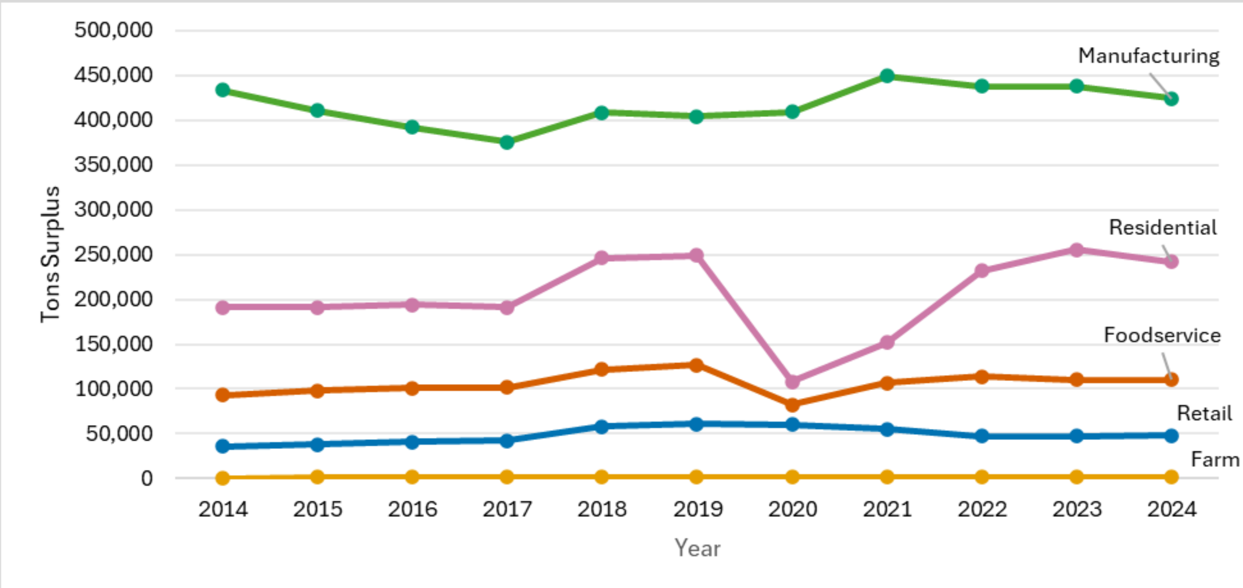
- Manufacturing remains the largest contributor to food surplus throughout the period; and
- Farm surplus has remained essentially constant since 2015.

A notable exception occurs during 2020 and 2021, when surplus food generation declined across multiple sectors. This reduction is likely associated with disruptions related to the COVID-19 pandemic, including:

- Temporary closures of restaurants and institutions;
- Reduced demand in the foodservice sector;
- Supply chain disruptions; and
- Changes in consumer purchasing and consumption patterns.

As economic activity resumed, surplus food generation returned to levels comparable to pre-pandemic trends, suggesting that underlying structural patterns in food production and consumption remain largely unchanged.

Figure 9. Surplus Food Generation by Sector (2014-2024)



Interpretation and Planning Relevance

ReFED data provide important context for understanding how wasted food is generated across the food system in Iowa. While these estimates do not directly measure disposed food, they offer insight into:

- Where in the supply chain surplus food is generated;
- Which sectors present the greatest opportunities for intervention; and
- How material characteristics vary by sector, influencing feasible management pathways.

Consistent with the baseline findings presented earlier in this section, ReFED data reinforce several key observations:

- Residential sources represent a significant share of total wasted food, underscoring the importance of prevention and behavior change strategies;
- Commercial and institutional sectors generate more concentrated and consistent waste streams, making them strong candidates for early diversion efforts;
- Material composition varies by sector, affecting the suitability of pathways such as donation, animal feed, composting, or anaerobic digestion.

These insights support a targeted, phased approach to implementation, focusing first on high-impact opportunities within specific sectors while building toward broader system-wide solutions.

1.3.3 Key Takeaways

Together, these data indicate that wasted food is both a dominant component of the disposed waste stream and broadly distributed across sectors, reinforcing its importance as a priority material for statewide diversion efforts.

1.4 CURRENT MANAGEMENT PRACTICES

Wasted food in Iowa is managed through a combination of disposal and diversion pathways, with landfill disposal representing the dominant method. Diversion pathways, including food donation, composting, and anaerobic digestion, currently manage a relatively small portion of total wasted food.

1.4.1 Disposal

Wasted food is typically mixed with other MSW and collected through residential curbside programs, self-haul to transfer stations or landfills, and commercial collection routes serving ICI generators. Because materials are generally not source-separated, they are co-managed with other wastes, resulting in methane generation as organic material decomposes in anaerobic landfill conditions.

1.4.2 Food Donation and Rescue

A portion of excess food is recovered through food donation and redistribution networks, including food banks, food pantries, and food rescue organizations. These systems play an important role in diverting edible food from disposal; however, available data on quantities recovered are limited and not consistently tracked. Capacity for storage, transportation, and coordination varies by region, which constrains the amount of food that can be recovered.

The Food Waste Prevention and Management Study included interviews with several food rescue and redistribution organizations, including Dubuque Food Pantry, Quad Cities Food Rescue Partnership, Table to Table, Feed Iowa First, Northeast Iowa Food Bank, and Food Bank of Iowa. These organizations illustrate the range of food recovery activity already occurring in Iowa, although available data on quantities accepted and redistributed remain limited and inconsistent.

1.4.3 Composting

Composting represents an established but limited pathway for managing wasted food in Iowa. While a number of composting facilities operate statewide, only a subset currently accept food waste. Many facilities are designed primarily for yard waste and may face operational or permitting constraints that limit their ability to accept food waste.

Currently, facilities may accept up to 2 tons per week of food waste without requiring a permit, which can constrain throughput at smaller operations. Facilities accepting more than 2 tons of food waste per week are required to obtain a permit. Although total composting capacity statewide is substantial, the portion available for food waste composting is significantly smaller, and post-consumer materials present additional contamination challenges.

1.4.4 Anaerobic Digestion

Anaerobic digestion (AD) is used to manage certain organic waste streams, including a portion of wasted food. Existing infrastructure includes private-sector digesters that process source-separated organics and produce renewable natural gas, as well as water resource recovery facilities that accept organic wastes for co-digestion.

Food waste managed through AD is primarily pre-consumer material, such as food processing byproducts, which are more consistent and less contaminated than post-consumer waste. While AD offers opportunities for expanded diversion, current capacity and geographic distribution are limited.

Iowa also has private-sector anaerobic digestion infrastructure that manages source-separated organic materials, including facilities in Ottumwa and Marshalltown with renewable natural gas cleanup. Available information suggests these facilities primarily manage commercial or industrial organic feedstocks, which are generally more consistent and less contaminated than residential post-consumer food waste. These facilities demonstrate that food-related organics can be managed through AD in Iowa, although current access appears limited and does not represent a broadly available statewide pathway.

The Food Waste Prevention and Management Study also identified water resource recovery facilities in Iowa that accept organic waste for co-digestion, including reported quantities of food waste, commercial fats, oils, and grease (FOG), and food manufacturing wastes. These data provide useful examples of existing beneficial use pathways, but reported quantities appear limited relative to total statewide generation and may not represent consistent statewide capacity. Reported quantities included approximately 2,500 tons of food waste, 24.4 million gallons of commercial FOG from food service, and 47 million gallons of food manufacturing waste.

1.4.5 Other Pathways

Additional pathways include on-site composting, animal feed, and other beneficial uses. These pathways are not comprehensively tracked at the statewide level, contributing to data gaps in understanding overall diversion.

1.4.6 Food Surplus Management Summary

In 2024, more than 825,000 tons of surplus food were generated in Iowa, according to ReFED data. Management of food waste is summarized in Table 5.

Table 5. Food Surplus Management Summary - 2024

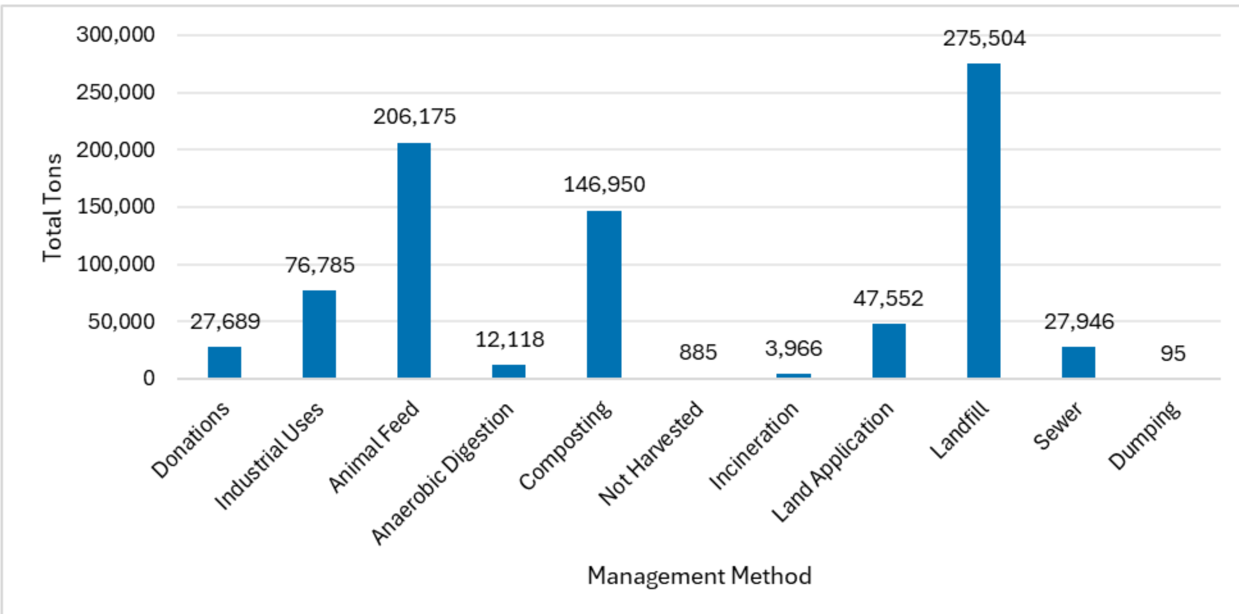
Management Method	Tons	Percentage of Total
Donations	27,689	3.1%
Industrial Uses	76,785	9.1%
Animal Feed	206,175	25.1%
Anaerobic Digestion	12,118	1.1%
Composting	146,950	18.1%
Not Harvested	885	0.1%
Incineration	3,966	0.1%
Land Application	47,552	6.1%
Landfill	275,504	33.1%
Sewer	27,946	3.1%
Dumping	95	0.1%
Total	**825,665**	

Key insights from this analysis include the following:

- Landfill is the largest destination (33.1%) - over one-third of all food surplus;
- Animal Feed is the top beneficial use (25.1%);
- Composting is significant (18.1%);
- Beneficial uses combined (Donations, Industrial Uses, Animal Feed, Anaerobic Digestion, Composting, Land Application) = 61.4%; and
- Waste disposal (Incineration, Landfill, Sewer, Dumping) = 37.4%.

Figure 10 illustrates the food waste management methods based on ReFED data.

Figure 10. Summary of Food Management Methods - 2024



Overall, current management of wasted food in Iowa is characterized by heavy reliance on landfill disposal, limited and unevenly distributed diversion infrastructure, and greater diversion of pre-consumer materials compared to post-consumer waste. These conditions are consistent with national trends identified by ReFED and highlight the need for expanded diversion capacity and improved data systems.

Iowa's five sectors display markedly different patterns in how food surplus is managed (Table 6 next page), revealing both challenges and opportunities for waste reduction (Figure 11 through Figure 15).

