

MAKING  
THE INVISIBLE  
VISIBLE

# The \$540B Grocery Bill

Unlocking the Hidden Value of Food  
Waste to Drive Growth and Profitability



# About this report

This report is designed to inspire action. It highlights waste reduction as an opportunity to boost profitability, growth and resilience with the aim of providing suggestions on how to act decisively on food waste to drive measurable impact now.

This research is one of the most extensive global studies conducted to date, with 3,500 leaders in the food retail supply chain — from manufacturing and processing through to distribution and packaging — spanning seven markets with a focus on perishable food waste. The Centre for Economics and Business Research (Cebr) was also commissioned to understand the economic output the retail supply chain could recover by addressing waste

across the value chain. Retail is a focus area in this report due to its pivotal position in connecting global supply chains with shoppers. It must navigate geoeconomic pressures and shifting consumer demands where trends and demand spikes often make waste control difficult. We've specifically called out perishables, such as meat, fresh produce (e.g., fresh fruit and vegetables) and baked goods, given that the challenge of food waste is acute in these categories.

By highlighting food waste challenges and the innovations that can address them, this report offers practical steps retailers can take today to help reduce waste, boost resilience and deliver a healthier bottom line.

Read the full methodology on [page 59](#).



## About Avery Dennison

Avery Dennison Corporation (NYSE: AVY) is a global materials science and digital identification solutions company.

We are Making Possible™ products and solutions that help advance the industries we serve, providing branding and information solutions that optimize labor and supply chain efficiency, reduce waste, advance sustainability, circularity and transparency, and better connect brands and consumers.

[www.averydennison.com](http://www.averydennison.com)

# Contributors

In order of appearance

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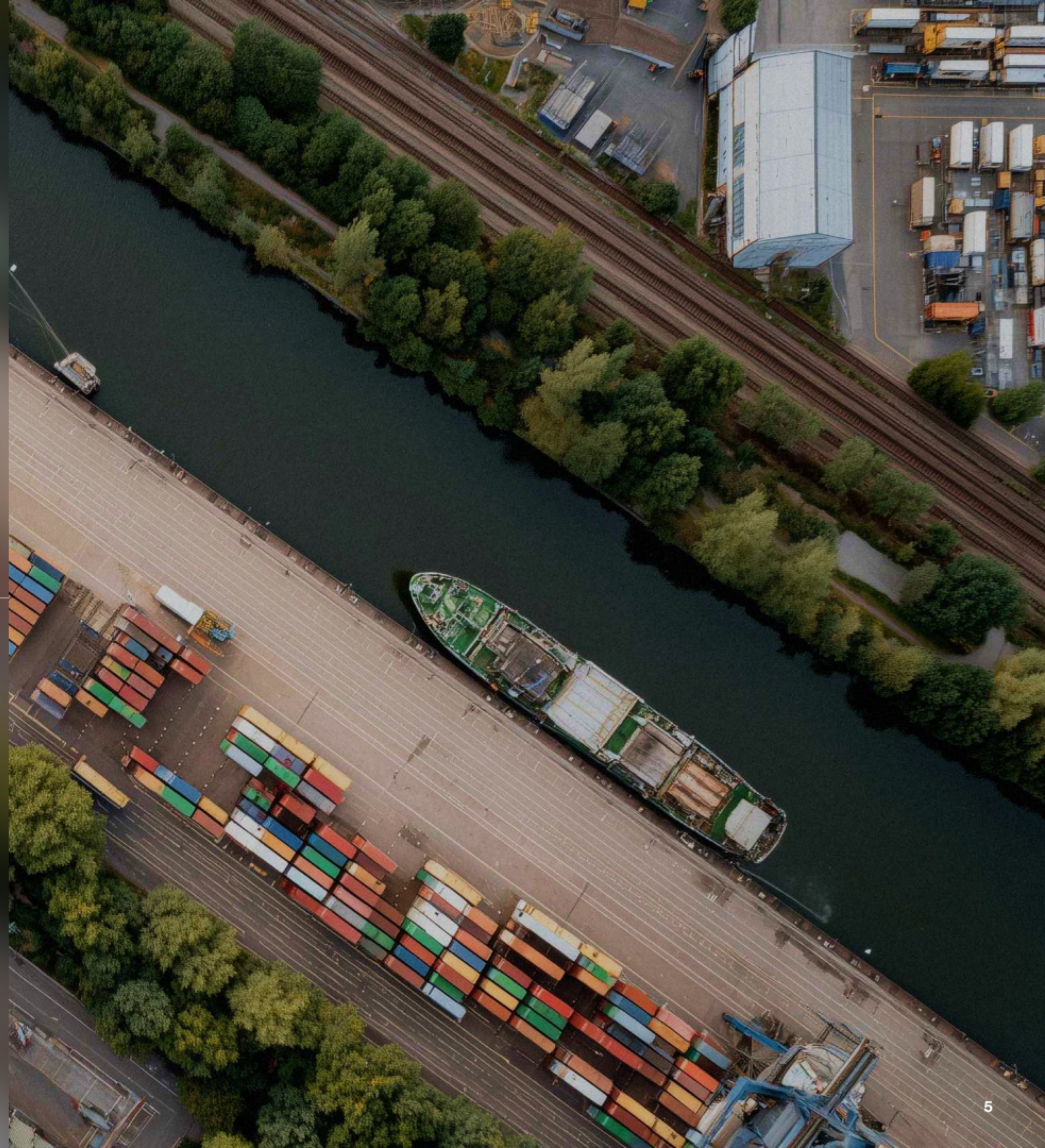
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# Foreword

Retail supply chains hold untapped,  
transformative potential.



