

Deep Dive

Overcoming the Food-Waste Challenge: Improving Profit While Doing Good

Food waste is an enormous challenge across the global agriculture, grocery, restaurant and consumer landscape. We explore the scope of this issue for food retailers in North America and discuss how technology can be used to manage and reduce food waste for the benefit of retailers and the environment. Our analysis is based on proprietary survey findings and exclusive interviews with leading grocery retailers.

- **Enormous loss of revenue**—About 30% of food in US grocery stores is thrown away, according to ReFED, and edible food is also discarded by restaurants, agriculture and consumers. We estimate that food waste costs the grocery industry $16 billion in net income annually.
- **Additional economic, societal and environmental costs**—Grocery retailers also face additional costs in disposing of wasted food, and the process of food disposal generates carbon and other emissions. An estimated 50 million people in the US will face food insecurity in 2022, according to ReFED.
- **Lack of definition and accountability in food retailing**—The grocery retailers we surveyed lack a cohesive definition of food waste, and the responsibility and accountability for food waste varies greatly among departments. Finding an industry-wide solution to food waste is more challenging due to these inconsistencies.
- **Food waste is a key element for sustainability initiatives in grocery retail**—90% of respondents in Coresight Research's survey of North American grocery retailers said that reducing food waste is important for reaching their sustainability goals, and 72% have set sustainability goals specific to food waste.
- **The technology to solve this urgent issue is here today**—84% of grocery retailers plan to invest in technology over the next two years to manage food waste. Retailers can take command of their data and unlock its power with low-cost, fundamental technologies such as RFID, blockchain and AI (artificial intelligence) software, which enhance demand forecasting and inventory management.

What We Think: Grocery retailers now have access to several technologies, including AI-based demand forecasting, to capitalize on the opportunity to improve profits while reducing the costly disposal of edible food into landfills.

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Introduction

What's the Story?

Food waste reduces grocery retailers' profitability and negatively impacts the environment, occupying space in landfills and generating carbon and greenhouse gas emissions.

An enormous amount of food goes to waste in the US and around the world while millions of people suffer food insecurity. There are several sources of food waste: homes (accounting for 37% of total food waste in the US, according to national nonprofit ReFED); restaurants, food retail (12%); farms (21%) and manufacturers (14%).

In this report, we focus on food waste occurring at grocery retailers, as highlighted in Figure 1. Edible food waste reduces grocery retailers' profitability and negatively impacts the environment, occupying space in landfills and generating carbon and greenhouse gas emissions. However, much of this waste can be avoided through the use of technology.

We explore the scope of the food-waste issue for grocery retailers and discuss how technology can be used to manage and reduce waste. Our analysis is based on proprietary survey findings and exclusive interviews with leading grocery retailers.

Figure 1. Sources of Food Waste and Share of Total



Source: ReFED/Coresight Research

Why It Matters

Food waste has wide-ranging economic, social and environmental consequences on a global basis. The United Nations' Environment Programme estimated that global food waste amounted to 931 million tons in 2021, and a 2011 study (latest available data) by the UN Food and Agriculture Organization estimated that food waste caused a $750 billion economic impact (excluding fish and seafood) and generating 3.3 billion metric tons of CO2e (carbon dioxide equivalents) into the air, and the current figure is likely much higher.

The magnitude of food waste has likely become even more acute than previous estimates in the current pandemic-impacted environment, with consumers having increased the share of food they purchase from grocery stores (as opposed to at restaurants) while sheltering and working from home. This larger volume of food passing through grocery retailers likely results in an even greater amount of food waste, particularly as retailers are experiencing supply chain shortages and finding demand forecasting even more challenging amid rapidly shifting consumer buying patterns.

Focusing on the US, we outline the costs of food waste in Figure 2 and discuss each in further detail below.

- While the calculation below sizes the lost revenues arising from food waste, if grocery food waste fell to zero, retail revenues would remain the same,

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though grocers would be freed from the cost burden of unsold food and its disposal costs.

Figure 2. US: Selected Costs of Food Waste

Type of Cost	Cost	Amount
Economic and Investor	Potential Lost Grocery Revenues	$482 billion*
	Potential Lost Grocery Profits	$16 billion (at a 22% gross margin and a 20% tax rate)
	Stock Performance	ESG (environmental, social and corporate governance) stocks outperformed broader US market by 8% in 2021
	Consumer Food Waste	$218 billion annually, or $1,600 in produce per household
Environmental	Landfill Volume	40 million tons, accounting for 22%–24% of landfilled and combusted solid waste
	Waste Disposal	$2.1 billion (40 million tons @ $53.72 per ton)
	Greenhouse Gases	170 million metric tons of CO2e
		3.7 billion pounds of methane
	Methane Emissions	15% of emissions from landfills
	Water Usage	21%–33% of water used in US farmlands is wasted
Social	Food Insecurity	50 million people in US in 2022

Financial estimates based on 2021 data
**Coresight Research's gross estimate of food waste; does not account for food that is donated, sold to a liquidator or reused*
Source: Environmental Research & Education Foundation/Feeding America/Morningstar/ReFED/US Bureau of Economic Analysis/US Department of Agriculture/US Environmental Protection Agency/ Coresight Research

Grocery retailers could increase their net income by $16 billion, which is meaningful in an industry that we estimate generated about $25 billion in net income in 2021.

Economic Impact

Kroger, the US's largest pure-play grocer, reported a 22% gross margin and a 20% tax rate in fiscal 2021. Applying these figures to our estimate of $482 billion in food waste, we calculate that grocery retailers could increase their net income by $16 billion, which is meaningful in an industry that we estimate generated about $25 billion in net income in 2021.

Grocery retailers face additional costs related to collecting wasted food and paying for its hauling and disposal in landfills.

Investor Impact

As highlighted in Figure 2, ESG stocks outperformed stocks in the broader US market by 8% in 2021, according to data from financial services firm Morningstar. Interest in ESG stocks is likely to increase over time, leading investors to increase allocations in the category to capture future outperformance, which would then lead to lower allocations of non-ESG stocks, causing their performance gap to widen. These relative changes in performance will put pressure on management teams to increase their ESG compliance and disclosure, with noncompliant or underperforming management teams at increasing risk of being replaced.

Public companies are also likely to come under pressure from investors to make climate-related disclosures. In March 2022, the US SEC (Securities and Exchange

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Commission) issued a rule for public comment that would require companies to include a climate-related disclosure section in their annual reports and registration statements, disclose their greenhouse gas emissions and add a note with climate-related metrics to their financial statements.

Surplus food has several environmental consequences, including the generation of greenhouse gases, consumption of fresh water, waste of valuable crop land, and occupying space in landfills.

Environmental Impact

Surplus food has several environmental consequences. According to ReFED, uneaten food consumes:

- 24% of landfill inputs
- 18% of US cropland use
- 14% of fresh water use
- 4% of US greenhouse gas emissions

The above figures exclude the environmental effects from the packaging containing wasted food, which emits chemicals and leeches into ground water as it decomposes.

Social Impact

Disposing of huge amounts of edible food in landfills seems irresponsible and shameful in a time when there is massive food insecurity in the US and around the world, which has likely increased during the pandemic. The proportion of US adults reporting there was either sometimes or often not enough to eat hit 9.4% in early October 2021, according to data from the US Census Bureau; the number of food-insecure people could be covered many times over by the food that is deposited into landfills.