Table 6. Surplus Food Management Methods - 2024

Management Method	Generating Sector				
	Farm	**Foodservice**	**Manufacturing**	**Residential**	**Retail**
Donations	19	251	18,154	0	9,265
Industrial Uses	0	0	74,646	0	2,139
Animal Feed	248	3	194,112	3,237	8,576
Anaerobic Digestion	0	5	9,780	0	2,333
Composting	0	46	58,904	79,302	8,698
Not Harvested	885	0	0	0	0
Incineration	0	1,563	304	1,866	233
Land Application	0	0	47,042	0	509
Landfill	10	108,582	21,103	129,637	16,172
Sewer	0	0	0	27,946	0
Dumping	95	0	0	0	0
Total	**1,256**	**110,450**	**424,045**	**241,989**	**47,925**

Figure 11. Farm Food Surplus Destination - 2024

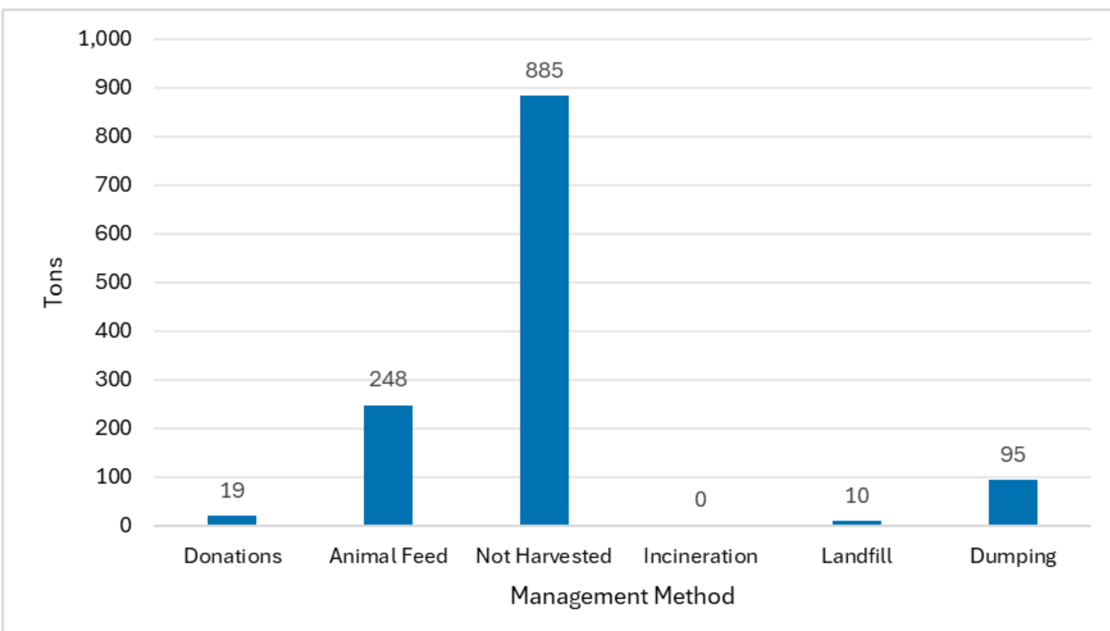


Figure 12. Foodservice Food Surplus Destination - 2024

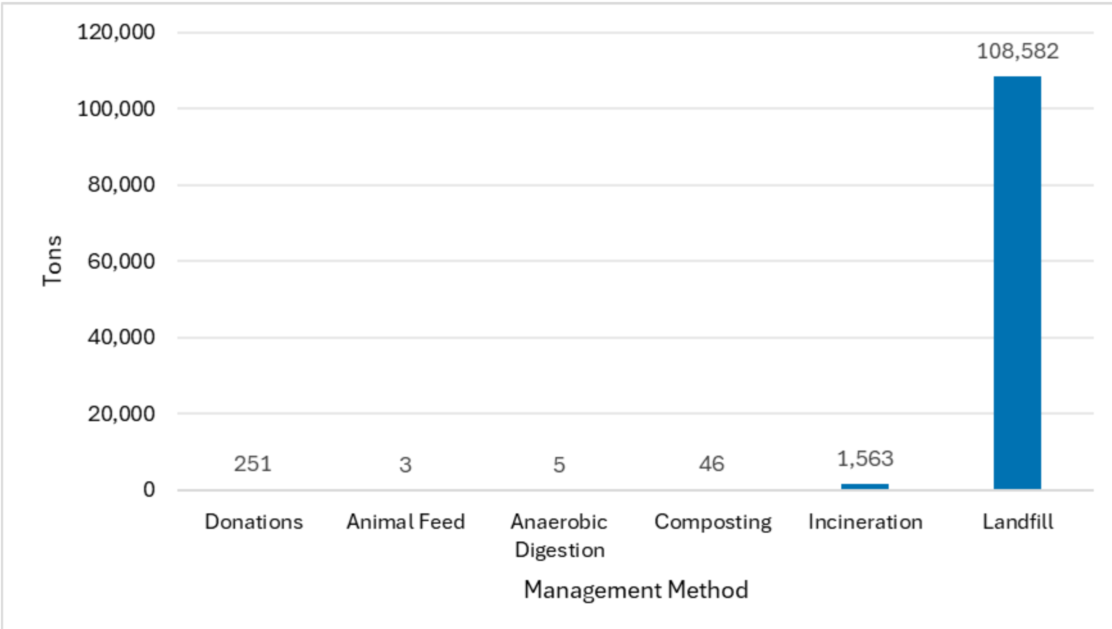


Figure 13. Manufacturing Food Surplus Destination - 2024

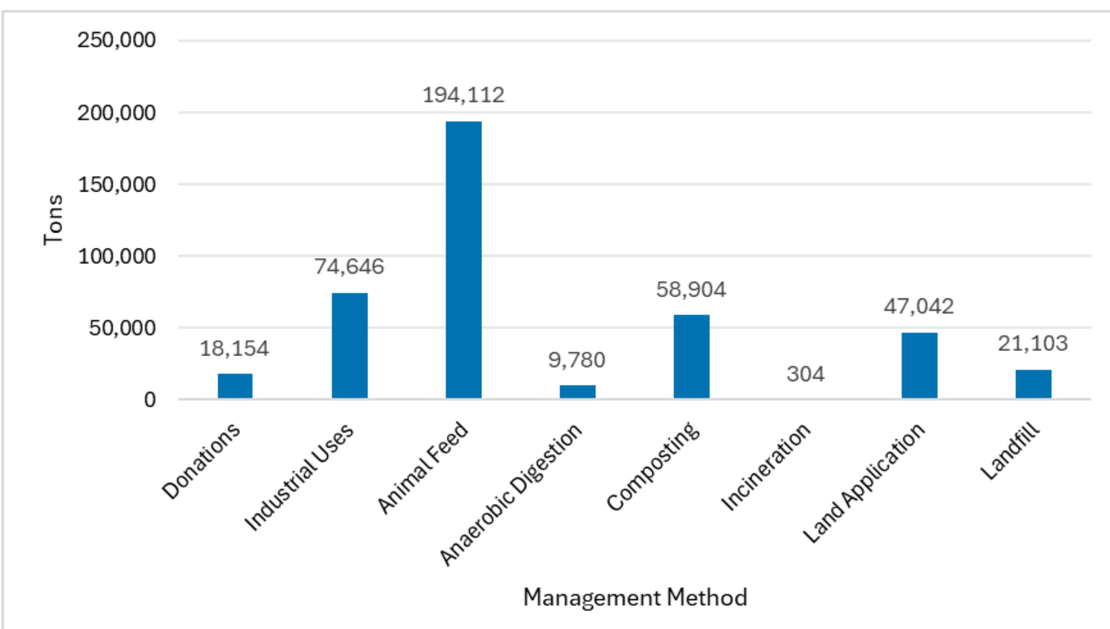


Figure 14. Residential Food Surplus Destination - 2024

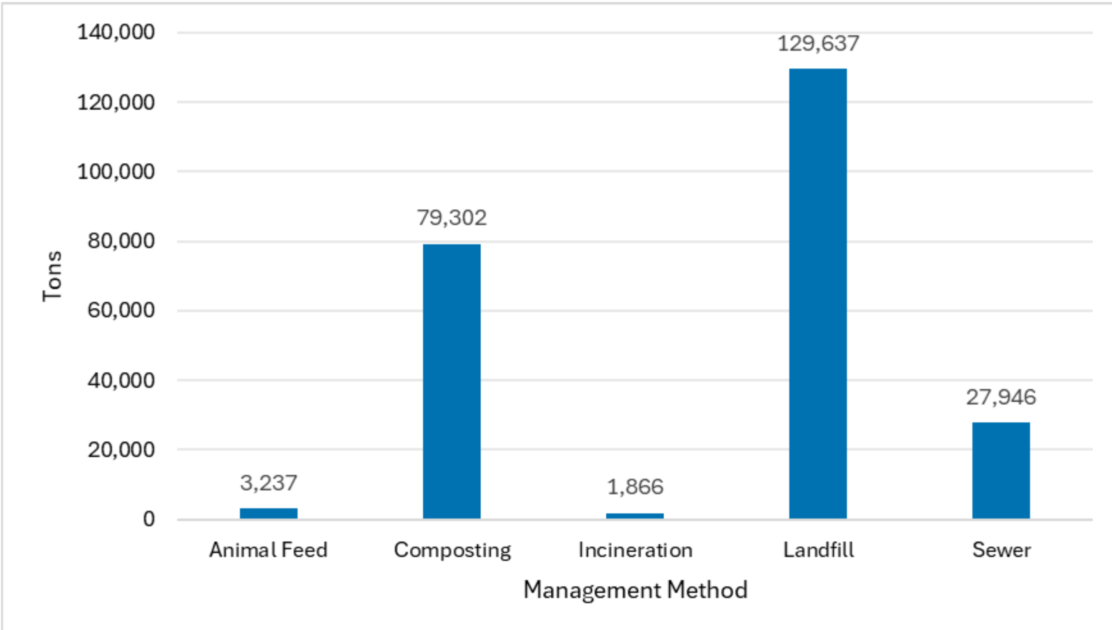
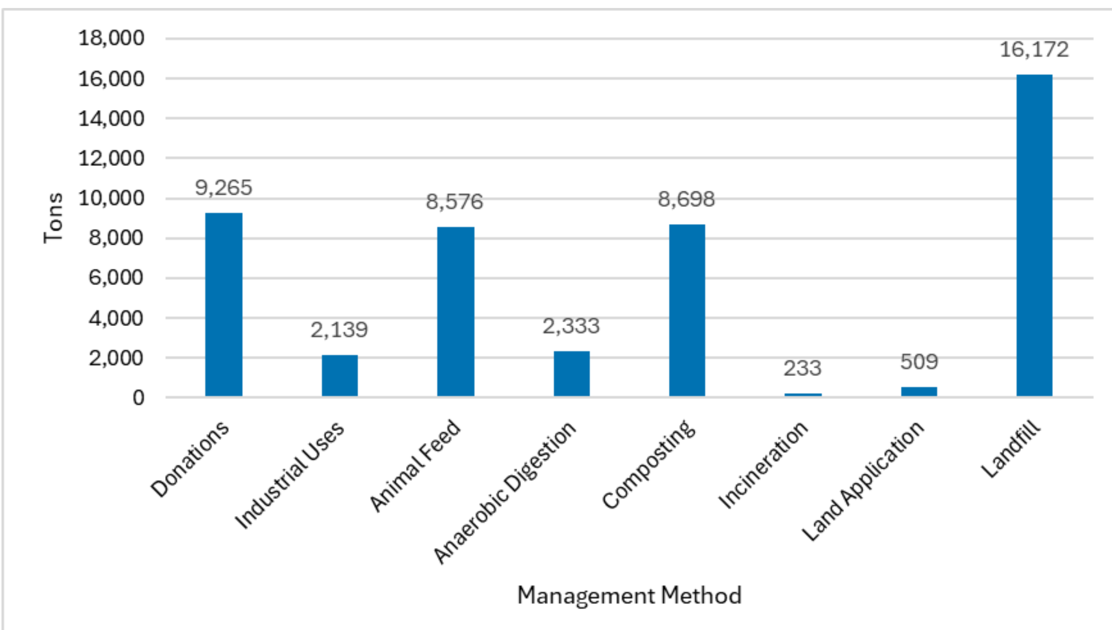


Figure 15. Retail Food Surplus Destination - 2024



Manufacturing stands out as the best performer, directing the vast majority of its surplus to beneficial uses, primarily animal feed, industrial applications, composting, and land application. Only 5% of Manufacturing's substantial surplus ends up in landfills, demonstrating that large-scale diversion is achievable when infrastructure and partnerships are in place.