# Reframing waste as a growth opportunity

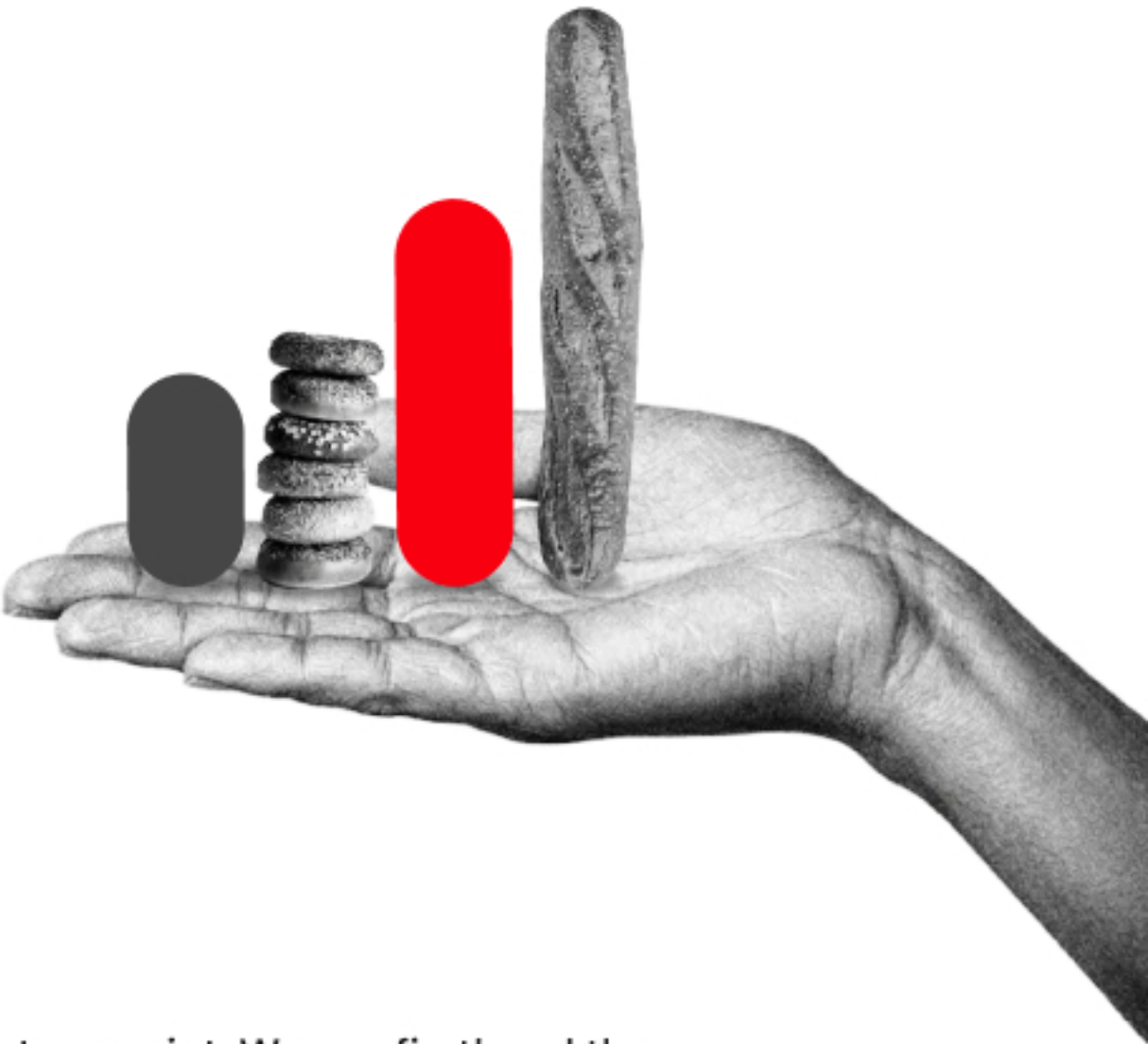


DEON STANDER  
PRESIDENT AND CHIEF EXECUTIVE OFFICER  
AVERY DENNISON

In today’s environment where food scarcity is a reality for an increasing number of communities, food waste is often treated by retailers as a recognized cost of doing business.

Within the global retail supply chain, which has undergone tremendous change in response to evolving consumer behavior, pandemic disruption and economic volatility, food waste remains a persistent challenge.

Solving this environmental, societal and economic issue presents a significant opportunity for the planet and is good business. **What if we could reframe food waste — not as an inevitable loss but as a powerful driver of growth and efficiency?**



What if we could ensure store shelves are fully stocked with fresh produce at all times to maximize sales and retain customer loyalty while minimizing the amount of perishables that go to waste?

Avery Dennison has dedicated over 90 years into research and innovation to help our customers solve some of their most complex challenges. We believe in a future in which every physical item carries a digital identity — a connected layer of information that enables greater transparency, efficiency and circularity. Through digital identification solutions, we can unlock new opportunities to solve key issues like food waste.

Our global scale and presence across multiple points in the supply chain and our ability to identify and track item-level products give us a unique

vantage point: We see firsthand the compounding losses that can occur from processing through to retail.

**Where is the incentive to act on food waste?**

While the challenge in solving the issue of food waste is significant, the opportunity is even greater. The companies that act will not only contribute to a more sustainable world but also materially strengthen their growth and profitability. That’s why we have commissioned in-depth research with 3,500 leaders across the retail supply chain in seven countries to uncover how food waste is being understood, prioritized and acted on today. Our findings reveal a striking gap between awareness and action.



While innovation exists and the appetite to build resilience is growing, ambition still outpaces outcomes. Targets such as the United Nations’ Sustainable Development Goal (UN SDG) 12.3<sup>1</sup> — aimed at reducing food waste — are now likely to be missed. Yet at every stage of the supply chain, scalable solutions already exist.

The benefits of innovation in this area extend far beyond operational and economic efficiency. They include reducing emissions, conserving resources and improving food security while at the same time creating a more resilient retail ecosystem with a healthier bottom line. And while much waste occurs at the consumer level, the most immediate and scalable opportunity lies within the grocery and food retail sector.

Retailers influence every part of the value chain, from growers and manufacturers to logistics providers and consumers, giving them a pivotal role in driving lasting change. When retailers act, the entire system responds.

This report highlights how innovation can deliver meaningful progress for one of the world’s most pressing challenges. Amid unprecedented margin pressures, those who invest in innovation today will be best positioned to lead tomorrow. By leveraging materials science and digital technology to tackle food waste, we can unlock new possibilities, transforming a historic operating cost into measurable value.

“Retailers influence every part of the value chain, from growers and manufacturers to logistics providers and consumers, giving them a pivotal role in driving lasting change. When retailers act, the entire system responds.”

DEON STANDER  
PRESIDENT AND CHIEF EXECUTIVE OFFICER  
AVERY DENNISON

# Leading with courage in the age of waste



PAUL POLMAN  
BUSINESS LEADER,  
CLIMATE AND EQUALITIES CAMPAIGNER

Retailers sit at a pivot point of our food system. Few actors have more power to influence how food is produced, distributed and consumed. Yet one of the most damaging consequences of our current model, food waste, remains largely hidden in plain sight. It is not only an ethical and environmental failure but a profound market inefficiency, draining value from every corner of the chain.

Addressing it is not a cost — it is one of the greatest innovation and growth opportunities of our time. That is the essence of what I call a Net Positive business: one that succeeds not by extracting value but by solving real-world problems. Food waste is a textbook example. Today, eight million people go to bed hungry while more than a third of the world's food never reaches a plate. Behind that statistic lies squandered land, labor, energy, capital and a mindset that still treats waste as unavoidable rather than unacceptable.

“The future will belong to those who stop seeing waste as an inevitable cost and start treating it as the greatest untapped asset of our age.”



It doesn't have to be this way. By reusing food side streams such as byproducts, offcuts and unsold inventory currently written off as loss, we could unlock over \$1 trillion in value every year. From farm-level surplus to shelf-level inefficiency, what we discard today could power the next generation of products, partnerships and business models.

The question is not whether the opportunity exists. It is whether we are brave enough to seize it.

That requires a shift in mindset. Waste reduction must move from the CSR page to the P&L. Cutting waste improves margins, strengthens supply security and builds resilience in a world defined by shocks. If the past few years have taught us anything, it is that efficiency, agility and circularity are now essential to business survival, not nice-to-haves.

“Food waste is not a cost — it is one of the greatest innovation and growth opportunities of our time.”

PAUL POLMAN  
BUSINESS LEADER,  
CLIMATE AND EQUALITIES CAMPAIGNER

Retailers are uniquely placed to lead this transformation. Their purchasing power can reward suppliers who innovate. Their data can expose inefficiencies no one else can see. Their relationship with consumers can normalize new behaviors and expectations. But leadership now demands more than quiet intent. It requires those willing to move first, publish imperfect data, share progress as it happens and invite collaboration rather than waiting for regulation. Discomfort is no longer a signal to slow down — it is the price of meaningful change.

Reports like this demonstrate what becomes possible when technology, partnership and purpose converge. They show that food waste is not just something to be reduced but something to be reimaged.

The leaders who act now will not just cut emissions and costs — they will also build more resilient supply chains, deepen consumer trust and unlock new profit pools. Those who hesitate risk being left with stranded assets, stranded models and ultimately no license to operate.

The future will belong to those who stop seeing waste as an inevitable cost and start treating it as the greatest untapped asset of our age.

Wasting that opportunity should no longer be seen as acceptable. It should be seen as unthinkable.