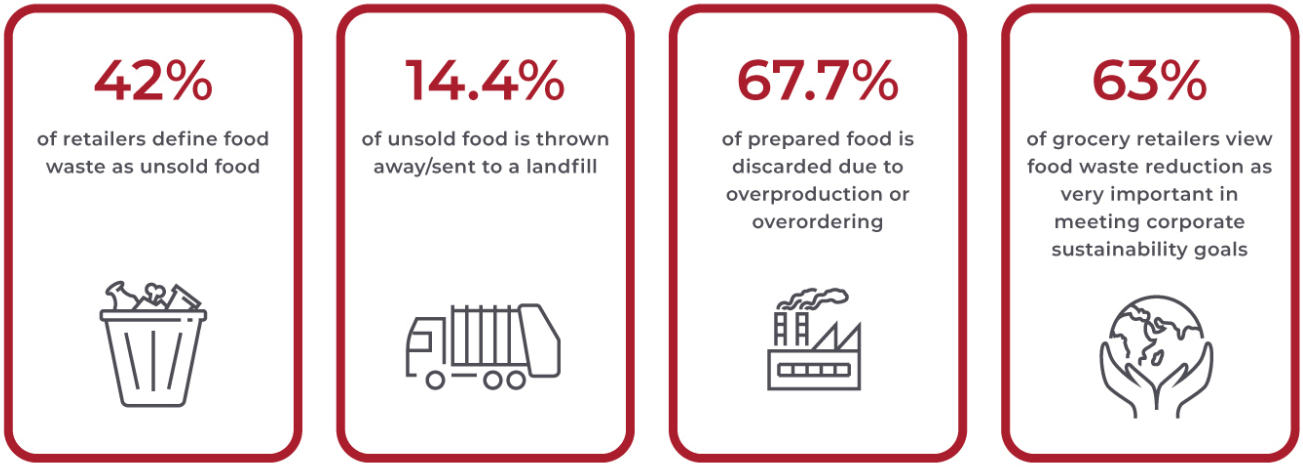
Getting a better handle on food waste would enable grocery retailers to "do good by doing well"—i.e., meeting commitments around sustainability and social responsibility while also improving profitability.

Overcoming the Food-Waste Challenge: Coresight Research Analysis

Coresight Research conducted a survey of more than 200 large grocery retailers in North America in October 2021, asking them about their definitions, activities, challenges and plans for reducing food waste. We present key findings in Figure 3 and dive deeper into the results in this report.

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Figure 3. Key Insights from Food-Waste Survey



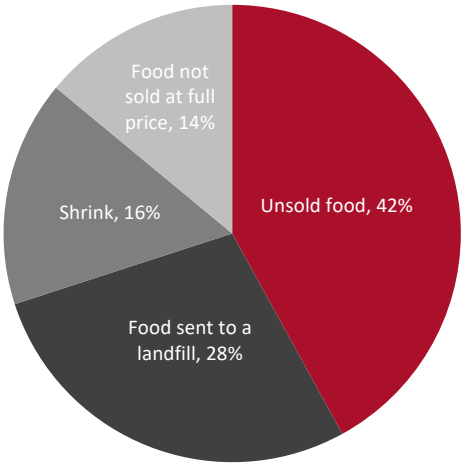
Base: 219 grocery retailers based in North America
Source: Coresight Research

The Definition of "Food Waste"

Coresight Research's survey of grocery retailers in North America found that retailers use a variety of definitions for food waste, as shown in Figure 3. Finding an industry-wide solution to food waste is more challenging due to the inconsistent views held by grocers.

Subsequent questions in the survey defined food waste as part of "shrink" (inventory lost due to spoilage and expiration, theft, inaccurate shipments and miscounting) as it is an industry-standard term.

Figure 4. Definitions of Food Waste Used by Grocery Retailers (% of Respondents)



Base: 219 grocery retailers based in North America
Source: Coresight Research

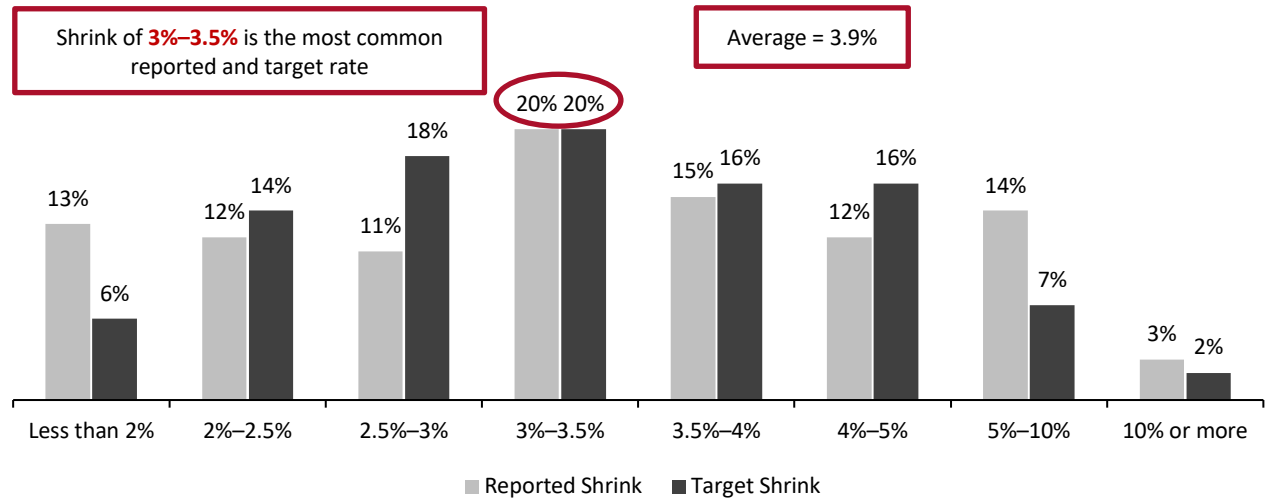
***Call to action**: The grocery retailer industry needs to adopt common metrics for food waste to bring attention to the issue and enable comparison across companies.*

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The Size of the Food-Waste Problem for Grocery Retailers

Survey respondents reported average shrink of 3.9% (as shown in Figure 5), and industry experts we interviewed defined the lowest reasonably achievable shrink as slightly above 2% of revenues.

Figure 5. Shrink as a Proportion of Total Annual Revenue in the Most Recent Financial Year vs. Annual Target for Food Shrink (% of Respondents)

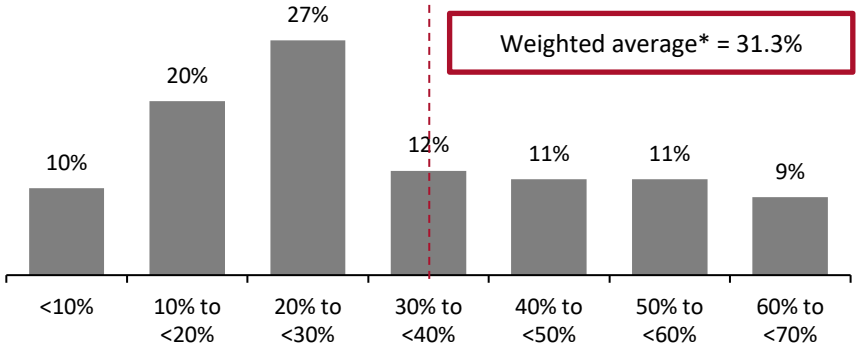


May not sum to 100 due to rounding
Base: 219 grocery retailers based in North America
Source: Coresight Research

Interestingly, respondents reported that shrink from food damage, waste, expiration or spoilage only accounts for slightly less than one-third of shrink.