In contrast, Foodservice sends 98% of its surplus directly to landfill, with virtually no meaningful diversion to donations, composting, or animal feed. This represents the sector with the greatest room for improvement. Residential follows a similar pattern, with over half going to landfill, though composting participation is notably higher than other sectors. The Residential sector is also unique in its use of sewer disposal, reflecting household behaviors like garbage disposals.

Retail shows the most balanced approach, with meaningful contributions across donations (the highest donation rate of any sector), composting, and animal feed, though landfill still leads. Farm, while the smallest sector by volume, is distinct in that most surplus consists of crops not harvested, with dumping as a secondary pathway—disposal methods unique to agricultural operations.

The Foodservice sector represents the single greatest opportunity for impact. Implementing targeted donation programs, composting partnerships, or animal feed arrangements could redirect tens of thousands of tons annually away from landfills, following the successful model demonstrated by the Manufacturing sector.

1.5 SUMMARY IOWA FOOD WASTE PREVENTION AND MANAGEMENT STUDY

The Food Waste Prevention & Management Study was prepared for the DNR by HDR, environmental consultants, in 2025 to evaluate the scale of food waste in Iowa and identify opportunities to reduce waste and improve management. The study combined analysis of statewide disposal data (including the 2022 Iowa Statewide Material Characterization Study), review of existing food waste infrastructure, and stakeholder interviews with composting facilities and water resource recovery facilities (WRRFs). The study assessed food waste generation, disposal, and management practices across residential, commercial, and industrial sectors and identified strategies to reduce food waste and expand diversion options statewide.

1.5.1 Key Findings

- Food waste was identified as the single largest material disposed in Iowa landfills, representing approximately 19 percent of municipal solid waste.
- The study estimated that approximately 488,000 tons of food waste are landfilled annually, with residential sources accounting for the majority of disposed food waste. On a per-capita basis, the report estimates that the average Iowan disposes of about 200 pounds of food waste per year at home, or approximately 300 pounds per person per year when commercial sources are included.
- Most food waste generated in Iowa is disposed rather than diverted, with donation, composting, and anaerobic digestion managing only a small fraction of total food waste.
- Existing food waste diversion infrastructure is limited in number, capacity, and geographic distribution, particularly for post-consumer residential food waste.
- Water resource recovery facilities and composting operations that accept food waste face significant barriers to expansion, including capital costs, contamination concerns, permitting requirements, and staffing needs.

- Data on food waste managed outside of landfills are incomplete and inconsistent, limiting the ability to fully quantify statewide diversion.

The findings of the Food Waste Prevention and Management Study provides a strong foundation for this Plan, particularly in identifying food waste as a priority material and emphasizing prevention as the highest-impact strategy.

2.0 KEY CHALLENGES AND OPPORTUNITIES

The following challenges and opportunities reflect current conditions in Iowa, as described in the preceding sections on generation and management. Together, they highlight the key barriers to diversion as well as the most practical entry points for implementation.

2.1 KEY CHALLENGES

The key challenges to reducing wasted food in Iowa stem from limited access to source-separated collection and processing capacity, compounded by contamination, logistics, and uneven regional ability to support diversion and food rescue:

- Limited access to source-separated collection programs: Most households and many smaller generators do not currently have access to convenient food waste collection options. Given that residential sources account for the majority of disposed wasted food, this limits the ability to capture material for diversion even where interest exists.

- Uneven distribution of processing infrastructure: Composting facilities and anaerobic digestion systems that accept food waste are not uniformly available across the state. This creates regional disparities in diversion opportunities and increases transportation distances and costs.

- Lack of preprocessing capacity for mixed and packaged food waste: Many commercial and institutional food waste streams include packaging or contamination that cannot be directly managed by composting or digestion facilities. Iowa currently has limited infrastructure to preprocess these materials into acceptable feedstocks.

- Contamination and participation challenges: Effective food waste diversion depends on proper separation at the source, which can be difficult to achieve without consistent education, clear program design, and sustained outreach to residents and businesses.

- Logistical challenges in rural areas: Lower population density, longer transportation distances, and smaller waste volumes in rural areas make collection and processing systems more difficult to implement cost-effectively, reinforcing reliance on landfill disposal.

- Variable capacity for food rescue and redistribution: While food rescue networks exist, capacity for cold storage, transportation, and coordination varies by region, limiting the amount of edible food that can be recovered and redistributed.

- Economic and operational barriers for generators: Businesses and institutions may face cost, staffing, and operational constraints that limit their ability to implement food waste reduction, donation, or diversion programs without additional support or incentives.

2.2 KEY OPPORTUNITIES

Iowa is well positioned to advance food waste prevention and recovery through established education networks, Iowa State University (ISU) Extension, and existing food rescue organizations. There is also opportunity to expand diversion through composting and anaerobic digestion, particularly for commercial and institutional generators that produce more consistent and higher-volume material streams. Additionally, Iowa's strong agricultural base creates opportunities to connect food waste diversion with broader nutrient management and soil health objectives.

Despite current system constraints, Iowa has clear opportunities to reduce wasted food by scaling prevention and rescue efforts and strategically expanding diversion infrastructure where it can deliver the greatest near-term impact:

Prevention (Source Reduction)

- Prioritize food waste prevention as the most effective strategy, with a focus on education, inventory management, and behavior change for households and businesses.
- Promote use of standardized messaging such as the EPA Wasted Food Scale and food labeling education.

Food Rescue and Donation

- Strengthen and expand food donation systems to redirect edible food to food banks, pantries, and food rescue organizations.
- Address logistical and regulatory barriers that limit donation, particularly for commercial generators.

Composting and Anaerobic Digestion

- Expand composting and anaerobic digestion capacity where feasible, including at WRRFs and permitted composting facilities.
- Address contamination, siting, and permitting challenges to support facility expansion.

Policy, Funding, and Technical Assistance

- Use incentives, grants, and technical assistance to support food waste reduction and diversion efforts by businesses and local governments.
- Consider policy tools that encourage prevention and diversion while accounting for infrastructure and market limitations.

Data, Measurement, and Tracking

- Continue regular material characterization studies and improve data collection on food waste managed outside of landfills to support planning and performance tracking.

Appendix B

Statewide Organic Waste Baseline

Yard Waste

1.0 YARD WASTE

1.1 MATERIAL DESCRIPTION

Yard waste consists of vegetative materials generated from landscape management activities, including grass clippings, leaves, garden waste, brush, and trees. Under Iowa Administrative Code (567 IAC 105), yard waste also includes clean wood waste used as a bulking agent, provided it is free of coatings and preservatives.

Yard waste is a highly visible and widely managed component of the municipal solid waste stream and represents one of the most established materials within Iowa's organics management system.

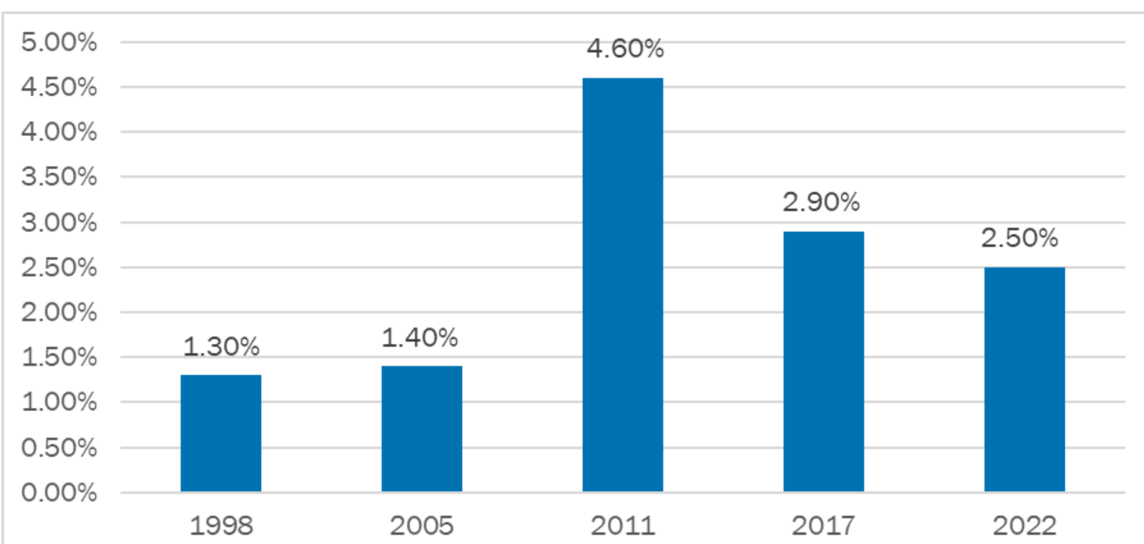
1.2 GENERATION ESTIMATES

Yard waste generation in Iowa is best understood through a combination of waste characterization data and compost facility reporting, as no single dataset fully captures total generation or management.

The 2022 Iowa Statewide Material Characterization Study estimates that yard waste comprises approximately 2.5% of the MSW disposed in Iowa's landfills. This percentage varies by sector, with higher concentrations in residential waste (3.5%) compared to commercial and institutional sources (1.8%). Yard waste is also present in construction and demolition debris at relatively low levels (approximately 0.6%). These data reflect yard waste remaining in the disposal stream and therefore represent only a portion of total generation.

Figure 16 below displays the disposal of yard waste in Iowa based on waste and material characterization results since 1998. The disposal of yard waste experienced a significant increase from 2005 to 2011 and has been declining since.

Figure 16. Percentage of MSW Waste Stream Consisting of Yard Waste by Year



Compost facility reporting provides a complementary perspective on yard waste management. Based on recent annual reports submitted to the DNR, composting facilities in the state collectively manage approximately 200,000 tons of yard waste per year. However, this figure likely understates total composting activity due to unweighed materials, incomplete reporting, and the presence of decentralized management practices such as backyard composting and on-site handling.

Taken together, available data indicate that yard waste is largely diverted from disposal due to long-standing landfill restrictions, with composting representing the dominant management pathway. However, gaps in measurement and reporting limit the ability to fully quantify total generation and diversion.

Yard waste generation is also highly seasonal, with peak volumes occurring in the spring and fall due to landscaping activities and leaf collection. These seasonal patterns influence collection systems, processing capacity, and facility operations across the state.

1.3 DATA SOURCES AND LIMITATIONS

Yard waste generation and management in Iowa are informed by multiple data sources, each of which captures different portions of the system. As a result, no single dataset provides a complete picture of total generation or diversion. Table 7 below summarizes how available data sources align with material flows and highlights key limitations associated with each.

Table 7. Yard Waste Data Sources and System Coverage – Iowa

Data Source	What It Measures	What It Misses	Planning Use
Material Characterization Study (2022)	Yard waste present in disposed municipal solid waste stream (~2.5%)	Yard waste diverted to composting, backyard management, or other non-disposal pathways	Identifies remaining disposal and diversion opportunities
Compost Facility Annual Reports	Yard waste received and processed at composting facilities (~200,000 tons/year)	Facilities without scales, incomplete reporting, backyard composting, on-site or informal management	Illustrates scale of formal composting infrastructure and system throughput
National Generation Estimates (EPA)	Generalized per capita yard waste generation rates	Local variation, state-specific policies (e.g., landfill bans), and actual diversion practices	Provides high-level context for potential total generation
Decentralized Management (e.g., backyard composting, on-site handling)	Not directly measured	All quantities managed outside formal systems	Represents a potentially significant but unquantified portion of total generation

1.4 CURRENT MANAGEMENT PRACTICES

1.4.1 Regulatory Framework

Iowa has one of the longest-standing yard waste diversion policies in the United States. Since 1991, state law has prohibited the disposal of yard waste in landfills, with limited exceptions.