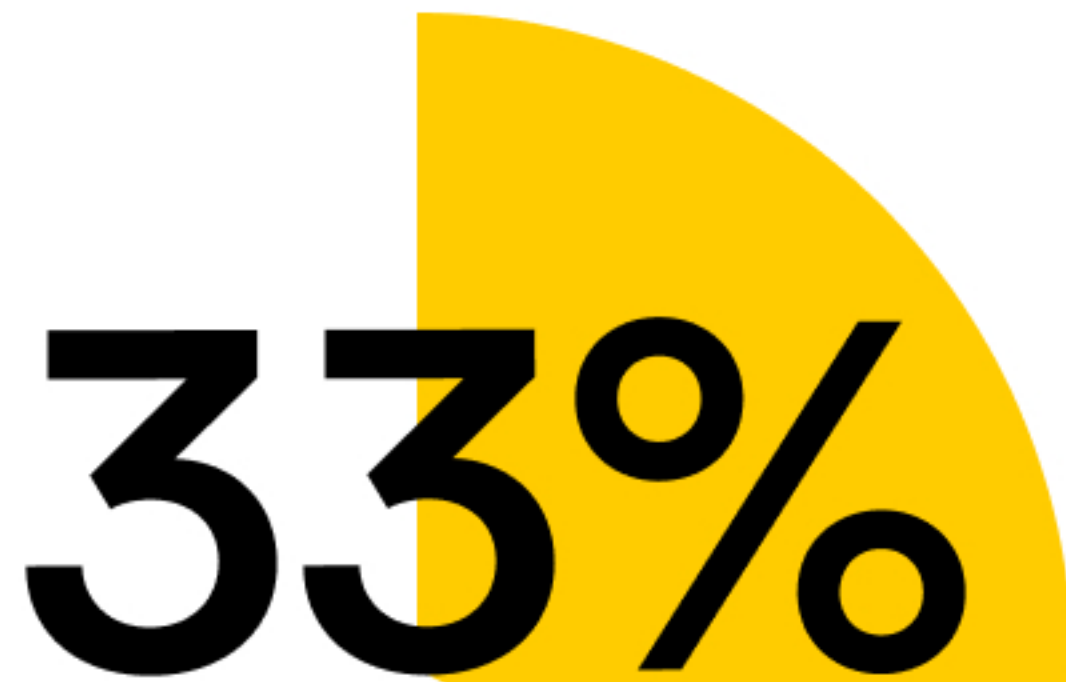


# Introduction

Where is the incentive to act  
on food waste?



# A business-critical opportunity to unlock profitable growth



# 33%

The cost of food waste across a business' supply chain (processing to retail) is equivalent to 33% of its revenue.

Food waste is widely recognized as an opportunity to improve value chain profitability and address food insecurity and yet demonstrable progress remains a challenge.

Working with leading economists at the Centre for Economics and Business Research (Cebr)<sup>2</sup>, we uncovered a \$540 billion opportunity to reduce food waste annually. Addressing this can improve the profitability of businesses across the food value chain and grow economic output.

Our research found that, on average, food waste costs are equivalent to 33% of revenues in the retail supply chain, from post-farm up to the point of sale. Additionally, over half (54%) of business leaders polled report that these costs have risen in the last three years. At the same time, the world population is on course to reach nearly 10 billion people by 2050, requiring food systems to deliver significantly more with increasingly fewer resources.

As with all forms of waste, food waste is an indication of system and resource inefficiency and is a missed opportunity to nourish communities, reduce pressure on agricultural systems and build a more equitable food future.

Accounting for the United Nations Environment Programme's 2024 estimation that food waste across the globe costs retailers and consumers \$1 trillion annually<sup>5</sup> and the Food and Agriculture Organization's (FAO) estimation that 13.2% of food is wasted between farm and retail and 17% between retail and food services<sup>6</sup>, it is clear that waste is an embedded inefficiency costing the sector significantly.

Waste reduction is a business-critical opportunity to unlock profitable growth while maintaining customer loyalty. Much of the technology and innovation needed to tackle food waste already exists, but it is incumbent on stakeholders across the supply chain to embrace them.

# The mounting financial burden of food waste

The research highlights the vast scale of the invisible problem and the financial impact of inaction.

THE FINANCIAL IMPACT ON BUSINESS:



ON THE UN's SDGS 12.3:



PREDICTING DEMAND AROUND PEAK SEASON:



ON THE UN's SDGS 12.3:



# The report provides three key themes with recommendations for action

## Chapter 1

### A fresh perspective on improving food waste visibility

#### Understand the visibility gaps:

Identify and address food waste visibility issues across the value chain.

#### Collaborate across the chain:

Engage suppliers and partners to create scalable solutions to address the systemic causes of food waste.

#### Stay ahead of upcoming regulations:

Stay on top of regional, national and local regulations to be ahead of mandated changes.

## Chapter 2

### The smart moves to unlock value in the supply chain today

#### Connect the physical and digital to uncover the food waste gap:

Leverage sensor technologies such as RFID to establish item-level visibility for inventory management and traceability purposes. Leverage reliable data sets for use in AI models to enable demand prediction and accurate forecasting.

#### Close the gaps in manufacturing and transport:

Leverage the Internet of Things (IoT)<sup>7</sup> to cut errors at the processing stage and gain supply chain visibility.

#### Navigate the elements:

Use packaging innovation to maintain freshness and adopt demand forecasting tools.

## Chapter 3

### Systemic issues addressed with long-term leadership

#### Leverage technology to extend shelf life:

Fully embrace innovation that boosts transparency and maintains product quality.

#### Be prepared for peak season and changes in consumer trends:

Create agility by using inventory intelligence to align stock with demand and minimize spoilage.

#### Empower people with tech:

AI will augment human decision-making, but it needs to be fed with reliable data for businesses to make informed decisions and tell a transparent story to consumers.

Chapter 1

# A fresh perspective on improving food waste visibility



# Retail supply chains hold untapped, transformative potential

Economic modeling found that **\$540 billion in Gross Added Value (GVA) could be gained** by tackling food waste across the global supply chain in 2026.

Driven by critical factors such as rising food inflation, population growth and higher living standards, the cost of food waste is expected to rise to \$540 billion in 2026 and total \$3.4 trillion by 2030.<sup>8</sup>

This projection is the result of economic modeling conducted by economists at the Cebr who measure the cost of food waste in GVA terms, a measure closely related to GDP.

To put this in perspective, the annual value of food waste equates to roughly half of what it would cost to feed the estimated 673 million people around the globe who went hungry last year.<sup>9</sup>

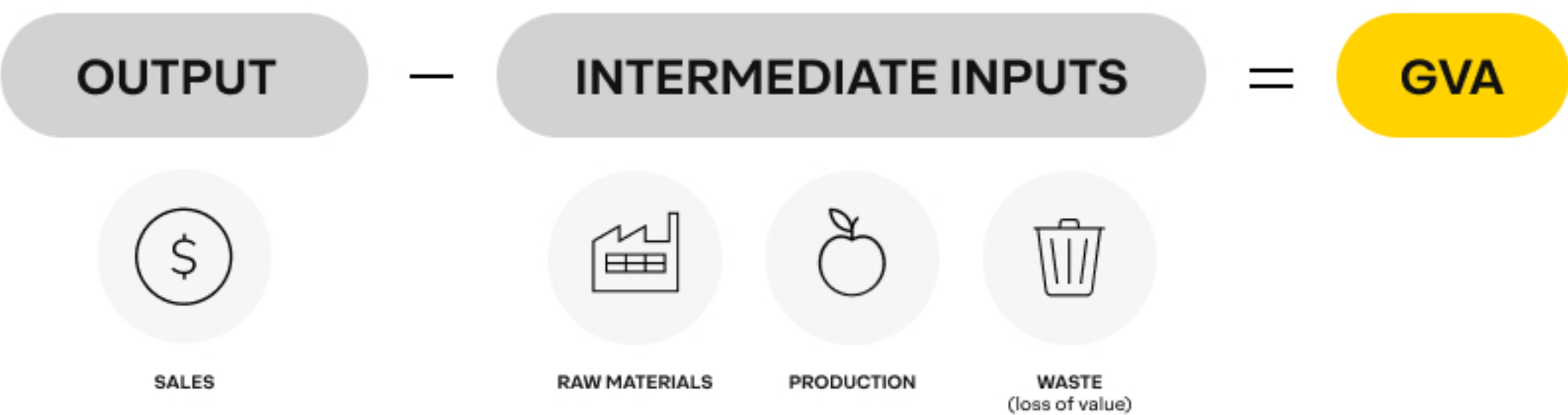
And by 2030, the cost of food waste in the supply chain will have surpassed the GDP of each of the following economies:<sup>10</sup>

- Brazil
- France
- Britain

## What is GVA?

GVA measures the value a company creates by taking its total output (sales) and subtracting the cost of inputs (i.e., raw materials and services to make the product).