Interestingly, respondents reported that food damage, waste, expiration or spoilage only accounts for slightly less than one-third of overall shrink (see Figure 6 below).

Figure 6. Food Damage, Waste, Expiration or Spoilage as a Proportion of Shrink (% of Respondents)



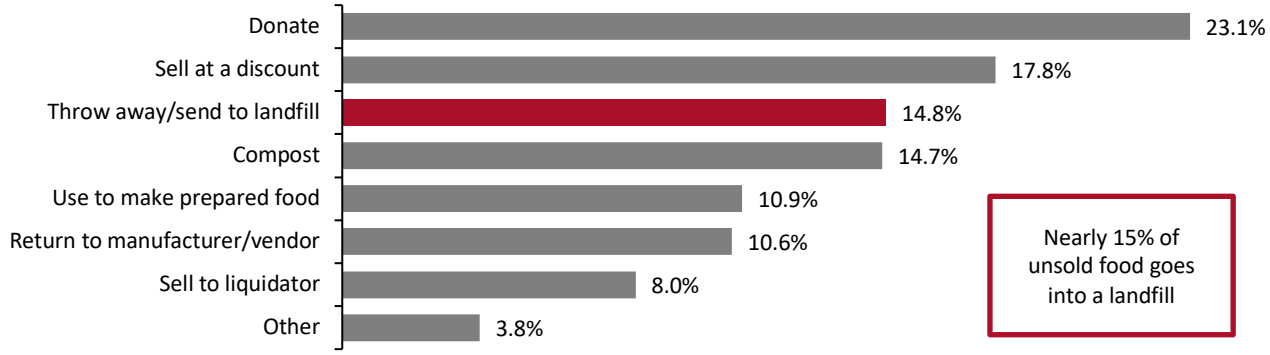
**Based on a midpoints of the ranges*
Base: 219 grocery retailers
Source: Coresight Research

***Call to action**: Food waste, expiration and spoilage are sources of shrink that can be measured and reduced.*

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Grocery retailers reported that, on average, just 14.4% of unsold food is thrown away, with the remaining 85.6% being donated, sold at a discount or to a liquidator, composted, used to make prepared food, or used for other purposes. However, ultimately, grocery retailers have little visibility or control of how much donated, discounted or returned food is actually eaten or disposed of in a landfill—although they clearly can select the most effective food pantries, for example.

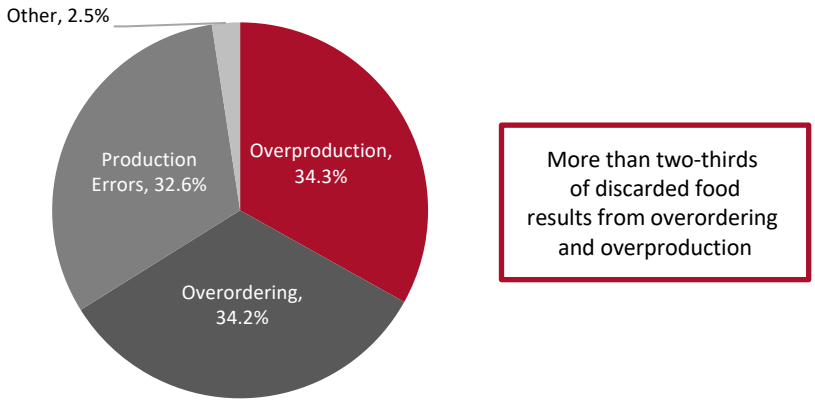
Figure 7. How Organizations Manage Unsold Food (% of Total Unsold Food)



Charted proportions are the calculated averages for each option
Base: 219 grocery retailers
Source: Coresight Research

In terms of the causes of food waste, respondents reported a fairly even split, on average, among overproduction, overordering and production errors (see Figure 8). Overproduction and overordering can be mitigated by better demand forecasting, which we will discuss later in this report.

Figure 8. Proportion of Prepared Food That Grocery Retailers Discard Due to Selected Reasons (% of Total Discarded Food)



Charted proportions are the calculated averages for each option
Base: 219 grocery retailers
Source: Coresight Research

Managing food waste ranks as the top response among sustainability goals that food retailers have set.

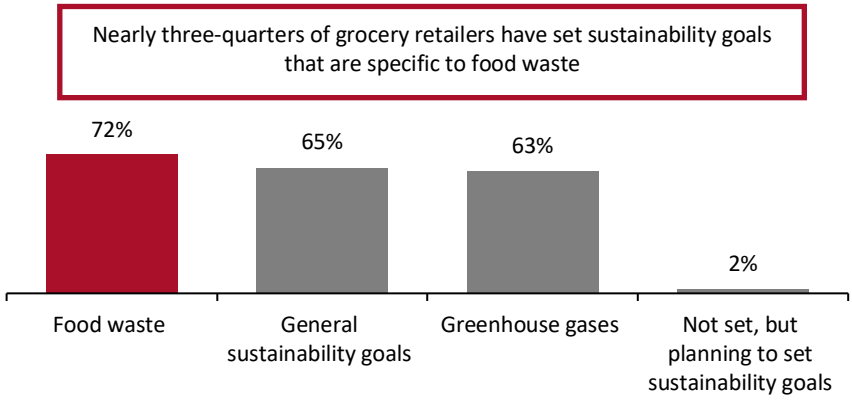
***Call to action**: Overproduction and overordering are situations that can be mitigated with more accurate demand forecasting.*

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Sustainability Goals

The majority (98%) of grocery retailers we surveyed have set some type of sustainability goal, and managing food waste ranks as the top response, reported by nearly three-quarters of respondents.

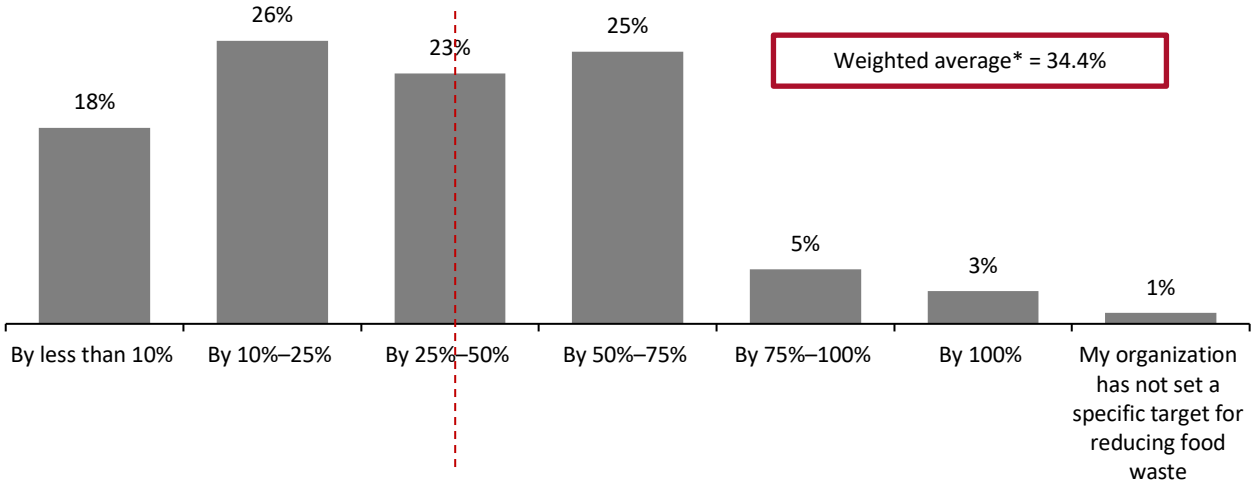
Figure 9. Sustainability Goals That Have Been Set by Grocery Retailers (% of Respondents)



Respondents could select more than one option
Base: 219 grocery retailers
Source: Coresight Research

In accordance with these goals, nearly half of grocery retailers said that they plan to reduce food waste by 25%–75% by 2030.