Under Iowa Code Section 455D.9:

- Yard waste must be separated from other solid waste streams
- Local governments are required to provide yard waste collection systems
- Landfill disposal is prohibited except under specific conditions, including:
  - Disaster-related debris management
  - Pest or disease control
  - Use in landfill operations for composting or soil conditioning
  - Acceptance at certain landfills with methane collection systems that produce energy

These requirements have effectively established composting as the primary management pathway for yard waste in Iowa.

Based on 2024 Landfill Methane Outreach Program (LMOP) data from the EPA, there are seven landfills in Iowa that have operational projects that convert methane into an energy source. These project types can be seen below.

Table 8. Operational Methane Projects - 2024

Landfill Name	**Project Type**	**LFG Energy Project Type**
Black Hawk County Sanitary Landfill	Renewable Natural Gas	Other
Cedar Rapids Linn County Solid Waste Landfill #2	Electricity	Cogeneration
Central Disposal Landfill	Electricity	Reciprocating Engine
Des Moines County Regional Sanitary Landfill	Direct	Leachate Evaporation
Dubuque Metropolitan Sanitary Landfill	Renewable Natural Gas	Vehicle Fuel
Loess Hills Regional Sanitary Landfill	Renewable Natural Gas	Other
Metro Park East Landfill	Electricity	Reciprocating Engine

Based on the yard waste disposal exemptions listed in 455D.9, these facilities could accept yard waste for disposal. Currently, only one facility, Loess Hills Regional Sanitary Landfill, is accepting yard waste for disposal.

1.4.2 Permitted Composting Facilities

This section summarizes Iowa's composting infrastructure that is authorized to accept yard waste and other organic materials, including both permit-by-rule sites and fully permitted composting facilities. It provides context on how these facilities are regulated, where they are located, and what role they play in supporting statewide diversion of yard waste and potential co-composting of additional organics.

1.4.2.1 Permit-by-Rule Compost Facilities

In Iowa, a "permit-by-rule" compost facility that handles less than two tons of combined food and yard waste per week (excluding bulking agents). Managed by the DNR, this removes the need for a permit for smaller operations.

Key Requirements for Iowa Permit-by-Rule Facilities:

- Capacity Threshold: Must handle less than two tons of food/yard waste per week.
- Location Constraints: Must be located away from wetlands, 500 feet from residences, 200 feet from public wells, and 100 feet from private wells, water bodies, or streams.
- Operational Standards: Must have all-weather surfaces, proper signage (hours, contacts), and management practices that control leachate and prevent water runoff.
- Purpose: Designed to encourage smaller, community-level composting by reducing the regulatory burden.

Operators must follow these rules, but do not need to apply for a formal permit if they stay under the threshold.

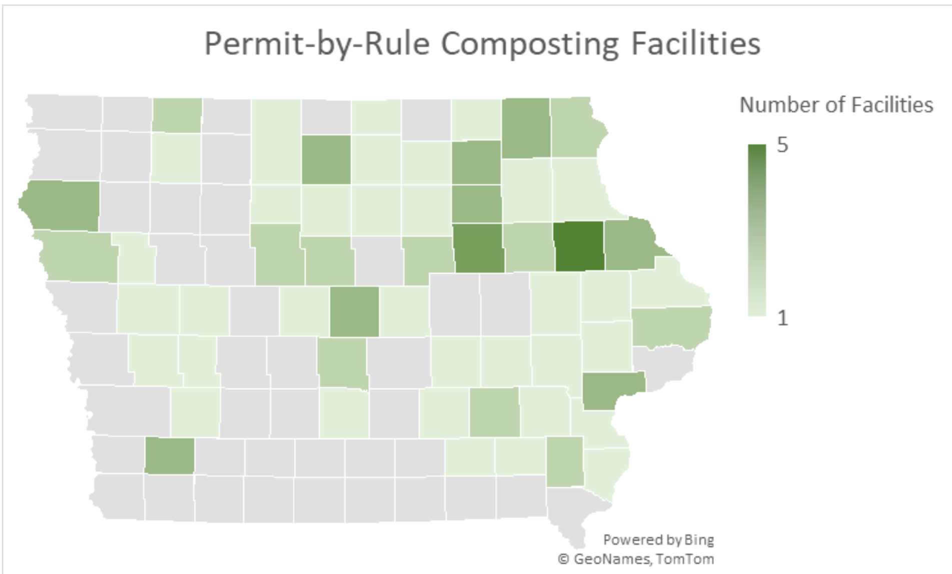
Iowa's permit-by-rule composting facilities provide a distributed network of smaller-scale organics management sites, with 92 facilities identified statewide. These facilities are not evenly distributed across the state. The Northeast region has the largest concentration, with 29 facilities, followed by the North Central region with 21 facilities. The Northwest and Southeast regions each have 16 facilities, while the Southwest and South Central regions have fewer identified sites, with six and four facilities, respectively.

Table 9. Regional Distribution of Permit-by-Rule Composting Facilities

Region	Number of Facilities
North Central	21
Northeast	29
Northwest	16
South Central	4
Southeast	16
Southwest	6

The heat map of facility locations (Figure 17) shows that permit-by-rule composting capacity is concentrated in the northern and eastern portions of the state, particularly in counties with multiple municipal, county, or institutional yard waste composting sites. Delaware County has the highest number of identified facilities, with five sites, followed by Black Hawk County with four. Several counties, including Bremer, Chickasaw, Dubuque, Hancock, Montgomery, Muscatine, Plymouth, Story, and Winneshiek, each have three facilities.

Figure 17. Distribution of Permit-by-Rule Composting Facilities



Overall, the analysis indicates that permit-by-rule composting facilities are an important component of Iowa's existing organics management infrastructure, particularly for yard waste and other lower-risk organic materials. However, the regional distribution also suggests potential geographic gaps, especially in the South Central and Southwest regions. These gaps may affect local access to composting options and could be considered when evaluating opportunities to expand organics diversion, improve regional collection efficiency, or support additional local processing capacity.

1.4.2.2 Permitted Composting Facilities

In addition to permit-by-rule sites, Iowa maintains a smaller network of fully permitted composting facilities that support the management of a broader range of organic materials.

Permitted composting facilities operate under an individual, site-specific permit issued by the state, which establishes detailed design, operational, and monitoring requirements tailored to the facility. This permitting process typically involves a higher level of regulatory review than permit-by-rule authorization, including evaluation of site conditions, material types, and environmental controls (e.g., odor management, leachate handling, and vector control). As a result, permitted facilities are generally authorized to accept a broader and potentially higher-risk range of organic materials—such as food waste, biosolids, or mixed organics—compared to permit-by-rule sites, which are limited to lower-risk materials and standardized operating conditions.

Based on available data, ten permitted composting facilities are currently operating statewide with approximately half open to public customers. These facilities are distributed across six regions, though the overall network is relatively limited in scale compared to other solid waste infrastructure.

Table 10. Permitted Composting Facilities in Iowa

Facility Name	City	County
Appanoose	Centerville	Appanoose
Joseph E. Borntreger	Murray	Clarke
J. Pettiecord Earlham Compost Facility	Bondurant	Dallas
Dubuque Landfill Compost Facility	Dubuque	Dubuque
WINR-Center, Woodbine Site	Woodbine	Harrison
Skunk River Compost	Lynville	Jasper
Iowa City Compost Facility	Iowa City	Johnson
Cedar Rapids/Linn Co Solid Waste Agency Composting Facility	Marion	Linn
Cedar View Farms LLC	Atalissa	Muscatine
Davenport Compost Facility	Davenport	Scott

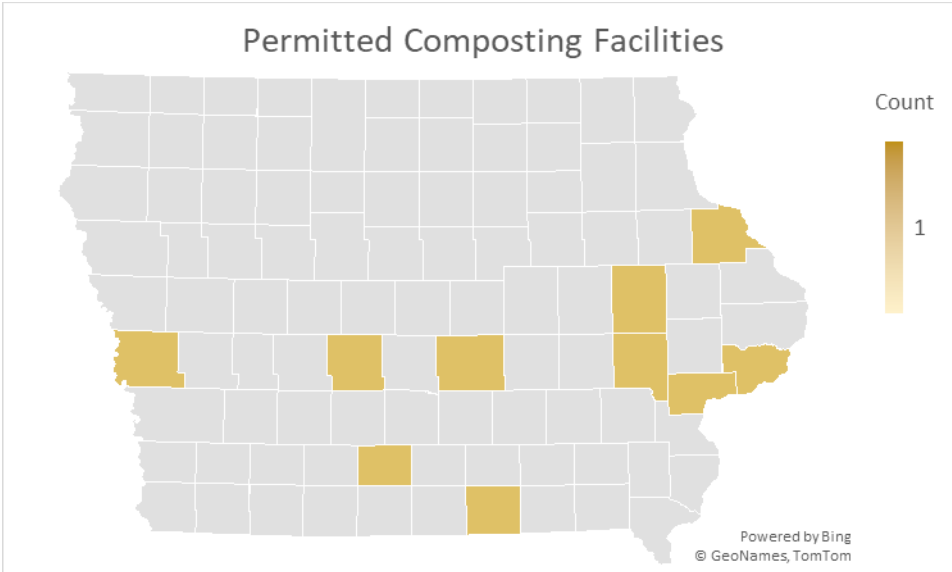
Regional distribution shows the greatest concentration in the Southeast region, with three facilities located in Johnson, Muscatine, and Scott counties. The South Central region contains three facilities in Appanoose, Clarke, and Jasper counties. The remaining facilities are dispersed across the Northeast (Linn County), North Central (Dallas County), Northwest (Dubuque County), and Southwest (Harrison County) regions, each with one facility.

Table 11. Regional Distribution of Permitted Composting Facilities

Region	Number of Facilities
North Central	1
Northeast	1
Northwest	1
South Central	3
Southeast	3
Southwest	1

Geographically, permitted composting infrastructure is anchored by several larger or publicly affiliated operations, including the Cedar Rapids/Linn County Solid Waste Agency composting facility and the Dubuque Landfill Compost Facility, as well as municipal facilities in Iowa City and Davenport. These facilities play a key role in managing compostable materials within their service areas.

Figure 18. Distribution of Permitted Composting Facilities



Despite statewide coverage, the relatively small number of permitted facilities suggests limited capacity for managing more complex organic materials (e.g., food waste, biosolids, or mixed organics) that typically require more stringent permitting. The distribution also indicates potential regional gaps in access—particularly in western and parts of central Iowa—which may result in longer haul distances or reliance on alternative management practices.

From a planning perspective, this network highlights both a foundation to build upon and a constraint to address. Existing permitted facilities could serve as regional hubs for expanded organics diversion, particularly if supported by investments in preprocessing, contamination management, and collection systems. At the same time, the limited number and uneven distribution of facilities may present barriers to scaling statewide organics diversion efforts without additional infrastructure development.

1.4.3 Collection and Management Systems

Yard waste is managed through a combination of curbside collection, drop-off programs, and self-haul to composting facilities. Most communities provide seasonal curbside collection services, typically operating from spring through fall, using dedicated containers or paper bags. In some areas, municipalities operate vacuum leaf collection programs during peak fall months.

Once collected, yard waste is transported to composting facilities. Across Iowa, more than 78 composting sites accept yard waste materials, the majority of which are designed to process yard waste exclusively. Based on recent reporting, these facilities collectively manage over 200,000 tons of yard waste annually; however, this total likely understates actual quantities due to unweighed loads and incomplete reporting.

Composting infrastructure in Iowa is widely distributed but varies in scale and capability. Many sites are small or seasonal operations focused primarily on yard waste, with limited capacity to manage higher-moisture or more complex feedstocks. This variability affects the feasibility of expanding into co-composting various organic materials or regional organics programs.