By converting food waste reported as a share of turnover into GVA, the analysis isolates the true value lost at each stage — ensuring waste is not counted multiple times.



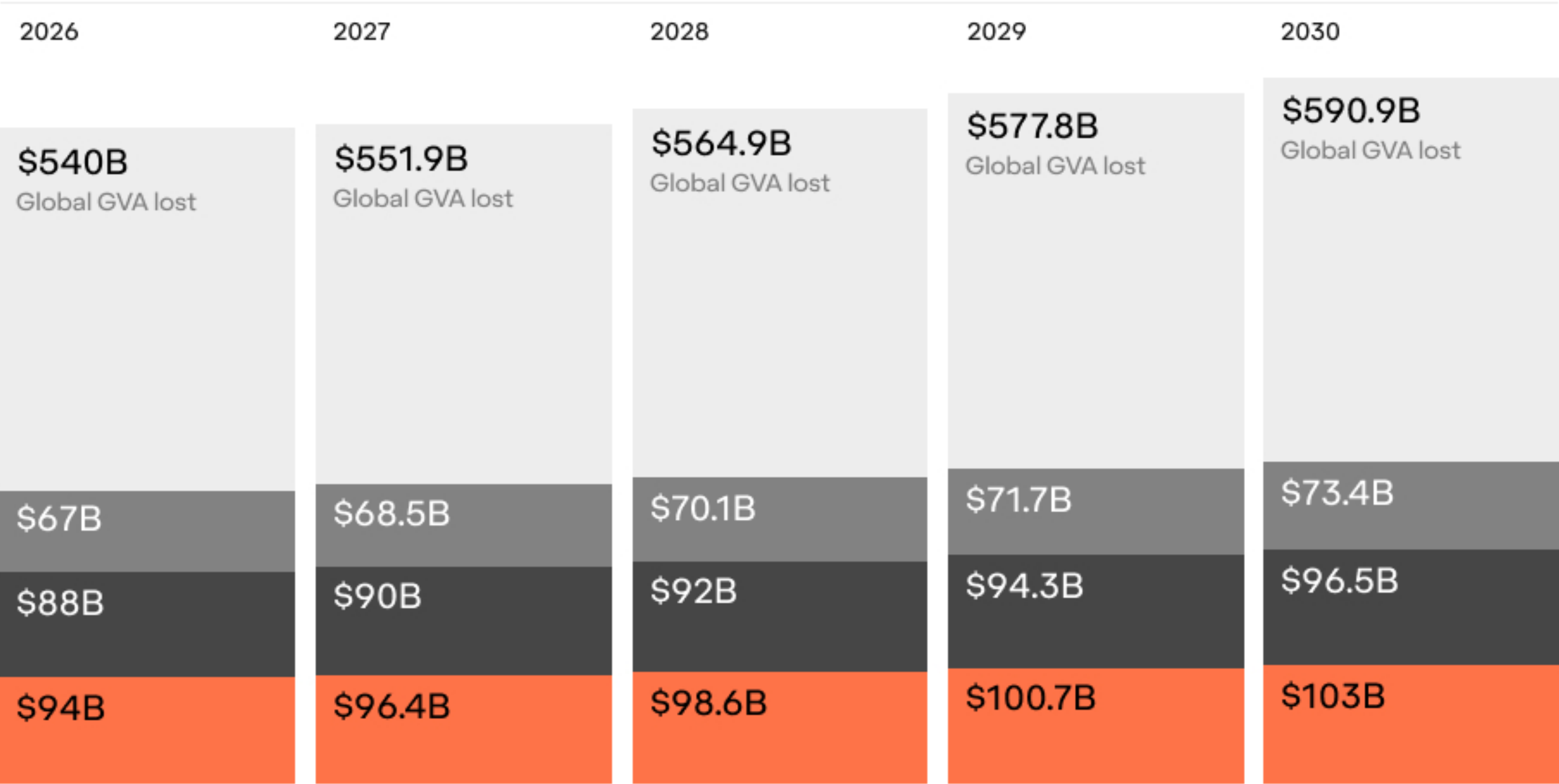
**\$540 billion opportunity** to unlock —  
by tackling food waste across the global  
food retail supply chain in 2026

# Rising waste costs across the world

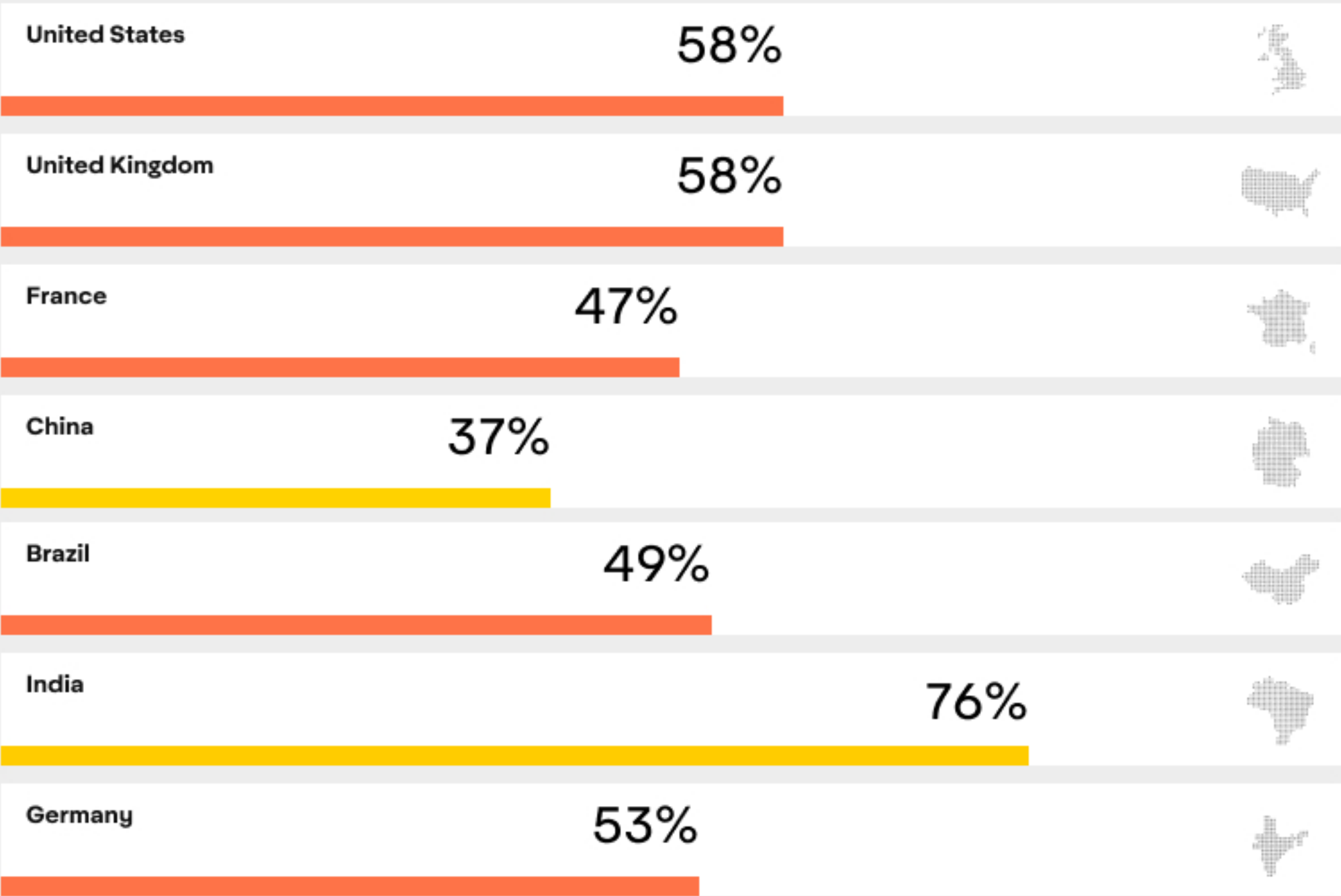
The total value of food waste worldwide is projected to rise steadily over the next five years. Meat, produce and baked goods categories all show consistent year-on-year increases.