Figure 10. Grocery Retailers' Targets for Reducing Food Waste by 2030 (% of Respondents)



**Based on the midpoints of the ranges*
Base: 158 grocery retailers that have set sustainability goals for food waste
Source: Coresight Research

Leading Grocery Retailers' Food-Waste Goals

Several large US grocers have publicly released their goals for reducing food waste. We present notable examples below.

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- **Albertsons** committed in 2019 to reduce food waste by 50% in its Pacific Coast divisions by 2030. The company also donates edible fresh and packaged food products that are close to the "use by" date to local food banks. It donated more than $226 million worth of products to food banks, food pantries and other hunger-relief agencies in 2018. Albertsons also has partnerships with local farms to donate animal feed, and in the Pacific Northwest, the company sends food waste to a biodigester that creates biogas and soil nutrients for a local organic farm.
- **Kroger**'s **"**Zero Hunger | Zero Waste" program aims to end hunger in the communities it operates and end food waste by 2025 through innovation, increasing food donation, increasing nutrition and advocating for changes in public policy to address hunger and divert food from landfills. Kroger reported that it achieved its prior goal of becoming a zero-waste company by 2020 and is targeting zero food waste in all of its stores and across the country by 2025. The company donated 1 billion meals in 2020 and aims to donate 3 billion meals by 2025.
- **Walmart** has set a goal to eliminate food waste in the US, Canada, Japan and the UK by 2025 as part of its general goal of moving to zero waste in the US and Canada by the same year. This program supplements the company's existing initiatives, such as "10x20x30," which was launched in 2019 and aims to engage 10 of the largest grocery retailers with 20 of their priority suppliers, to halve food loss and waste by 2030. The company disclosed that in 2020, it sold more than 256 million food units through discount programs, and in 2019, it had wasted 57 million fewer food units in its fresh departments than in the prior year.

The emerging boom in quick commerce could encourage consumers to purchase only what they immediately need and so reduce food waste on the consumer side.

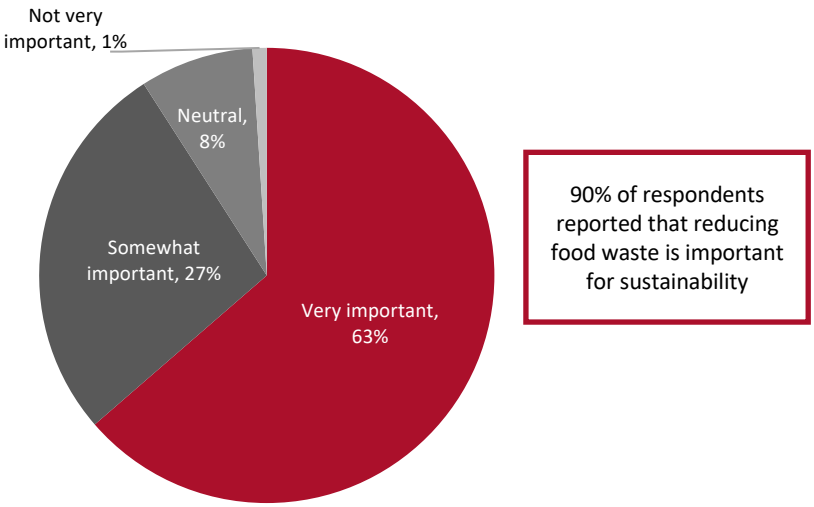
The emerging boom in quick commerce (grocers offering sub-30-minute delivery times) could encourage consumers to purchase only what they immediately need and so reduce food waste on the consumer side. Delivery service provider DoorDash has offered its services to community organizations engaged in sharing food and essentials, and the company announced in December 2021 a program to donate excess DashMart produce to a local food pantry in New York City.

Execution of Food-Waste Goals

Our survey found that reducing food waste is an important element of meeting corporate goals for the majority of respondents, as shown in Figure 11.

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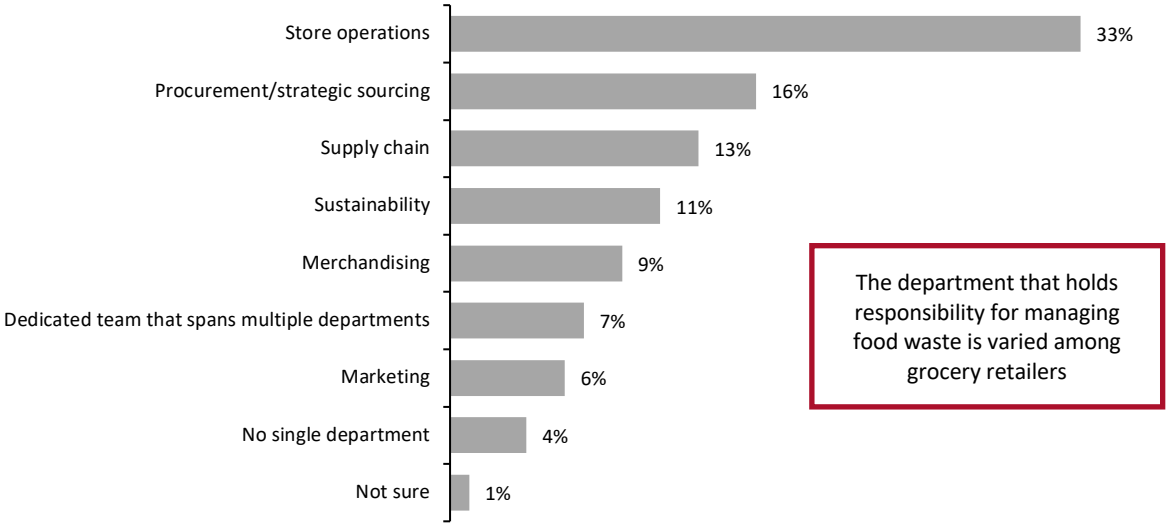
Figure 11. The Importance of Food-Waste Reduction in Meeting Corporate Sustainability Goals (% of Respondents)



Base: 219 grocery retailers
Source: Coresight Research

However, the execution of food-waste reduction among grocery retailers is fragmented, with the responsibility lying with varied departments (see Figure 12).