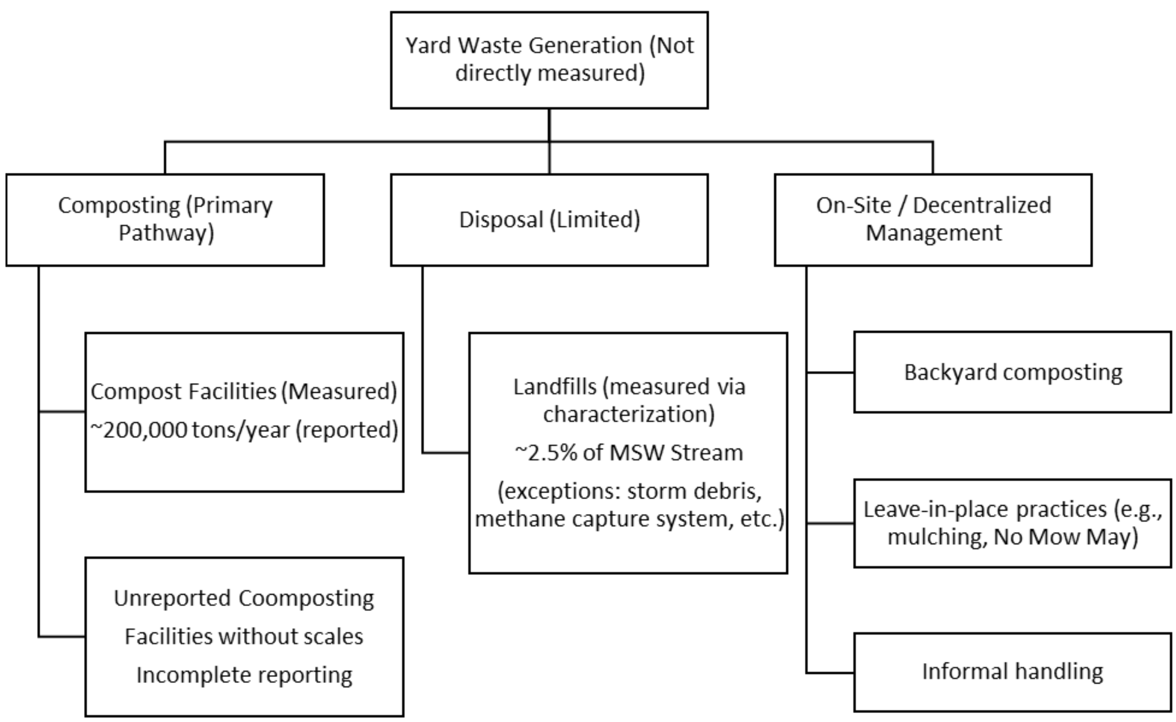
Processing methods at these facilities typically include windrow composting, with periodic turning to maintain aerobic conditions. In some cases, facilities manage excess woody material through grinding, stockpiling, or permitted disposal practices.

1.4.4 Material Flow Overview

Due to longstanding landfill restrictions, the majority of yard waste generated in Iowa is diverted to composting systems. Limited quantities may be managed at landfills under specific allowable conditions, such as storm debris or facilities with energy recovery systems.

While available data indicate that composting is the dominant management pathway, data gaps, including facilities without scales, decentralized management practices, and incomplete reporting, introduce uncertainty in statewide material flow estimates. Figure 19 below illustrates the primary pathways for yard waste management in Iowa and the extent to which each pathway is captured by available data sources.

Figure 19. Yard Waste Material Flow in Iowa (Conceptual)



1.4.5 Programs and Waste Reduction Practices

In addition to formal collection systems, many communities promote source reduction and on-site management practices. Programs such as "Leave the Leaves" and "No Mow May" encourage residents to reduce collection volumes by leaving organic material in place. As Iowa is primarily a rural state, it is assumed that most of the yard waste generated in the state is passively managed (e.g., not collecting grass clippings, etc.). These practices support soil health, reduce municipal collection and processing costs, and contribute to stormwater management and ecosystem benefits.

Backyard composting is also widely encouraged as a means of reducing reliance on centralized collection and processing systems.

2.0 KEY CHALLENGES AND OPPORTUNITIES

The following challenges and opportunities reflect current conditions in Iowa and are intended to inform implementation strategies.

2.1 KEY CHALLENGES

Yard waste management in Iowa is generally well established, but persistent challenges, driven by seasonality, uneven facility capability, and market and data constraints, can limit efficiency and expansion:

- Seasonal variability in feedstock supply: Yard waste generation fluctuates significantly throughout the year, creating operational challenges for composting facilities and limiting the ability to support consistent year-round processing.
- Limited facility readiness for expanded materials: Many facilities are designed for yard waste only and may require upgrades to accept food waste or other organics.
- Inconsistent access to infrastructure: Availability of composting facilities varies regionally, particularly in rural areas.
- Contamination risks with expanded programs: Expanding accepted materials increases the risk of contamination, affecting compost quality and operational efficiency.
- Market variability for finished compost products: Demand for compost products can fluctuate, limiting revenue stability.
- Data and reporting limitations: Variability in measurement and reporting practices across facilities limits the ability to fully quantify system performance.
- Operational and regulatory constraints: Permitting, siting, and operational requirements may limit facility expansion or modification.

2.2 KEY OPPORTUNITIES

Building on Iowa's long-standing yard waste diversion systems, key opportunities center on optimizing existing operations and using yard waste as a platform to expand organics diversion, improve markets, and strengthen data and performance tracking:

Composting and Anaerobic Digestion

- Established infrastructure provides a strong foundation: Iowa's composting system offers a ready platform for expanding organics diversion.

- Co-composting potential with food waste: Yard waste provides structure and carbon balance, making it well suited for integration with food waste.

- Targeted facility upgrades: Investments in equipment and site improvements can expand capacity and material acceptance.

Collection Systems

- Expansion of municipal programs: Existing yard waste systems provide a pathway for broader organics collection programs.

Market Development

- Strengthening compost markets: Increased use in agriculture, landscaping, and erosion control can support system sustainability.

Data, Measurement, and Tracking

- Improved data tracking and reporting: Enhanced measurement practices can support planning, investment, and program evaluation.

- Alignment with statewide diversion goals: Yard waste diversion supports broader waste reduction and resource recovery objectives.

Appendix C

Statewide Organic Waste Baseline

Wood Waste

1.0 WOOD WASTE

1.1 MATERIAL DESCRIPTION

Wood waste encompasses a broad range of materials generated across residential, ICI, and construction sectors. It includes clean, untreated wood such as dimensional lumber, pallets, and land clearing debris, as well as treated or engineered wood products that may contain coatings, adhesives, or preservatives. These distinctions are important because they directly influence how wood waste can be managed, including its suitability for reuse, recycling, composting, or disposal.

In Iowa, wood waste is generated primarily through construction and demolition (C&D) activities, which produce significant quantities of dimensional lumber, engineered wood products, and painted or treated materials. Additional sources include commercial and industrial operations that utilize wood for packaging and shipping (e.g., pallets and crates), residential activities such as home renovation and yard maintenance, and municipal operations related to tree trimming and land clearing. While Iowa has some forested areas, particularly in the eastern and southern portions of the state, it does not have a large-scale commercial forestry industry. As a result, wood waste generation in Iowa is driven more by development patterns and infrastructure activity than by continuous timber production.

In addition to these routine sources, Iowa periodically experiences significant surges in wood waste generation associated with severe weather events. The Iowa derecho of 2020, for example, resulted in widespread tree damage and generated substantial volumes of woody debris across multiple regions of the state. These episodic events can produce large quantities of material over short periods of time, placing temporary strain on local collection systems, processing capacity, and disposal infrastructure. As a result, planning for wood waste management in Iowa requires consideration of both baseline generation and the system's ability to respond to infrequent but high-volume events.

Wood waste also varies widely in physical and chemical characteristics. Clean, untreated wood can often be recovered for beneficial uses such as mulch production, composting support, or biomass fuel. In contrast, treated, painted, or composite wood materials may be limited to disposal or specialized processing due to the presence of contaminants. This variability, combined with differences in how materials are generated and managed across sectors, makes wood waste a complex material stream to characterize and plan for at a statewide level.

Understanding the sources and characteristics of wood waste is essential for identifying practical opportunities to improve recovery, support existing markets, and reduce disposal. In Iowa, this requires considering not only the portion of wood waste captured in landfill disposal data, but also materials managed through reuse, storm response activities, on-site practices, and existing recycling or processing systems that may not be consistently tracked.

1.2 GENERATION ESTIMATES

Wood waste generation in Iowa is not captured by a single data source. Instead, available information reflects different portions of the overall material stream. Statewide waste characterization studies provide insight into wood disposed in MSW and C&D, while national datasets and planning-level factors help approximate total generation across all sectors. The 2022 Iowa Statewide Material Characterization Study found that more than seven percent of total disposed MSW and more than 20 percent of all disposed C&D consisted of dimensional lumber, engineered wood products, and painted or treated materials.

Waste characterization data indicate that wood represents a meaningful component of the disposed waste stream, particularly within C&D activities where treated and painted wood can account for a substantial share of materials. However, these data reflect only the portion of wood waste that is landfilled and do not capture materials managed through reuse, processing, or on-site practices.

To provide a more complete picture, national per capita estimates suggest that approximately 106 pounds of wood waste are generated per person annually in the United States. Applied to Iowa's population, this equates to roughly 170,000 tons of wood waste generated per year. This estimate includes wood managed across all pathways, including reuse, recycling, and disposal, but does not reflect year-to-year variability associated with construction activity or storm events.

Additional context can be drawn from sector-based indicators. In Iowa, wood waste generation is driven primarily by C&D activity, packaging materials such as pallets and crates, and urban tree and land clearing activities. Unlike heavily forested states, Iowa does not generate significant quantities of forestry residues from commercial timber operations. As a result, wood waste in the state is more closely tied to development patterns and episodic events, rather than continuous industrial forestry production.

Given these factors, wood waste generation in Iowa is best understood as a composite of multiple sources, with C&D activities representing the largest and most consistent contributor, supplemented by smaller but variable contributions from municipal, commercial, and storm-related materials.

Because no single dataset captures all wood waste generated in Iowa, this assessment uses multiple indicators to characterize the material stream. Waste characterization data provide the best available estimate of wood disposed through MSW and C&D pathways, while national per capita estimates and sector-based indicators help identify additional wood managed through reuse, recycling, storm debris response, land clearing, or on-site practices. Together, these indicators provide a planning-level picture of wood waste generation and help distinguish routine disposal opportunities from less predictable, event-driven material flows. Table 12 below provide planning level data pertaining to wood waste generation by various generating sectors.

Table 12. Planning-Level Wood Waste Generation Indicators for Iowa

Estimation Method	What It Measures	Iowa-Relevant Data / Indicator	Planning Interpretation	Key Limitation
Waste characterization – MSW	Wood disposed in municipal solid waste	Untreated wood: 2.3% of overall MSW; treated wood: 4.9% of overall MSW	Establishes the portion of wood currently reaching MSW disposal and represents a near-term landfill diversion opportunity.	Captures only disposed material; does not include wood reused, recycled, burned, chipped, or otherwise managed outside MSW.
Waste characterization	Wood disposed	Untreated wood: 0.5%; treated wood: 3.1%	Indicates residential wood disposal is present but smaller	Does not fully capture home renovation debris

Estimation Method	What It Measures	Iowa-Relevant Data / Indicator	Planning Interpretation	Key Limitation
– residential MSW	from households		than ICI and C&D sources.	that may move through C&D or private hauling pathways.
Waste characterization – ICI MSW	Wood disposed from industrial, commercial, and institutional sources	Untreated wood: 3.6%; treated wood: 6.0%	Suggests nonresidential generators contribute a larger share of disposed wood, likely including packaging, pallets, fixtures, and renovation-related materials.	Does not capture materials that have been donated or reused.
Waste characterization – C&D	Wood disposed in C&D	Wood pallets: 2.8%; untreated dimensional lumber: 4.4%; untreated wood: 1.4%; painted/stained wood: 11.6%	Indicates C&D is likely one of the most important wood waste streams for statewide planning, especially for source separation and recovery strategies.	C&D wood quality varies widely; painted, stained, treated, and engineered wood may have limited recovery options.
National per capita estimate	Total wood waste generated across all management pathways	EPA estimate: 106 pounds/person/year; applied to Iowa = approximately 172,000 tons/year	Provides an order-of-magnitude estimate of total wood waste generation, including material not captured in landfill characterization studies.	National average may not reflect Iowa-specific construction activity, storm debris, forestry activity, or existing reuse/recycling practices.
Sector-based proxy – C&D activity	Wood generated through building, remodeling, and demolition	Construction activity, demolition activity, and C&D disposal trends	Helps identify wood generation drivers and regional hotspots tied to development and redevelopment.	Requires additional assumptions or local data; not currently a direct statewide tonnage estimate.
Sector-based proxy – storm debris	Episodic woody debris from severe weather	Derecho and severe storm debris volumes, municipal debris management records, FEMA/public	Important for resilience planning because storms can generate large short-term surges that exceed routine processing capacity.	Highly variable by year and event; should be treated separately from baseline annual generation.