Cost of food waste, forecast annually (billions \$)

- ☒ Cost of meat waste
- ☐ Cost of produce waste
- ☐ Cost of baked goods waste



Leaders across seven markets said that food waste costs have risen over the past three years. Highest in India, lowest in China.



These figures represent the share of business leaders who reported an increase in food waste costs over the past three years in our quantitative survey, highlighting the markets where the issue is most widely experienced.

# Why does the food sector accept losses of this scale?

Retailers today operate in an era of unprecedented complexity. Global events such as geopolitical conflicts, changing trading relationships and fluctuating inflationary pressures are squeezing margins and profitability.

Retailers are facing a double loss when they are already operating on tight profit margins. Economic volatility is pushing up the cost of getting products to shelf, while inflexible operations mean they may struggle to respond quickly enough to shifts in consumer demand.

This can mean products arrive late, expire early and the revenue that could have been generated is lost. Not only are retailers absorbing higher costs but they’re also writing off potential sales, ultimately turning avoidable waste into a total profit loss.

## Businesses can see the opportunities available




Seventy-three percent of those polled believe tackling food waste to be a growth opportunity.




Seventy-nine percent of those polled cite investing in technology as having the potential to unlock savings both in the near term and over the next decade.

The survey presented business leaders with 13 innovations leveraged in the food supply chain.


Among those who had implemented them, the five most effective were the following — each delivering a 25-26% reduction in food waste:




**Materials innovations**  
to improve freshness, reduce leakage or limit ethylene exposure




**Data platforms**  
for monitoring food loss across the value chain



**Intelligent labeling**  
(e.g., freshness or ripeness indicators, time-temperature tags, item-level identification and cold chain-optimized packaging)



**Shelf-life extension technologies**  
(e.g., barrier materials and compounds that slow ripening)



**Packaging redesigns**  
to reduce spoilage or improve portioning



PAUL LEJUEZ  
MANAGING DIRECTOR,  
SENIOR RETAIL ANALYST  
CITI

“The more food retailers invest in improving their inventory management, the more profitable their business can become. This isn’t just a food waste issue but rather an opportunity to improve profitability.

We believe technology is key to driving performance in this sector, and accurate inventory management and effective waste reduction are essential for maximizing profitability and cash flow.”

# Supply chain collaboration falling short

68%

The majority (68%) of businesses polled believe collaboration across the food system to champion food waste reduction is falling short.

Examples include:

1  
Mismatched incentives along the chain (procurement vs. store operations),

2  
Nonstandard data and labeling practices between suppliers and retailers.

3  
Limited joint planning on forecasting, markdowns and redistribution.



LIZ GOODWIN  
SENIOR FELLOW AND DIRECTOR  
FOOD LOSS AND WASTE  
WORLD RESOURCES INSTITUTE

“A sustainable food future starts with tackling food waste. Transparency and traceability are essential because what gets measured gets managed. Knowing how much food is wasted helps identify hot spots, guide decisions and enable supply chain-wide solutions. Pioneering retailers that publish their data

are already showing that reducing waste can go hand in hand with strong business performance. It’s time for this to become the norm, not the exception. Governments can accelerate this shift and create a level playing field for collective action with clear policy frameworks that mandate reporting.”



# 61%

do not have total visibility of food waste across the supply chain.

## Rewiring the food supply chain for visibility

Supply chains were once defined by ambiguity: retailers had little visibility into where, between production, transport and shelf, the data was lost. Traceability technology is closing those gaps, turning guesswork into a thing of the past. By tracking factors like real-time monitoring of location, temperature, humidity and handling conditions, companies can finally see what is happening across every link of their networks. It is a shift from reactive to proactive logistics — one that cuts waste, boosts efficiency and builds resilience into systems that previously operated partially in the dark.

Now, a new wave of battery-free, Bluetooth-enabled sensors is pushing that transformation even further. These ambient IoT tags, like those developed in partnership with [Wiliot](#), draw power from Bluetooth Low Energy (BLE) infrastructure and connect everyday items through standard devices such as smartphones or Wi-Fi access points. The result is a continuous, low-cost visibility layer that makes products intelligent and traceable. The supply chain itself becomes a source of insight for the food supply chain.



In the U.S., ReFED is a nonprofit that serves as a central convening platform — sharing data, insights and best practices — and brings together businesses, including grocery retailers representing more than 50% of U.S. market share, with innovators, funders, government bodies, NGOs and others to drive national food waste reduction efforts.

Through its Roadmap to 2030 and associated initiatives, ReFED has aligned cross-sector priorities, supported pilot programs and shared data-driven

insights to guide collective action, including leading work on standardized food date labeling, which can annually prevent 425,000 tons of food waste.<sup>11</sup> It convened more than 40 industry experts to develop a Date Labeling Standardization Tool, helping businesses determine when to use “quality” labels (e.g., “Best If Used By”) versus “safety” labels (e.g., “Use By”).

This collaboration points toward a unified and practical guide to reduce confusion and prevent avoidable food waste.

Models like ReFED demonstrate what’s possible when coordination, data and investment come together, but they also show that more alignment is needed across markets. Supply chain transparency is only achievable when data is shared consistently across the value chain because you can’t change what you can’t see.



**JACKIE SUGGIT**  
VICE PRESIDENT OF BUSINESS INITIATIVES  
& COMMUNITY ENGAGEMENT  
REFE

“Food waste is a systemwide challenge — and solving it demands systemwide action. The good news is that proven solutions already exist.

Real impact depends on shared motivation, alignment and investment, and it will take a united effort from leaders across the grocery sector to turn ambition into action and drive lasting change throughout the supply chain.”

“Businesses across the value chain are looking to reduce costs, and this report shows the huge opportunity for food loss and waste reductions to drive significant savings that can help their bottom lines. We have an opportunity to create a ‘win-win’ for both the environment and the boardroom.

We must stop seeing food waste as a side project and start seeing it as a core operational problem, with action required at both the individual and collective levels.

Businesses need data and knowledge of where waste is happening in the supply chain to be able to address it. Building alignment on targets, measurement systems and metrics can ensure we have the right language to work together effectively.”



**VICTORIA CRAWFORD**  
AGRICULTURE AND FOOD DIRECTOR  
WORLD BUSINESS COUNCIL FOR  
SUSTAINABLE DEVELOPMENT

## USE CASES: INNOVATION IN ACTION

# How Chipotle's tech-first approach is tackling short meat shelf life



Chipotle has piloted the rollout of RFID solutions to 200 locations. The company did this to optimize its operations and trace ingredients at its distribution center, as food safety and increased supply chain and inventory management become ever more critical.