Figure 12. Departments That Hold the Primary Responsibility for Food-Waste Reduction (% of Respondents)

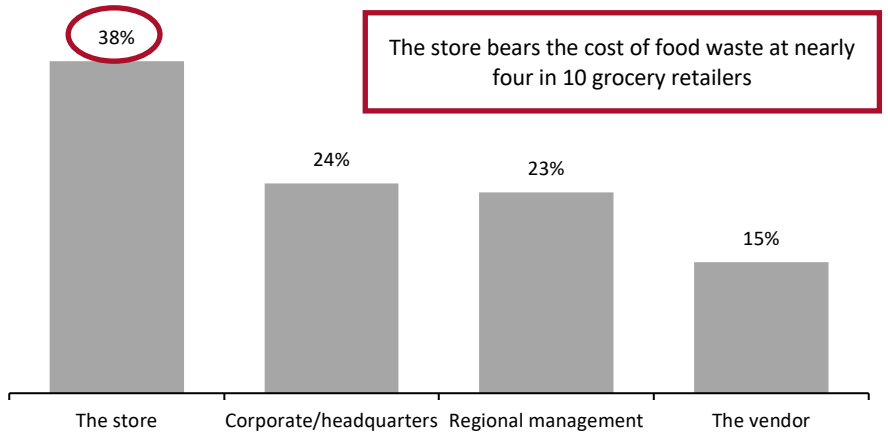


Base: 219 grocery retailers
Source: Coresight Research

Although the responsibility for food waste is spread among multiple departments in grocery retail, the cost of food waste falls primarily upon the individual store, as shown in Figure 13.

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Figure 13. Parties That Bear the Cost of Food Waste or Surplus Food (% of Respondents)

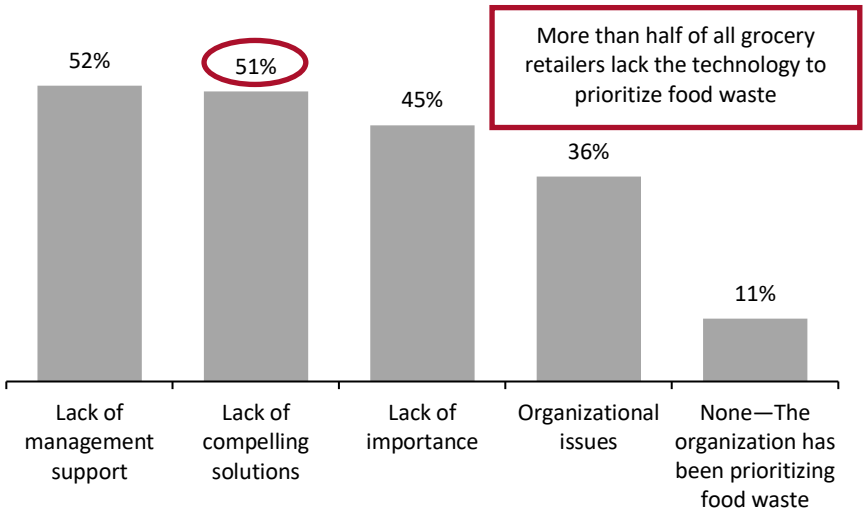


Base: 219 grocery retailers
Source: Coresight Research

When asked what has hindered their organization's management of food waste the top two answers were lack of management support and lack of a compelling solution.

Food waste continues to be a serious challenge despite a majority of grocery retailers responding that they view sustainability and food-waste goals as important, leading to the question of what is holding up progress in these areas. A lack of management support and lack of a compelling solution topped the list of hindrances for grocery retailers in prioritizing the management of food waste (see Figure 14). Despite nine in 10 respondents citing food-waste reduction as important to meeting sustainability goals, it is troubling that nearly half of all respondents cited a lack of importance as a hindrance for grocery retailers in prioritizing food-waste management.

Figure 14. Hindrances in Prioritizing the Management of Food Waste (% of Respondents)



Respondents could select multiple options
Base: 219 grocery retailers
Source: Coresight Research

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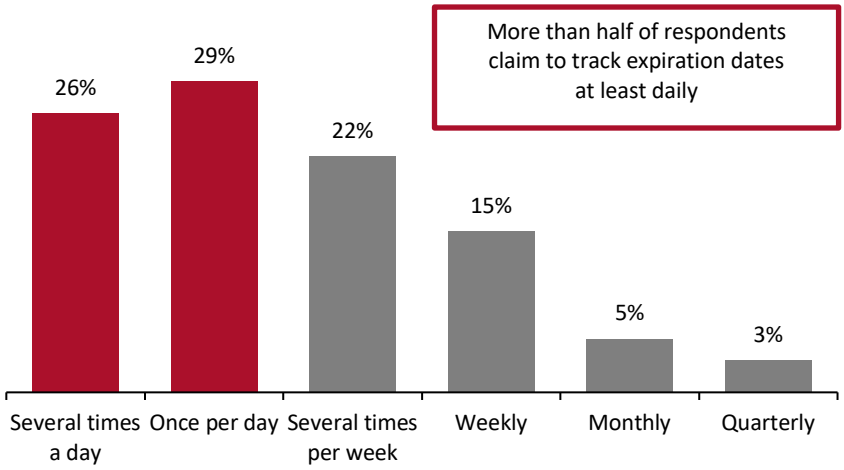
***Call to action**: Grocery retailers need to empower an individual with responsibility and the power to manage food waste across the entire organization and make the organization changes necessary to achieve their food-waste goals.*

Areas of Opportunity To Manage Food Waste

More than half of food retailers claim to check the freshness of food at least once per day.

More than half of our survey respondents reported that they check food freshness or sell-by dates at least once per day, as indicated in Figure 15. However, this could apply primarily to prepared food or fresh produce; our interviews turned up anecdotes of retailers keeping long-expired cans of food on the shelves.

Figure 15. Frequency That Grocery Retailers Check Freshness or Sell-By Dates of Food (% of Respondents)

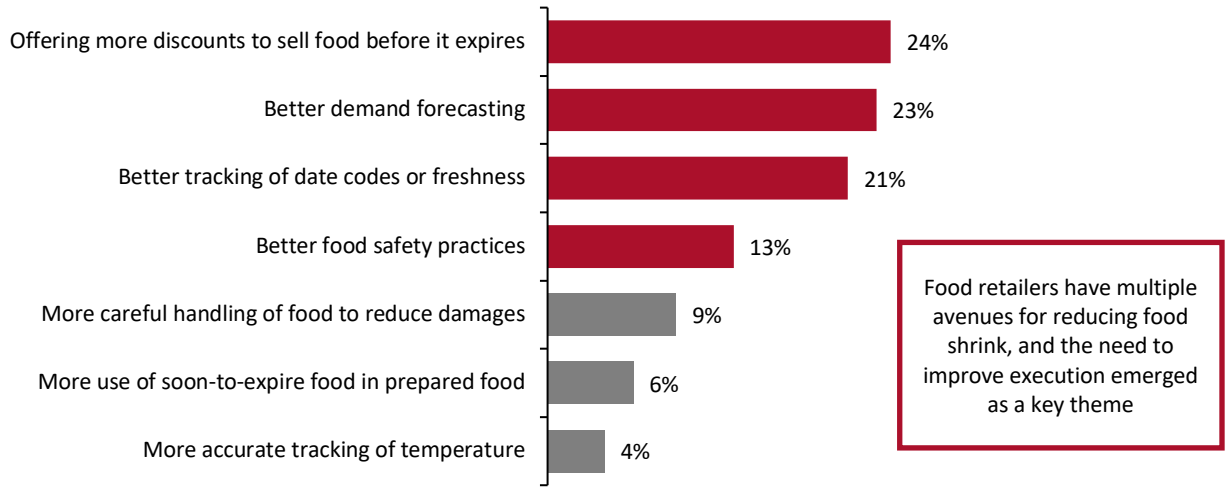


Base: 219 grocery retailers
Source: Coresight Research

Better tracking of freshness ranked third in the top areas of opportunity for grocery retailers to reduce shrink from unsold food, according to our survey. The top four areas of opportunity are primarily related to retailers' need to improve execution, as shown in Figure 16.