Estimation Method	What It Measures	Iowa-Relevant Data / Indicator	Planning Interpretation	Key Limitation
		assistance records where available		
Sector-based proxy – forestry/land clearing	Wood from timber activity, land clearing, and tree removal	Forestry activity, land clearing, municipal tree trimming, utility clearing	Useful for capturing wood managed outside the MSW/C&D system, especially chipped, burned, or used on-site.	Iowa is not a forestry-heavy state, so this stream may be locally important but not the dominant statewide driver.

For planning purposes, Iowa's routine annual wood waste generation is estimated at approximately 575,000 to 600,000 tons per year. This estimate combines a population-scaled MSW wood estimate with a population-scaled C&D wood estimate. EPA estimated that 18.1 million tons of wood were generated in the national MSW stream in 2018, while wood products accounted for 40.8 million tons of national C&D debris generation. Scaled to Iowa's 2024 population, these national benchmarks suggest approximately 179,000 tons per year of MSW wood and 405,000 tons per year of C&D wood, for a combined estimate of approximately 584,000 tons per year.

This estimate should be considered a planning-level generation estimate, not a measured Iowa tonnage. It is useful for establishing the order of magnitude of the wood waste stream and comparing wood waste to other organic materials addressed in the plan. Waste characterization data from Iowa can then be used to identify the portion of this material currently appearing in disposed MSW and C&D streams, including untreated wood, treated wood, pallets, dimensional lumber, and painted or stained wood. Table 13 below compares national and Iowa wood waste generation figures.

Table 13. Wood Waste Generation – Planning Level

Estimate Component	National Basis	Iowa Planning Estimate	What This Represents
MSW wood	18.1 million tons nationally	~179,000 tons/year	Wood entering the MSW stream, including discarded wood products such as packaging, furniture, and small-scale residential debris
C&D wood products	40.8 million tons nationally	~405,000 tons/year	Wood generated through construction, renovation, and demolition activities; represents the largest and most consistent source of wood waste in Iowa
Routine annual wood waste estimate	MSW + C&D wood	**~584,000 tons/year**	Total estimated annual wood waste generation across major sectors (excluding episodic events)
Storm debris / derecho-related wood	Event specific	Not included	Episodic woody debris generated during severe weather events; important for capacity and resiliency

			planning but not part of routine annual generation

1.3 CURRENT MANAGEMENT PRACTICES

Wood waste in Iowa is managed through a combination of reuse, processing, energy recovery, and disposal pathways. Unlike some other organic materials, wood waste is not typically managed through a single, unified system. Instead, management practices vary widely depending on material type (e.g., clean vs. treated wood), source (e.g., residential, commercial, or construction and demolition), and local access to processing infrastructure and markets.

1.3.1 Collection and Transportation

Wood waste is collected through a mix of municipal services, private hauling, and self-haul by generators. Residential wood waste, including small quantities from home improvement or yard-related activities, is often managed through curbside bulky waste collection, drop-off sites, or direct disposal at landfills. Larger volumes—particularly from C&D activities—are typically handled by private contractors and transported in roll-off containers to disposal or processing facilities. Commercial and industrial generators may manage wood waste through contracted hauling services, particularly for pallet recovery or manufacturing byproducts.

Collection practices are influenced by service structure (e.g., municipal vs. subscription-based systems), generator size, and material type. In many cases, especially in rural areas, generators may rely on self-haul or on-site management practices, including stockpiling, grinding, or burning where permitted.

1.3.2 Processing and Beneficial Use

Clean, untreated wood is commonly processed into mulch, wood chips, or other products for landscaping, erosion control, or use as a bulking agent in composting systems. Grinding and chipping operations may occur at dedicated facilities, landfill sites, or mobile processing operations. Some wood waste may also be used as a biomass fuel, although the extent of biomass energy utilization in Iowa is not well documented at the statewide level.

Pallets and other wood packaging materials represent a distinct management pathway, as they are often recovered, repaired, and reused through established private-sector networks. This reuse pathway reduces the volume of wood entering the waste stream and is typically not captured in disposal data.

Wood waste may also be processed into biochar through pyrolysis, a thermal process that converts organic material into a stable, carbon-rich product. Biochar can be used for soil amendment, stormwater management, and carbon sequestration applications. While biochar production is not currently a widespread management pathway for wood waste in Iowa, it represents a potential opportunity for clean, untreated wood materials, particularly in rural or agricultural settings. Feedstock quality is a key consideration, as treated or contaminated wood is generally not suitable for biochar production due to the potential for concentrating metals or other contaminants.

1.3.3 Management of Lower-Quality or Contaminated Wood

Treated, painted, or composite wood materials have more limited management options due to the presence of coatings, adhesives, or preservatives. These materials are generally not suitable for mulch production, composting, or certain forms of energy recovery. As a result, they are more likely to be disposed of in permitted landfills. In some cases, these materials may be segregated for specialized processing or energy recovery, but such practices are not consistently available across the state.

1.3.4 Disposal and On-Site Management

A portion of wood waste, particularly mixed, contaminated, or lower-value materials, is disposed of in municipal solid waste or C&D landfills. Waste characterization data indicate that wood remains a notable component of the disposed waste stream, particularly within C&D debris.

In addition to landfill disposal, some wood waste is managed on-site, particularly in rural or agricultural settings. Practices may include open burning (where permitted), chipping for on-site use, or incorporation into land management activities. These pathways are not consistently tracked and contribute to uncertainty in statewide management estimates.

1.3.5 Storm Debris Management

Severe weather events can generate substantial quantities of woody debris over short periods of time. These materials are typically managed through temporary staging, grinding, and redistribution or disposal, often coordinated at the municipal or regional level. While these events are episodic, they can place significant short-term demands on collection systems, processing capacity, and available disposal infrastructure.

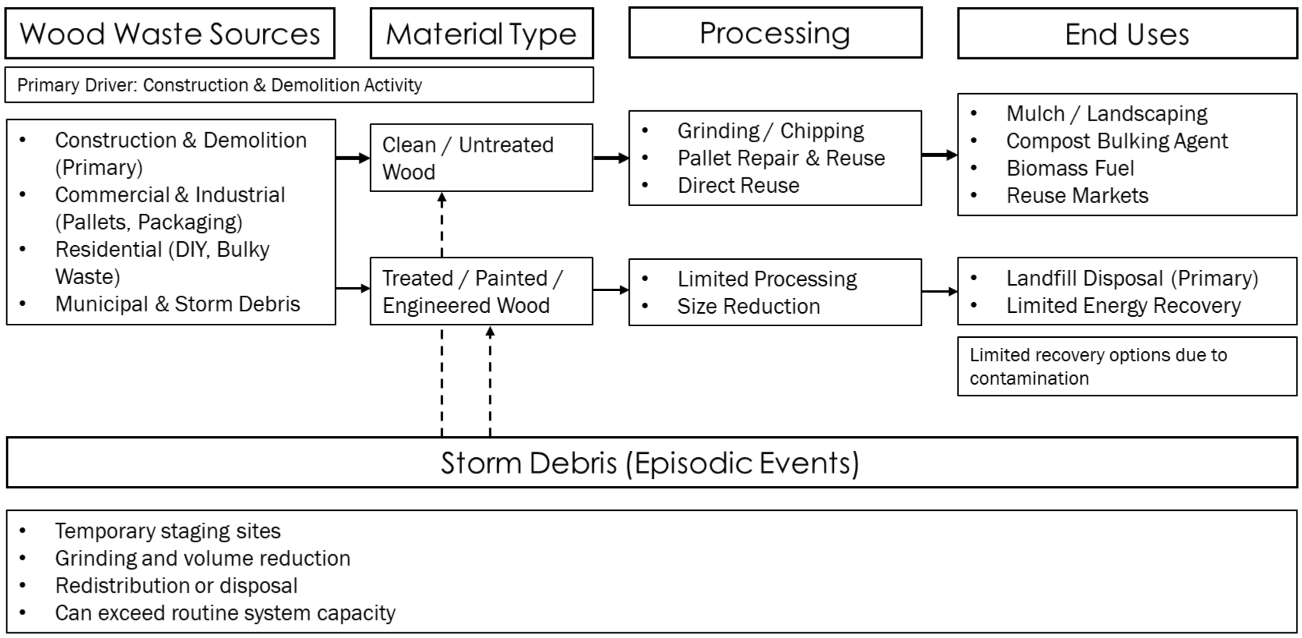
Biochar production may also provide a potential management pathway for large volumes of clean woody debris generated during storm events, where temporary surges in material exceed conventional processing capacity.

1.3.6 Material Flow Overview

Overall, wood waste management in Iowa is characterized by a decentralized system with multiple pathways and limited statewide data on material flows. Clean wood is often successfully diverted through reuse or processing markets, while mixed or contaminated wood is more likely to be disposed. Access to processing infrastructure, transportation distances, and market conditions play a significant role in determining management outcomes, particularly in rural areas.

Figure 20 (next page) illustrates the primary pathways for wood waste management in Iowa, from generation through processing and end use. It highlights how material type, particularly the distinction between clean and treated wood, influences available management options, including reuse, recycling, energy recovery, and disposal. The diagram also reflects the decentralized nature of the system and the role of episodic storm debris in creating short-term surges in material flows.

Figure 20. Wood Waste Management Pathways in Iowa



2.0 KEY CHALLENGES AND OPPORTUNITIES

The following challenges and opportunities reflect current conditions in Iowa and are intended to inform the implementation strategies outlined in this plan.

2.1 KEY CHALLENGES

Key challenges for improving wood waste management in Iowa reflect the material's wide variability and inconsistent source separation, which complicate recovery logistics, processing options, and reliable end markets:

- Heterogeneity of material streams: Wood waste includes a wide range of materials, from clean, untreated wood to painted, treated, or composite products, which limits consistent recovery and reuse options.

- Limited source separation in C&D activities: C&D sites often do not consistently separate wood waste, leading to higher disposal rates and reduced recovery potential.

- Variable access to processing and markets: Facilities and markets for wood waste processing (e.g., mulch, biomass, engineered products) are not uniformly available across the state.

- Transportation and logistics constraints: The cost of transporting bulky, low-density materials like wood waste can limit recovery in areas without nearby processing facilities.

- Data limitations: Wood waste generation and diversion are not always well tracked, making it difficult to assess system performance and identify priority opportunities.

2.2 KEY OPPORTUNITIES

Opportunities exist to expand recovery of wood waste from C&D sources, increase processing into mulch or engineered wood products, and improve separation at the point of generation. Clean wood streams may also support composting operations or biomass energy applications. In addition, improving storm debris management practices could enhance recovery during large-scale events. Iowa can increase wood waste diversion by improving separation at the point of generation and strengthening local processing and end-use pathways for clean and storm-generated wood streams:

Composting and Anaerobic Digestion

- Integration with composting systems: Wood waste can support composting operations by providing structure and aeration, particularly when processed into chips or mulch.