The RFID system reads hundreds of tagged items in seconds, with the traceability system allowing the company to act on food safety and quality concerns swiftly, efficiently and precisely — avoiding overproduction and reducing spoilage and waste.

“Avery Dennison’s RFID technology gives us an unparalleled view of our supply chain, allowing us to ensure the freshness and safety of our ingredients while making significant strides in reducing food waste.

This partnership provides the precise inventory tracking and data needed to minimize spoilage and more accurately forecast demand, furthering our commitment to 'Food with Integrity.'”

CARLOS LONDONO  
VICE PRESIDENT AND HEAD OF SUPPLY CHAIN  
CHIPOTLE

USE CASES: INNOVATION IN ACTION

# Keeping ice cream frozen across a growing empire



Primo Partners, the largest Ben & Jerry's franchisee, faced critical challenges in managing its growing empire. The business needed to ensure efficient operations and ice cream quality were maintained in its 23 locations across state lines, facing the risk of costly product loss due to a lack of real-time refrigeration monitoring and inefficiencies stemming from manual, spreadsheet-based inventory.

To ensure reliable temperature control and inventory accuracy, Primo Partners implemented AD Sense for continuous temperature monitoring and AD Inventory for a centralized inventory system.

This led to significantly reduced spoilage risk, gaining critical operational visibility and data accuracy while saving over 700 labor hours annually.

“Primo Partners has maintained 1% lower COGS and has seen a significant drop in product loss incidents since rolling out Avery Dennison's AD Sense and AD Inventory solutions.”

PHILLIP SCOTTON  
CHIEF OPERATING OFFICER  
PRIMO PARTNERS

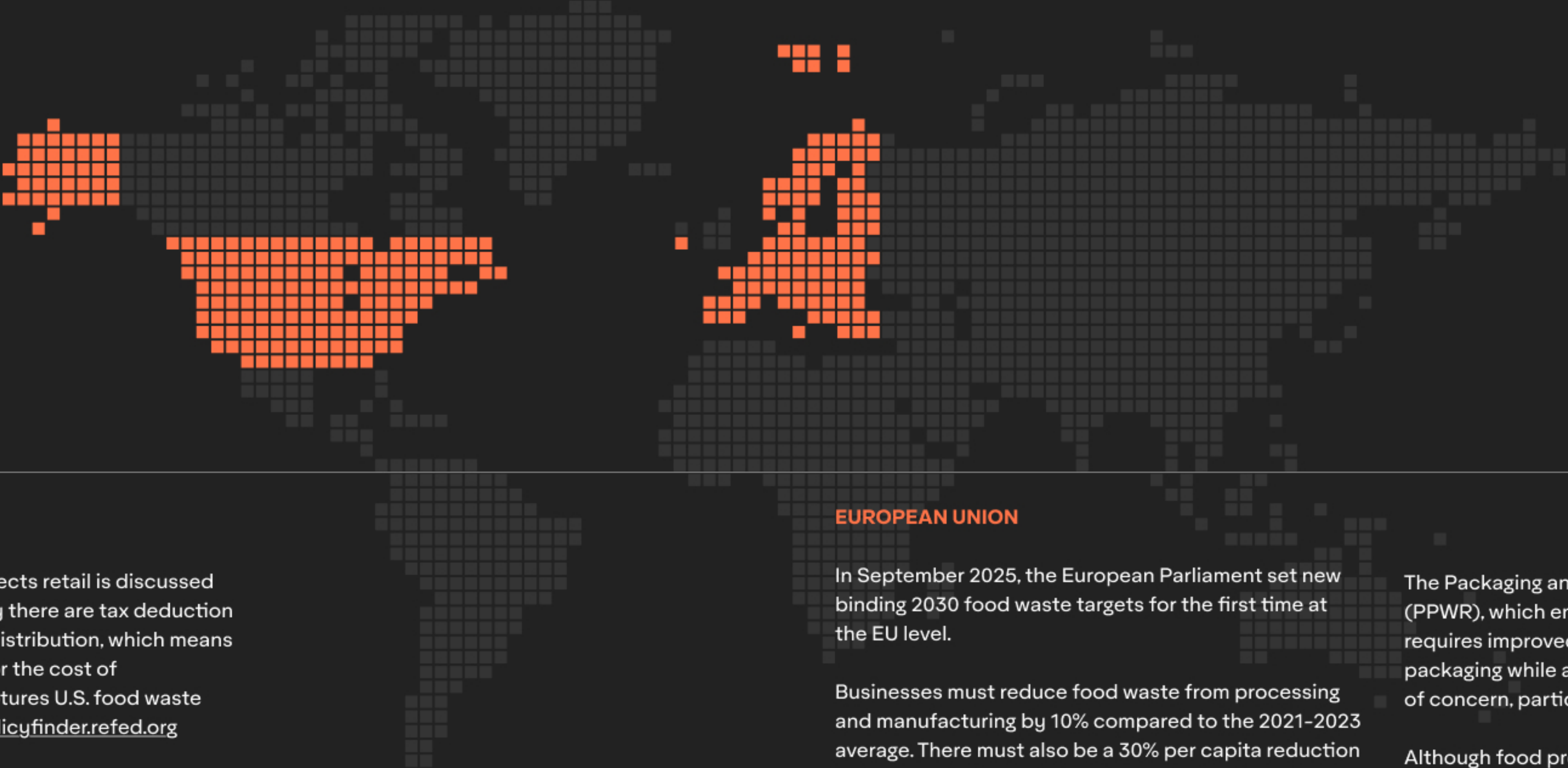
# Regulatory pressure intended to further business action

Across markets, there is a consistent signal that policy will become more stringent as governments make a greater effort to reduce food waste and improve the resilience of their food systems. While the pace and approach differs by region, stricter reporting combined with economic incentives (like Extended Producer Responsibility) are driving greater accountability and the need to focus on prevention.

Indeed, 73% of the retail leaders polled said that legislation/regulatory compliance serves as one of the key drivers of food waste reduction.

# 73%

of retail leaders polled agree compliance is a key driver



UNITED STATES

Much of the regulation that affects retail is discussed at the state level, but nationally there are tax deduction policies that incentivize food distribution, which means there is some compensation for the cost of redistributing food. ReFED captures U.S. food waste policies neatly here: <https://policyfinder.refed.org>

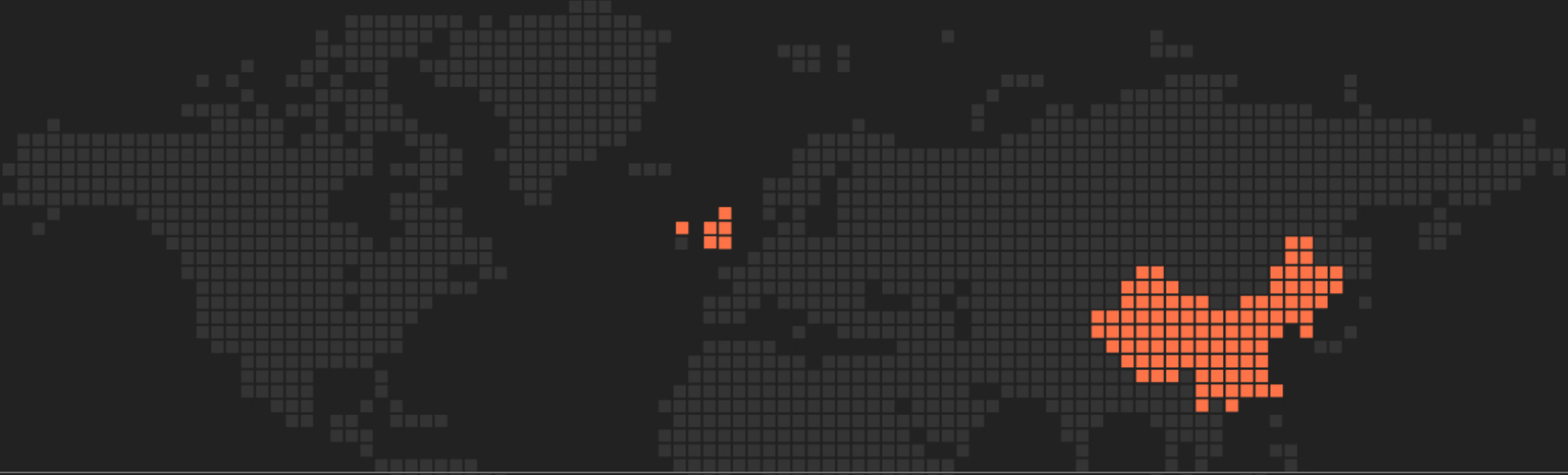
EUROPEAN UNION

In September 2025, the European Parliament set new binding 2030 food waste targets for the first time at the EU level.