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Figure 16. Top Areas of Opportunity To Reduce Shrink from Unsold Food (% of Responses)



Respondents were asked to select three areas of opportunity
Base: 219 grocery retailers
Source: Coresight Research

***Call to action**: Grocery retailers' top opportunities to reduce shrink from unsold food include freshness tracking and discounting, which go hand in hand.*

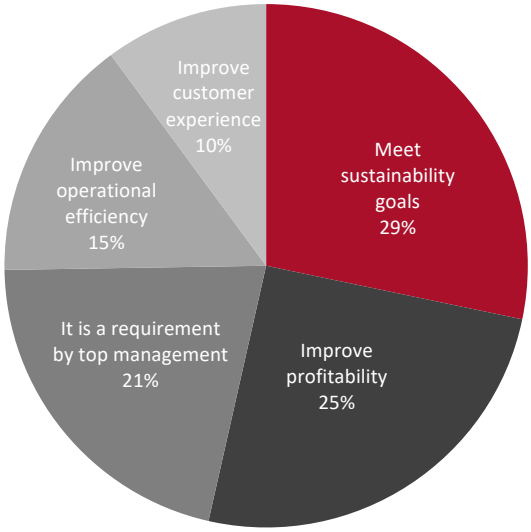
Grocery retailers plan to invest in food-waste technology to meet sustainability goals and improve profitability and efficiency.

Technology-Driven Strategies for Reducing Food Waste

Our survey found that 84% of respondents plan to invest in technology over the next two years to manage food waste. Grocery retailers have diverse reasons for investing in food-waste technology, with meeting sustainability goals being the top response. Despite the strong motivation to increase profitability and efficiency, these goals ranked second and fourth, respectively, as shown in Figure 17.

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Figure 17. Grocery Retailers' Most Important Reason for Investing in Food-Waste Technology (% of Respondents)

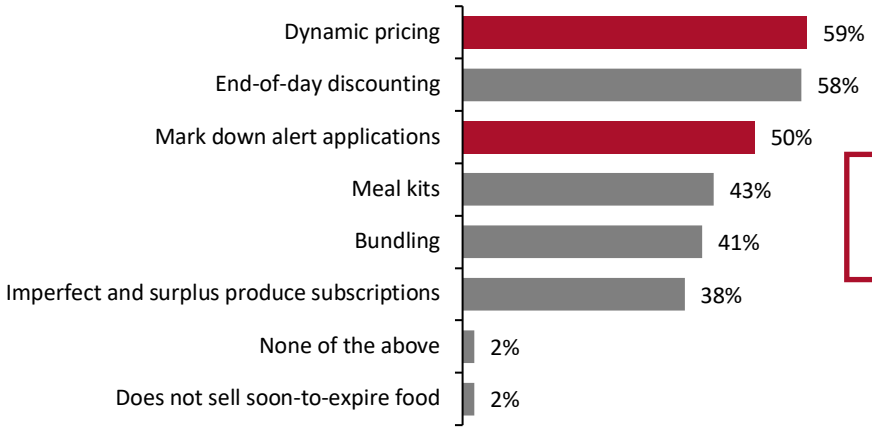


Nearly three in 10 grocery retailers that plan to invest in food-waste technology plan to do so to meet sustainability goals

Base: 183 grocery retailers who plan to invest in technology over the next two years to manage food waste
Source: Coresight Research

Investments in technology will build on current strategies for selling soon-to-expire food for many grocery retailers. In the store, more than half of the respondents in our survey reported that they use dynamic pricing (whereby pricing changes during the day based on expiration date), end-of-day discounting and markdown alert applications to close out food inventory, as shown in Figure 18.

Figure 18. Methods Employed by Grocery Retailers To Sell Soon-To-Expire Food (% of Respondents)



Advanced technologies are helping grocery retailers to sell soon-to-expire food

Base: 219 grocery retailers
Source: Coresight Research

Grocery retailers reported plans to invest in AI-driven demand forecasting to manage food waste.

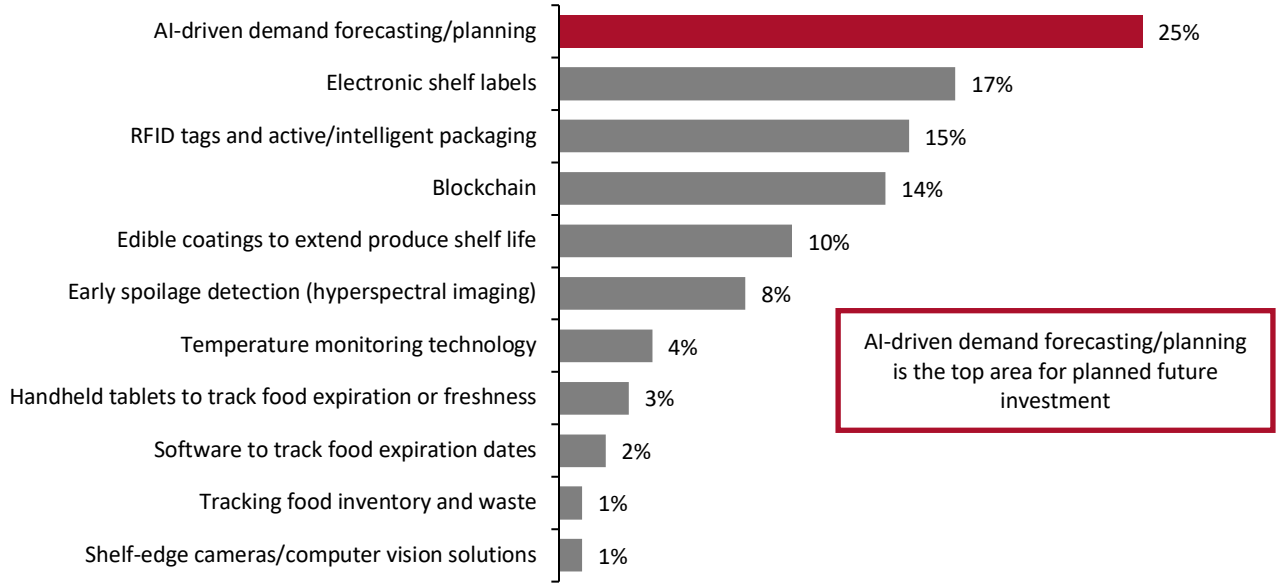
Our interviews with grocery retailers largely linked food waste to over-receiving, overordering and overproduction of prepared food. Many of these issues could be reduced through accurate demand forecasting. In fact, AI-driven demand forecasting emerged as the top technology that grocery retailers in our survey plan to invest in to reduce food waste, followed by electronic shelf labels and blockchain, as shown in Figure 19. Although RFID (radio-frequency identification) tags and intelligent packaging only ranked third among respondents, the use of

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RFID in food tracking has been cited as a major opportunity by vendors, and it works in concert with many of the other technologies.

- Please refer to the appendix of this report for descriptions of the technologies charted in Figure 19.