Collection Systems

- Expansion of source separation practices: Improved separation of wood waste at construction and demolition sites can significantly increase recovery rates and material quality.

- Improved storm debris management: Planning for recovery and processing of wood waste during storm events can increase diversion and reduce landfill burden during peak periods.

Market Development

- Existing markets for clean wood waste: Clean wood can be used for mulch, compost bulking agents, biomass fuel, and other applications, providing multiple pathways for beneficial use.

- Market development for lower-grade materials: Exploring additional uses for mixed or lower-quality wood waste could expand diversion opportunities over time.

Appendix D

Statewide Organic Waste Baseline

Biosolids

1.0 BIOSOLIDS

1.1 MATERIAL DESCRIPTION

Biosolids are the stabilized organic solids produced during the treatment of wastewater at municipal and industrial water resource recovery facilities (WRRFs). Unlike other organic materials, biosolids generation is closely tied to population served and wastewater treatment processes, resulting in a relatively consistent and predictable material stream.

1.2 GENERATION ESTIMATES

Iowa does not maintain a single consolidated statewide estimate of biosolids generation. However, planning-level estimates can be developed using standard per capita generation factors commonly applied in wastewater planning. Typical biosolids production in the United States ranges from approximately 0.04 to 0.06 dry tons per person per year.

Applying a midpoint factor of 0.05 dry tons per person per year to Iowa's population of approximately 3.2 million results in an estimated 160,000 dry tons per year. On a wet weight basis (assuming 20 to 25 percent solids content), this corresponds to approximately 650,000 to 800,000 wet tons per year. Table 14 below shows the estimated total tons of biosolids generated in Iowa.

Table 14. Estimated Biosolids Generation in Iowa

Metric	Value
Population	~3.2 million
Generation factor (dry tons/person/year)	0.05
Estimated dry tons/year	~160,000
Estimated wet tons/year	~650,000–800,000

This estimate provides an order-of-magnitude understanding of biosolids generation in Iowa. Because biosolids generation is closely linked to population and wastewater flows, future quantities are expected to remain relatively stable, with only modest changes over time.

1.3 CURRENT MANAGEMENT PRACTICES

Biosolids in Iowa are managed through a combination of established practices, with land application as the predominant pathway. Available data indicate that approximately 70 percent of biosolids in Iowa are managed through land application, with the remaining portion primarily managed through incineration and limited alternative pathways.

Following treatment to reduce pathogens and stabilize the material, biosolids are beneficially used as a soil amendment due to their nutrient content and organic matter. Consistent with national trends and available state-level information, land application is estimated to account for the majority of biosolids management in Iowa, with other pathways representing smaller but important components of the overall system.

Other management pathways include:

- Anaerobic digestion, which stabilizes biosolids and produces biogas
- Composting, which produces a marketable soil amendment
- Limited disposal, including landfill use in certain circumstances

Table 15 below estimates the management pathways for biosolids in Iowa.

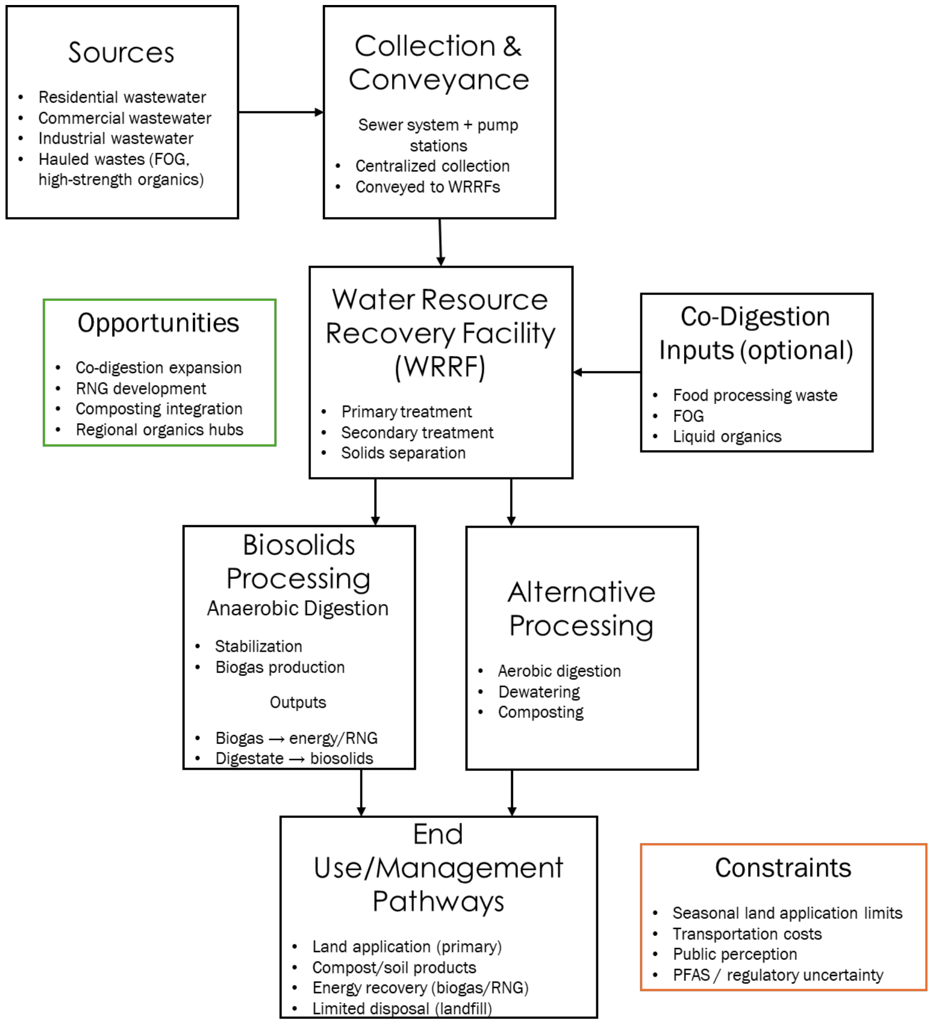
Table 15. Estimated Biosolids Management Pathways (Planning-Level)

Management Pathway	Estimated Share	Description
Land application	~70%	Primary management method; biosolids applied to agricultural land as a soil amendment
Anaerobic digestion (with or without energy recovery)	10–25%	Stabilization process used at larger facilities; may include biogas capture for energy or RNG
Composting	<10%	Further processing to produce a marketable soil amendment; often co-managed with yard waste
Incineration and other disposal	~20–30%	Primarily incineration at a single facility; landfill disposal of biosolids is prohibited in Iowa

Note: Estimates are based on national trends and regional practices and are intended for planning purposes in the absence of comprehensive statewide reporting data.

Figure 21 (next page) illustrates the primary pathways through which biosolids are generated and managed in Iowa, beginning with wastewater collection and treatment at water resource recovery facilities (WRRFs) and extending through stabilization, processing, and end use. The diagram also highlights opportunities for co-management with other organic materials and areas where system constraints or gaps may influence management practices.

Figure 21. Sewage Sludge/Biosolids Generation and Management Pathways in Iowa



1.3.1 Land Application

Land application is the predominant management pathway for biosolids in Iowa, reflecting the state's strong agricultural base and the nutrient value of treated biosolids. Following treatment to meet regulatory standards for pathogen reduction and vector attraction reduction, biosolids are applied to agricultural land as a soil amendment, providing nitrogen, phosphorus, and organic matter that support crop production and soil health.

This approach is widely used due to its relative cost-effectiveness compared to alternative management options and the availability of agricultural land across much of the state. In many cases, land application programs are well-established and integrated into local and regional nutrient management practices.

However, land application is influenced by several operational and logistical factors:

- Seasonality and weather constraints: Application is typically limited during winter months or periods of saturated or frozen ground, requiring storage or alternative management during these periods.
- Land availability and proximity: Suitable application sites must meet regulatory requirements and be located within a practical hauling distance of the generating facility.
- Transportation costs: Biosolids are high in moisture content, making transportation a significant cost factor, particularly for smaller or more remote facilities.
- Public perception and siting considerations: Odor concerns and public acceptance can influence where and how biosolids are applied.

In addition, land application may face increasing scrutiny due to emerging concerns about contaminants such as per- and polyfluoroalkyl substances (PFAS), which are likely to influence future regulatory requirements and management practices.

In some regions, biosolids land application also competes with other organic materials, including compost and digestate, for available land and nutrient capacity, which may influence long-term management strategies.

Despite these constraints, land application is expected to remain a central component of biosolids management in Iowa, particularly in rural and agricultural regions. Future planning efforts may focus on optimizing application practices, improving nutrient management coordination, and evaluating complementary management pathways to increase system flexibility.

1.3.2 Collection and Infrastructure

Biosolids are generated and managed within Iowa's network of municipal wastewater treatment systems, referred to in this report as water resource recovery facilities (WRRFs). These facilities receive wastewater from residential, commercial, and industrial sources and serve as the primary points of biosolids generation, treatment, and management.

Iowa's wastewater treatment system is large and decentralized, with approximately 870 WRRFs statewide, including just over 100 larger facilities that account for the majority of treatment capacity. Biosolids management practices vary across this system, with larger facilities generally having more advanced treatment and processing capabilities, while smaller systems rely on simpler stabilization and handling approaches.

1.3.3 Collection and Conveyance

Unlike other organic materials, biosolids are not collected through separate programs but are instead centrally conveyed through sewer infrastructure. Wastewater is transported via gravity sewers and pump stations to WRRFs, where solids are separated and treated.

In addition to wastewater solids generated onsite, some WRRFs accept hauled liquid wastes, including fats, oils, and grease (FOG) and high-strength industrial organic wastes. These materials are typically delivered by truck and may be incorporated into treatment processes, including anaerobic digestion, where infrastructure allows.

1.3.4 Processing Infrastructure

Biosolids processing infrastructure in Iowa is concentrated at larger WRRFs and includes:

- Anaerobic digestion systems, used to stabilize solids and, in some cases, produce biogas for energy recovery
- Biogas utilization systems, including electricity generation and thermal use
- Renewable natural gas (RNG) upgrading systems at a limited number of facilities
- Composting operations, typically at select facilities or in combination with other organic materials

Planning-level estimates suggest that approximately 20 to 30 WRRFs in Iowa utilize anaerobic digestion, primarily at larger facilities, as smaller systems typically rely on simpler stabilization methods such as aerobic digestion or lagoons. Of these, only a limited number have implemented RNG upgrading, though additional projects are planned or under development.

A limited number of WRRFs in Iowa currently accept external organic materials for processing alongside wastewater solids. These materials, typically high-strength liquid wastes such as FOG and food processing residuals, are delivered to WRRFs and incorporated into treatment processes, including anaerobic digestion where available. While established programs exist in larger systems such as Des Moines, co-digestion remains an emerging practice statewide and is generally constrained by infrastructure, pretreatment requirements, and contamination considerations. Table 16 below provides co-digestion examples for WRRFs in Iowa.

Table 16. Co-Digestion Examples at Iowa WRRFs (Planning-Level)

Facility	Co-Processed Materials	Delivery Method	Key Infrastructure / Notes
Des Moines Metropolitan Wastewater Reclamation Authority (WRA)	Hauled high-strength organic wastes (including FOG and industrial liquid wastes)	Hauled (truck)	Established anaerobic digestion system that blends hauled wastes with biosolids to increase biogas production; generates renewable energy from biogas
Muscatine Water & Resource Recovery Facility (MARRVE program)	Food waste and organic residuals	Hauled (with preprocessing)	Accepts and processes food waste as part of wastewater treatment operations; includes depackaging and pretreatment; produces biogas and biosolids for beneficial use
Additional WRRFs (statewide – planning-level)	Primarily FOG and industrial liquid wastes	Hauled	Co-digestion is emerging; typically limited to liquid or pumpable high-strength wastes due to infrastructure, pretreatment, and contamination constraints

Several WRRFs in Iowa illustrate the range of biosolids management approaches currently in use. The Des Moines Metropolitan Wastewater Reclamation Authority operates advanced anaerobic digestion and renewable natural gas (RNG) infrastructure, including the co-processing of external organic wastes. The City of Muscatine has implemented a resource recovery program that integrates food waste and high-strength organic materials into its treatment system to produce biogas and beneficially use biosolids. In early 2026, the City suspended this program as it evaluates operational costs.