Businesses must reduce food waste from processing and manufacturing by 10% compared to the 2021-2023 average. There must also be a 30% per capita reduction in food waste from retail, restaurants, food services and households over the same period. Member States are required to develop national food waste prevention strategies, meaning businesses will face more specific requirements at the national level. Countries must also ensure that major food operators donate safe, unsold food rather than discard it.

The Packaging and Packaging Waste Regulation (PPWR), which entered into force in January 2025, requires improved reusability and recyclability of packaging while also seeking to minimize substances of concern, particularly in food packaging materials.

Although food products are exempt from the Digital Product Passport (DPP)<sup>13</sup> requirements under the Ecodesign for Sustainable Products Regulation (ESPR)<sup>14</sup>, some producers may voluntarily adopt similar labeling practices to demonstrate packaging sustainability and circularity.



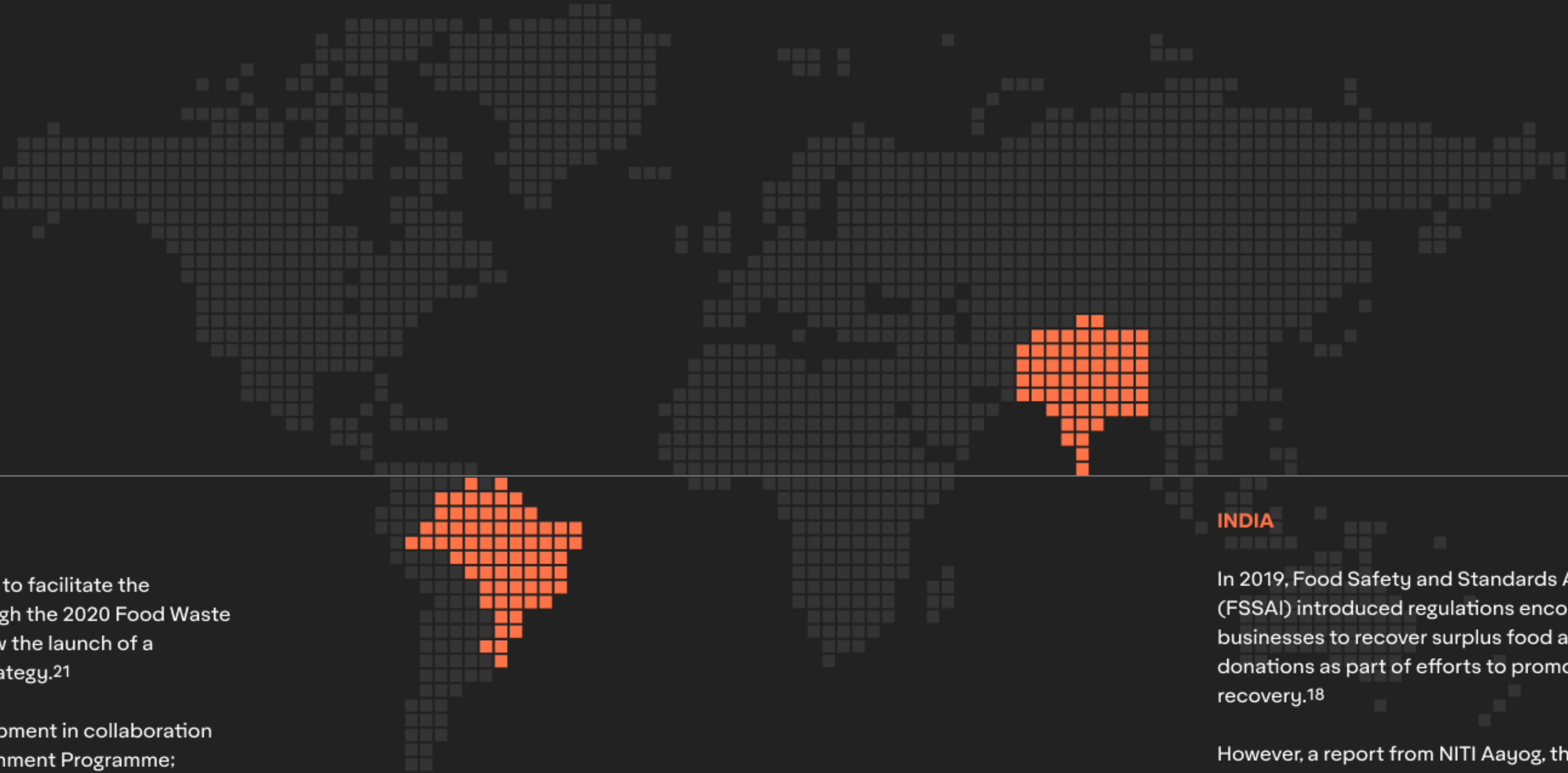
UNITED KINGDOM

Many large supermarkets, food services and consumer packaged goods companies have been lobbying for mandatory food reporting alongside the Waste and Resources Action Programme (WRAP). The current UK Government is signaling there is a possibility this could potentially come into effect. Further, businesses across the food supply chain have been making progress with WRAP’s Food and Drink Pact, which seeks to halve food waste levels by 2030.<sup>15</sup>

Simpler Recycling is now in effect across England, which means that from March 2025, businesses were required to separate food waste for collection.<sup>16</sup>

CHINA

China’s Anti-Food Waste Law exists to apply pressure on businesses and legally curb food waste, specifically driving source prevention in the out-of-home channel. For example, content that encourages “binge-eating” is banned.



**BRAZIL**

Action has been taken in Brazil to facilitate the donation of surplus food through the 2020 Food Waste Donation Law<sup>20</sup>, while 2024 saw the launch of a National Circular Economy Strategy.<sup>21</sup>

Further policy is also in development in collaboration with the United Nations Environment Programme; however, this is expected to mostly contain local government and consumer-focused interventions rather than addressing waste further up the value chain.<sup>22</sup>

**INDIA**

In 2019, Food Safety and Standards Authority of India (FSSAI) introduced regulations encouraging businesses to recover surplus food and facilitate food donations as part of efforts to promote food recovery.<sup>18</sup>

However, a report from NITI Aayog, the Government of India’s public policy think tank published in the same year, suggested there were challenges to tackling food waste, and no major food-waste-related policy interventions have been made since.<sup>19</sup>

# Conclusion: Turn a double loss into a double win

Market shocks and rising costs have become the norm. For food retailers already operating on razor-thin margins, addressing inefficiencies and waste across the value chain will be critical to maintaining profitability, customer loyalty and long-term resilience.

By acting now, double loss can be turned into double value: lowering cost exposure and recovering revenue that would otherwise be written off.

Greater visibility and collaboration can identify problem areas early and prevent cascading losses. Regulation is moving toward greater scrutiny, not less, making it all the more critical to stay ahead.

## Taking action: A checklist for business

1

**Identify and address the visibility gaps:** Leverage smart packaging and digital technologies across the value chain to reduce waste and build resilience.