Figure 19. Technologies That Grocery Retailers Plan To Invest In Over the Next Two Years To Track and Manage Food Waste (% of Responses)



Respondents were asked to select three responses
Base: 183 grocery retailers who plan to invest in technology over the next two years to manage food waste
Source: Coresight Research

***Call to action**: Accurate demand forecasting can align supply with demand and help prevent overordering and reduce food expiration.*

Solving the food-waste problem will likely take a combination of government support, technology, and pressure from investors or environmental activists to pressure grocery retailers to meet their sustainability goals.

Low-Cost Technology and Government Solutions Available Today

Solving the food-waste problem will likely take a combination of technology, government support and pressure from investors or environmental activists to pressure grocery retailers to meet their sustainability goals.

Areas of Focus

- *Data Enablement*

Collecting and getting command of relevant data is a critical precondition for demand forecasting and inventory management. Similar to the quote, "You can't manage what you can't measure," attributed to Peter Drucker (a management consultant and author, widely considered the father of modern management), collecting data on items, their location, their state, and inside the store is the essential first step towards management. Ecosystems such as using RFID or other tags and labels offer a platform for collecting item data.

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- *Demand Forecasting*

Demand forecasting seems one of the most effective tools to reduce food waste, since food waste is likely minimized when supply (i.e., food ordered) is accurately matched with demand. The complexity of the large number of SKUs (which can be as high as 60,000) managed by the average grocery store lends itself to an automated, powerful solution such as AI/ML-fueled demand forecasting. Although the accuracy of ML-based demand forecasting solutions runs around 50–60%, adding external data such as weather, local events and other unstructured data can raise accuracy to around 80%, according to industry experts, which is considered best of class.

- *Inventory Management*

To manage operations and minimize food waste, retailers need to know where there inventory is, how much there is, where it has been, and be able to derive insights for what to do with it. Well-established technologies such as RFID offer inventory transparency and accuracy to retailers, which supports any food waste-reduction efforts.

Digital Solutions

Digital solutions can create efficiencies while improving sustainability. Understaffed grocery businesses often base their inventory planning on incorrect data, so having accurate data is the first step to accurate demand forecasting. Improvements in demand forecasting enable retailers to reduce buffer inventory, thereby reducing food waste, the extent of which is significant and expensive.

Having accurate data also enables retailers to sell food items nearing expiry rather than having to dispose of them. With a system that tracks food expiry and also forecasts its usage, retailers can offer safe, edible food to consumers and avoid waste.

With persistent labor shortages, solutions that enable automated processes powered by data and RFID tags to track data can realize benefits across four key areas:

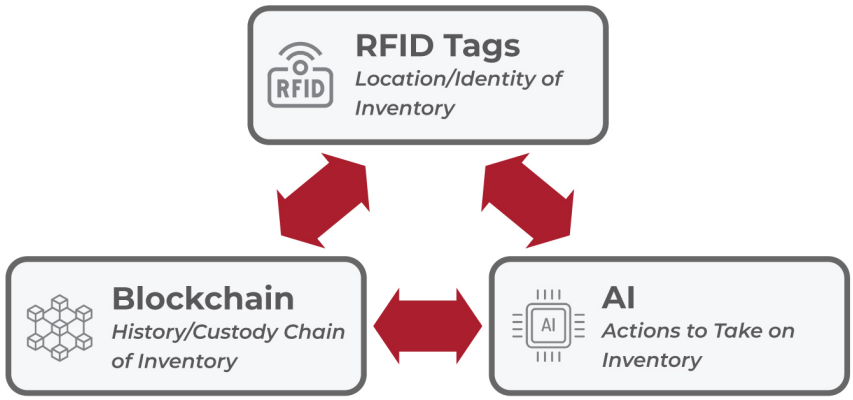
- **Availability**—Retailers and consumers gain visibility into whether items, and not substitutes, are available as advertised.
- **Quality and freshness**—Having accurate expiry data means that items maintain the maximum in-storage times and are rotated on a timely basis to ensure their use.
- **Safety**—Accurate expiry information helps avoid safety-related product recalls.
- **Brand identity**—Consumers increasingly prefer brands that they consider to be good stewards of the environment and whose owners make business decisions that reduce waste and support sustainability.

Fundamental Technologies

Three low-cost technologies that work in concert that can help retailers take command of their inventory are RFID tags, blockchain and AI software, as illustrated and discussed below.

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Figure 20. Interaction Between Basic Technologies for Inventory Management



Source: Coresight Research

- *RFID Tags*

These tags cost pennies a piece and include codes that uniquely identify inventory and its movement. Connecting RFID readers to the Internet represents including inventory as part of an Internet of Things (IoT) platform. Knowing the location and status of perishable food items provides a key input to demand forecasting.

- *Blockchain*

This low-cost technology forms an indelible, transparent record of the provenance and tracking of the ownership of an inventory item to all relevant parties.

- *AI*

AI excels at forecasting and finding unseen relationships among data, turning data into actionable insights. Examples include tracking and tracing supply chain dwell time and using AI to detect and provide alerts regarding supply chain anomalies that could generate waste.

In-Store Actions To Reduce Food Waste

In addition to the above, there are several measures that grocery retailers can take to reduce food waste once the inventory is already in the store.

- *Shelf-Life Extension*

This is not a technology per se, however retailers can use demand forecasting and expiration-date management tools to ensure that perishable food in the store is fresher, i.e., with more distant expiration dates, which means that less food is likely to expire in the store and in consumer's pantries and refrigerators.

- *Upcycling*

As mentioned under shelf-life extension, accurate and proactive expiration-date monitoring can identify food approaching its expiration date that can be cooked or turned into prepared food that can extend its expiration date.

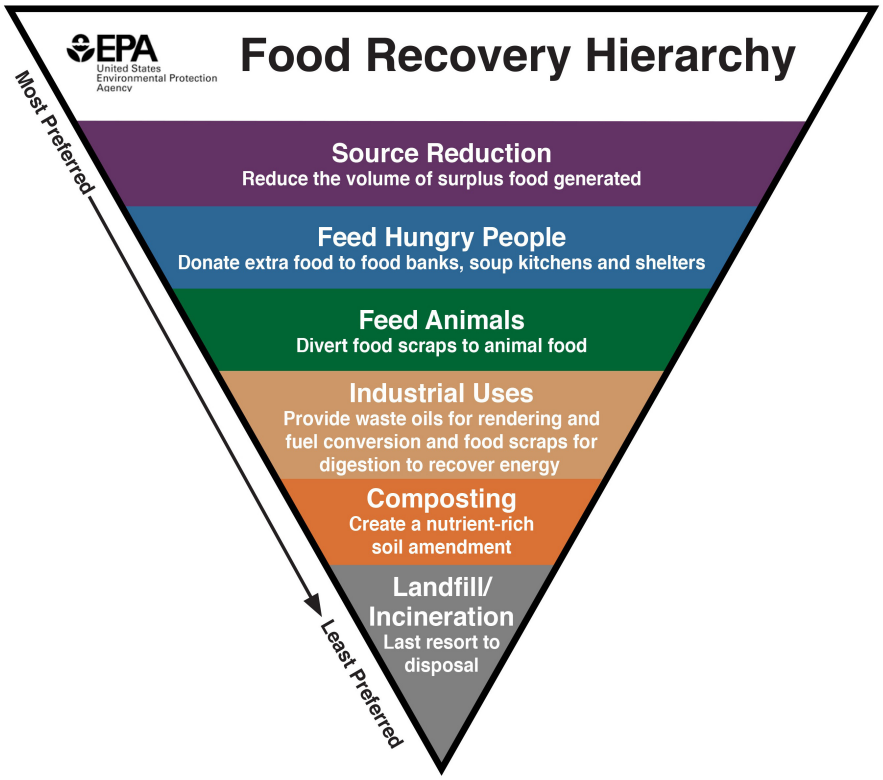
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- *Dynamic Pricing*

Dynamic pricing can help retailers sell food approaching its expiration date, avoiding donation, recycling or disposal. Typical manual solutions include bundling or placing food on a markdown table, and there are innovative companies developing apps that leverage the power of the Internet and mobile devices to inform bargain-seeking consumers of goods that have been discounted and become available. Electronic shelf labels enable the display of dynamic prices and can alert consumers' attention to marked-down items.