In Davenport, biosolids are composted with yard waste to produce a Class A soil amendment marketed to the public, demonstrating an alternative value-added pathway. In contrast, the Cedar Rapids Water Pollution Control Facility operates the state's only biosolids incinerator, with residual ash beneficially used as landfill cover. These examples highlight the diversity of infrastructure and management approaches across the state and illustrate potential pathways for future system expansion.

Together, these examples demonstrate that while land application remains the dominant pathway, Iowa's biosolids infrastructure already supports a range of management approaches that could be expanded or replicated under the right conditions.

1.3.5 Role in the Broader Organics System

Iowa's network of WRRFs represents one of the state's most significant existing infrastructure systems for managing organic materials. While the primary function of these facilities is wastewater treatment and biosolids stabilization, some larger facilities also operate anaerobic digesters, biogas utilization systems, or receive hauled high-strength organic wastes such as FOG and food processing residuals.

A limited number of facilities are exploring or implementing enhanced resource recovery approaches, including co-digestion and RNG production. However, these systems are not yet widespread and are generally concentrated at larger facilities with sufficient operational capacity, pretreatment infrastructure, and access to end-use markets.

Expansion of WRRF-based organics management in Iowa may be constrained by:

- Availability of receiving and pretreatment infrastructure
- Operational and design limitations
- Contamination concerns associated with external feedstocks
- Economic feasibility and market development

Despite these constraints, WRRFs may represent an important long-term opportunity for expanding organics diversion and resource recovery through the use of existing infrastructure systems.

In addition to land application, a portion of biosolids in Iowa is managed through incineration, with a single facility in Cedar Rapids providing this capability.

1.3.6 Current Uses, Products, and Markets

As shown in Table 17 below, biosolids generated at WRRFs move through processing and stabilization before reaching end-use pathways. In Iowa, these downstream management options, land application, composting, energy recovery, and limited disposal, vary in their level of maturity and market development, with land application representing the dominant and most established pathway. The viability of each pathway is influenced by regulatory requirements, infrastructure availability, market demand, and site-specific factors such as transportation distance and material characteristics. Understanding these differences helps identify where Iowa's biosolids system is well-established and where opportunities exist to expand resource recovery or diversify management approaches. This distribution reflects Iowa's agricultural context and regulatory framework, which strongly favor beneficial use of biosolids through land application.

Table 17. Relative Maturity of End-Use Pathways

End Use Pathway	Description	Relative Maturity	Key Considerations
Land application	Application of treated biosolids to agricultural land as a soil amendment	High	Established regulatory framework; cost-effective; dependent on land availability, weather, and public acceptance
Compost / soil products	Composting of biosolids alone or with other organics to produce marketable soil amendments	Moderate	Requires processing infrastructure and market development; potential for higher-value products but limited scale
Energy recovery (biogas/RNG)	Anaerobic digestion with capture and use of biogas for electricity, heat, or RNG	Moderate	Concentrated at larger facilities; capital-intensive; growing interest due to energy and climate benefits
Nutrient recovery (emerging technologies)	Recovery of nutrients (e.g., phosphorus) through advanced treatment processes	Low	Limited deployment; high capital cost; potential long-term value as technologies mature
Incineration/residual disposal	Thermal treatment with ash beneficially reused (e.g., landfill cover)	Low	Limited to a single facility; used where land application or other pathways are not feasible

A small portion of biosolids in Iowa is treated to meet Class A Exceptional Quality (EQ) standards, allowing for broader distribution and use in compost and other soil products. However, much of this material is still ultimately land applied, rather than marketed through distinct product channels.

Overall, biosolids management in Iowa is characterized by a strong reliance on mature land application markets, with emerging opportunities to expand resource recovery through composting, energy production, and advanced treatment technologies where conditions support investment.

2.0 KEY CHALLENGES AND OPPORTUNITIES

The following challenges and opportunities reflect current conditions in Iowa, as described in the preceding sections on generation and management. Together, they highlight the key barriers to diversion as well as the most practical entry points for implementation.

2.1 KEY CHALLENGES

Several factors influence biosolids management in Iowa:

- Regulatory requirements: Biosolids management is governed by established state and federal regulations that define allowable treatment methods and end uses.
- Public perception and acceptance: Concerns related to odors, environmental impacts, and land application practices can affect siting and program expansion.
- Land availability and logistics: Access to suitable land for application, along with transportation distances, can constrain management options in some regions.
- Infrastructure and cost considerations: Advanced treatment technologies, such as anaerobic digestion, thermal processing, or nutrient recovery, require significant capital investment and operational expertise.
- Nutrient management pressures: Nitrogen and phosphorus management is an increasing focus in Iowa, particularly in relation to water quality goals and agricultural runoff. These considerations may influence biosolids land application practices, including application rates, site availability, and long-term regulatory requirements.
- Emerging contaminants (e.g., PFAS): Emerging contaminants such as PFAS are an increasing focus in biosolids management nationwide. PFAS compounds, which are persistent in the environment and resistant to conventional treatment processes, can be present in biosolids due to industrial, commercial, and household sources entering wastewater systems. While regulatory approaches continue to evolve at both the state and federal levels, the presence of PFAS may influence future biosolids management practices—particularly land application—by introducing additional monitoring requirements, application restrictions, or treatment standards. As a result, PFAS represents a key area of uncertainty for long-term planning and may affect costs, public acceptance, and the viability of certain beneficial use pathways.

2.2 KEY OPPORTUNITIES

Biosolids represent a well-established and largely managed material stream in Iowa, with opportunities focused on optimization, diversification, and integration rather than large increases in diversion. Key opportunities include:

Composting and Anaerobic Digestion

- Enhanced resource recovery: Expanding anaerobic digestion and biogas utilization (including RNG) can increase energy recovery and improve system efficiency.

- Expanded co-digestion and co-processing: Integrating food waste and other organic materials into existing WRRF infrastructure can provide cost-effective diversion pathways.

System Integration

- Optimization of land application systems: Improving coordination of nutrient management, site availability, and hauling logistics to increase efficiency and resilience of existing programs.

- Improved system integration: Coordinating biosolids management with broader organics systems can improve infrastructure utilization and reduce competition for end-use markets.

Market Development

- Composting and product development: Co-composting biosolids with yard waste or other organics can produce marketable soil amendments and reduce reliance on land application alone.

Data, Measurement, and Tracking

- Data collection and performance tracking: Improved data on biosolids generation, management pathways, and end uses can support more informed planning and policy development.

Appendix E

Statewide Organic Waste Baseline

Agricultural Waste

1.0 AGRICULTURAL WASTE

1.1 MATERIAL DESCRIPTION

Agricultural operations in Iowa generate substantial quantities of organic materials, including manure and ancillary wastes such as bedding, spoiled feed, and animal mortalities. These materials represent one of the largest organic material streams in the state by volume.

However, unlike other materials evaluated in this Plan, agricultural wastes are primarily managed within established agricultural systems and are overseen by agencies outside the scope of this project. Based on project direction and stakeholder input, agricultural waste management is not a focus of this Plan.

Nevertheless, given the scale of these materials and their potential interaction with other organic material streams, this section provides a high-level overview of how agricultural systems relate to Iowa's broader organics management framework and identifies limited areas for coordination.

1.2 CURRENT MANAGEMENT PRACTICES

Agricultural organic materials in Iowa are predominantly managed through well-established, on-site systems that are integrated into agricultural operations. Land application of manure is the primary management pathway, supporting nutrient recycling and soil health while aligning with farm-specific nutrient management planning.

Additional management practices include on-farm composting of solid materials and a growing number of anaerobic digestion systems that process agricultural feedstocks to produce biogas for energy use. These systems are typically designed around the operational needs of individual farms or agricultural enterprises and are influenced by site-specific conditions, livestock type, and regulatory requirements.

As a result, agricultural waste is largely managed independently of municipal solid waste and commercial organics systems, with limited reliance on off-site infrastructure.

While agricultural waste is primarily managed within its own system, there are areas where it intersects with broader organics management efforts in Iowa. These intersections represent opportunities for coordination rather than system transformation.

Key points of interaction include:

- Co-digestion opportunities: In some cases, manure may be combined with food waste or other organic materials in anaerobic digestion systems to improve performance and support renewable energy production.

- Use of finished products: Agricultural operations may serve as end users of compost, digestate, or other soil amendments derived from non-agricultural organic materials.

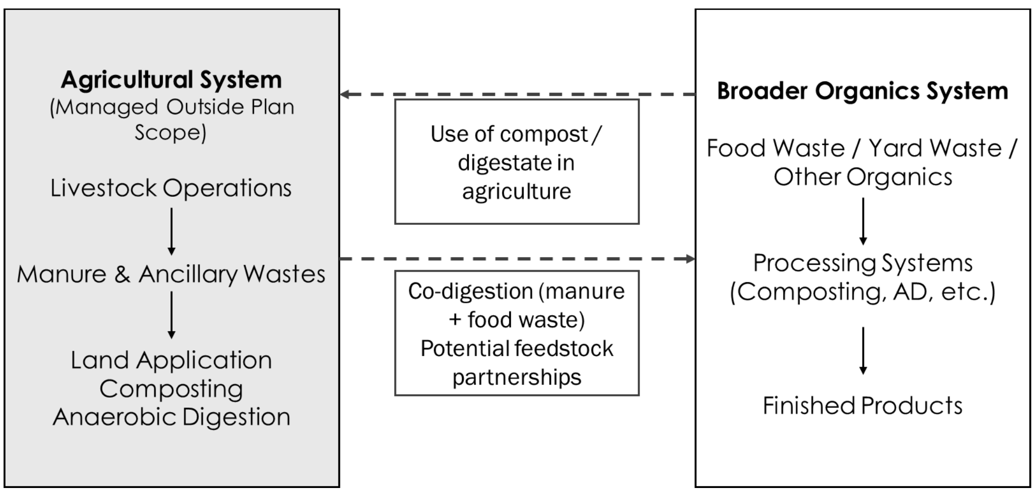
- Localized feedstock integration: In regions where agricultural and non-agricultural organic materials are co-located, there may be opportunities for limited integration through partnerships or shared infrastructure.

These interactions are typically site-specific and dependent on logistics, infrastructure availability, and operational compatibility.

1.2.1 Material Flow Overview

Figure 22 below illustrates the relationship between agricultural waste management systems and the broader organics management framework in Iowa. Agricultural materials are primarily managed within established, on-site systems, with land application representing the dominant pathway. The figure highlights limited but important points of interface, such as co-digestion and the use of finished products, where coordination between systems may occur under appropriate conditions.

Figure 22. Agricultural System and Points of Interface with Broader Organics Management



2.0 KEY OPPORTUNITIES

Given the established nature of agricultural waste management in Iowa, opportunities in this Plan do not focus on altering existing agricultural systems. Instead, they emphasize areas where coordination with other organic material streams may provide mutual benefit.

These opportunities are reflected in strategy areas related to anaerobic digestion, preprocessing and feedstock management, and partnership development. Further exploration may occur through pilot projects, stakeholder collaboration, and ongoing evaluation of system integration opportunities.

Uses of Nutrient Products

- Leverage existing nutrient management systems: Agricultural land application systems provide an established and effective pathway for nutrient reuse that may complement broader organics strategies.

Anaerobic Digestion

- Support targeted anaerobic digestion development: Agricultural operations may serve as anchor feedstock providers for digestion systems that also accept other organic materials in appropriate locations.

Partnership Based Approaches

- Explore co-digestion partnerships: Integration of manure with food waste or other organics may improve system performance and economic feasibility where conditions allow.

- Encourage pilot and partnership-based approaches: Collaboration between agricultural operations, municipalities, and private-sector entities may help identify practical, scalable models for integration.