US Government Measures

The US Food and Drug Administration and Environmental Protection Agency signed an agreement in 2018 that led to a food-recovery hierarchy that aims to minimize food waste and prioritize feeding hungry humans. The hierarchy logically starts with a reduction of excess food generated at the source, leading through other uses and relying on disposal in a landfill as a last resort, as depicted below.



Source: US Environmental Protection Agency

There are several pieces of recent and proposed legislation in the US that aim to alleviate issues surrounding food waste, including the following:

- **The Food Date Labelling Act**, introduced in December 2021, aims to standardize food labelling to include both a quality-date indicator and a discard-date indicator.
- **The proposed amendment to the Bill Emerson Good Samaritan Food Donation Act,** introduced in November 2021, aims to reduce limitations on the quantity of food that can be donated, improve visibility of available food

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for donation and clarify food-labeling standards for the purpose of donation. The original act, signed in 1996, aimed to protect consumers who donated food to non-profit organization, standardize donor liability and set a floor for intentional misconduct in food donations.

- **The Food Donation Improvement Act**, introduced in November 2021, aims to extend liability protections to food donors when food is given to persons in need or sold at a deeply reduced cost.
- **The Fresh Produce Procurement Reform Act**, introduced in September 2021, aims to improve the USDA's procurement of fruits and vegetables, requiring producers to partner with organizations such as schools, food pantries and youth organizations.
- **The School Food Recovery Act**, introduced in September 2021, aims to offer grants to enable food waste measurement and reporting, prevention and education in schools.
- **The Zero Food Waste Act and the Cultivating Organic Matter through the Promotion Of Sustainable Techniques (COMPOST) Act**, introduced in tandem in July 2021, aim to support the expansion of food waste reduction and management across the US.
- **The FDA Food Safety Modernization Act**, signed in 2011, granted the FDA new powers, including mandatory recall, as part of regulation on how food is grown, harvested and processed, in response to several foodborne illnesses.

What We Think

Food waste represents a huge, largely avoidable drag on grocery retailers' revenues and margins, in addition to posing additional burdens on the environment.

Food waste represents a huge, largely avoidable drag on grocery retailers' revenues and margins, in addition to posing additional burdens on the environment. Transporting food waste emits carbon; the waste occupies space in landfills; and additional chemical reactions take place there—such as the emission of large quantities of methane—from the food as well as from its packaging. Just as important is the social cost: The existence of avoidable food waste is shameful given the number of people facing food insecurity in the US and around the world. Moreover, companies without clear and adequate ESG programs will pay a penalty in their stock prices, possibly leading to the replacement of management teams.

Interviews with large grocery retailers, in addition to the survey discussed, indicate that many of the causes of food waste are organizational and bureaucratic. Grocery retailers generally support and have goals for reducing food waste, yet there is a disconnect in which part of their organizations are responsible (organizationally and financially) for reducing food waste, although there are clear financial and efficiency benefits.

Grocery retailers interviewed largely cited overordering, inflexibility in shipping quantities, and overproduction of prepared food as the greatest causes of food waste. Better linkage of demand versus supply can alleviate these problems, whether through AI-based demand forecasting software or tightening up operations. For example, more accurate demand forecasting would increase inventory turns, which would keep produce looking fresh and reduce the need for buffer inventory to make shelves look full.

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We are optimistic that many of the sustainability and waste-reduction goals espoused for 2025 will force grocery retailers to improve operations.

We are hopeful that many of the sustainability and waste-reduction goals espoused for 2025 will force grocery retailers to improve operations, and there is also the threat of heightened competition from quick-commerce vendors and a shift to online ordering during the pandemic that could prompt grocery retailers to become more efficient.

Methodology

This study is based on the analysis of data from an online survey of 219 large grocery retailers conducted by Coresight Research in October 2021. Respondents in the survey satisfied the following criteria:

- Based in the US and Canada
- Annual revenues of at least $100 million
- Selling in the grocery retail, convenience store, drugstore, mass merchant and other food retail segments
- Products sold include produce, fresh meat and seafood, dairy and eggs, breads and bakery, dry grocery, frozen food, prepared foods, meal kits and ready-to-drink beverages
- Titles include C-suite, president, senior vice president, vice president, senior director, director and manager
- Has primary responsibility or involved in efforts to reduce/manage food waste

This report is sponsored by Avery Dennison Corp., a global materials science company specializing in the design and manufacturing of a wide variety of labels, functional materials and digital ID technologies.

Appendix

The function and use of the technologies illustrated in Figure 19 are as follows:

- **AI-driven demand forecasting/planning**—These platforms use the forecasting and analytical capabilities of AI/ML to combine internal data (such as historical sales) with external data (such as the season and local events) to create highly accurate demand forecasts, free of human bias or error.
- **Blockchain**—This is a low-cost technology that provides an immutable ledger, providing trust, security and traceability. Its applications include documenting the provenance or history of an item—for example, recording a series of temperature measurements for frozen food to ensure preservation of the cold chain.
- **Early spoilage detection (hyperspectral imaging)**—Hyperspectral imaging uses a wide spectrum of wavelengths of light, and it can non-invasively determine freshness, microbial spoilage, the moistness/dryness of produce, as well as the presence of foreign matter.
- **Edible coatings to extend product life**—Edible coatings can replace disposable plastic packaging and extend the life of certain food items such as produce.

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- **Electronic shelf labels**—Active displays show pricing, and other information below the product on the shelf can receive updates wirelessly. Electronic shelf labels can be used to implement dynamic pricing, display promotions or supplemental product information, and provide wayfinding guidance for store associates for stocking shelves or filling online orders.
- **Handheld tablets to track food expiration or freshness**—Arming store associates with mobile devices enables them to collect data, access product information and receive direction as they pass through the store.
- **RFID tags and active and intelligent packaging**—RFID tags contain a unique product ID that can be read by handheld or fixed scanners in a store. Retailers can use them to track the number of items of a specific type as well as their location, getting a precise view of their inventory. Other applications include loss prevention.
- **Shelf-edge cameras/computer vision solutions**—Shelf-edge cameras use computer vision to track the amount of inventory on the shelves, verify price tags, and monitor planogram compliance, and they can issue directives to store associates when inventory is moved or runs low.
- **Software to track food expiration dates**—Tailored software platforms monitor food expiration dates and instruct associates when to rotate, discount and discard expiring items.
- **Temperature monitoring technology—**Thermal sensors and cameras can monitor the temperature of food and coolers in real time, alerting store associates in the event of a malfunction or power outage.
- **Tracking food inventory and waste—**Platforms and weighing systems can track the amount of inventory on the shelves as well as the quantity of food that is discarded.

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