Material and digital innovations, once rolled out, have the power to reshape how retailers tackle food waste. From smart packaging that extends shelf life to digital ecosystems that improve inventory visibility and generate richer data, technology can help pinpoint where losses occur and prevent them before they happen.

2

**Collaborate across the chain:** Engage suppliers and partners to create scalable solutions to address the systemic causes of food waste.

By fostering greater collaboration and encouraging improved data-sharing across every stage of the supply chain, businesses can improve their visibility into inefficiencies. This access to visibility is essential for driving system change.

3

**Stay ahead of upcoming regulations:** Act early to shape tomorrow's expectations.

Apply innovative solutions before new regional, national and local regulations are mandated to demonstrate category leadership and build a commercial advantage.

Chapter 2

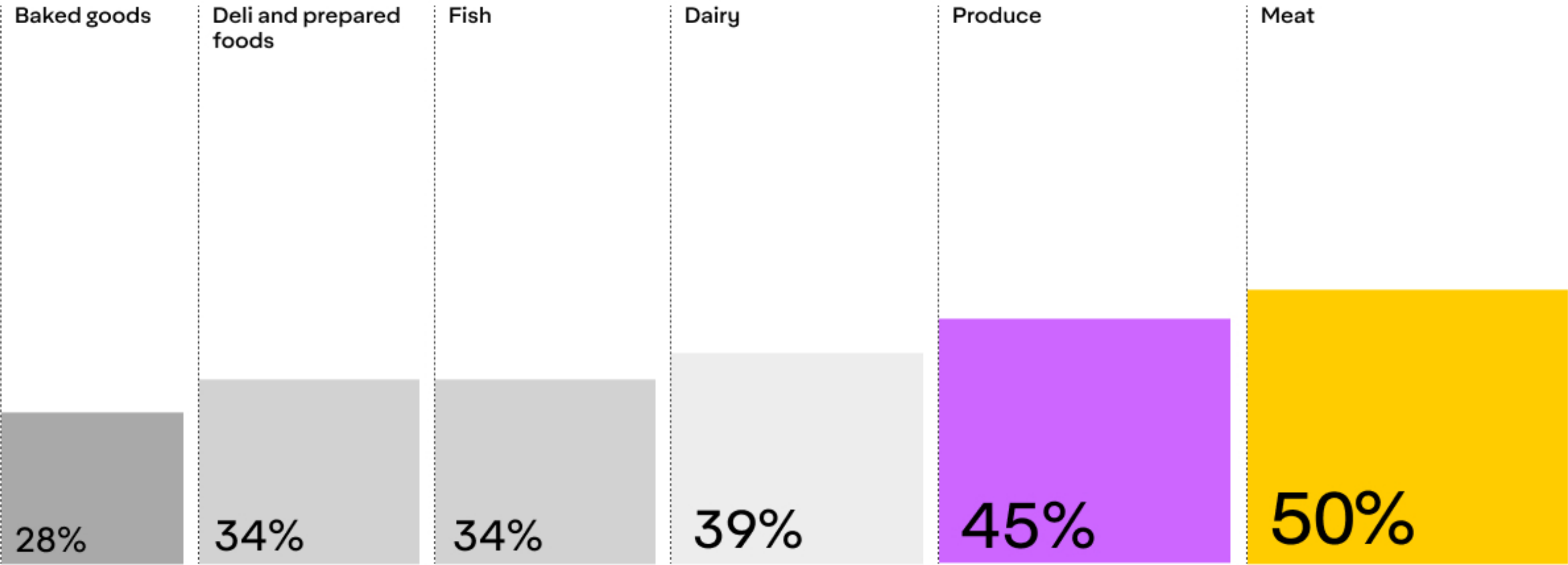
# The smart moves to unlock value in the supply chain today



# Uncovering supply chain opportunities to boost revenue

Perishables such as fresh meat, produce and baked goods are central to consumer demand and retailer profitability. Efficient management of their freshness is critical to maximizing returns in this high-value category.

When it comes to cutting food waste, leaders were asked to pick their top three most challenging categories. In order across those polled, these were:

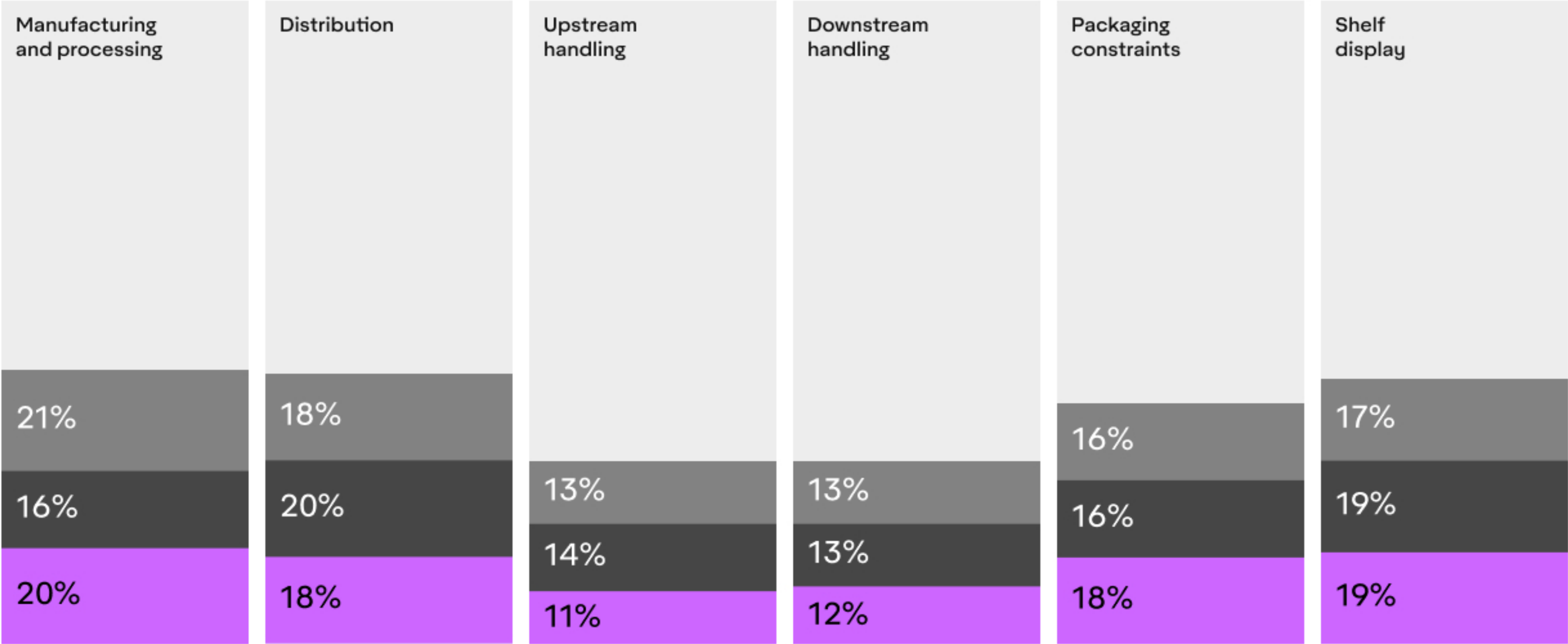


# Three perishable supply chain blind spots

Food waste occurs at different points along the supply chain depending on the category.

The broad distribution of perishability across the supply chain demonstrates that tackling food waste is a complex, multi-stage challenge rather than a linear process. Multiple solutions — from inventory visibility and management to enhanced packaging — will be required to address it.

- Meat
- Produce
- Baked goods



# A clear view on supply chain blind spots

According to the research, there is untapped potential to improve supply chain oversight, with 61% of businesses polled recognizing that they do not yet have full visibility of food waste across their operations. And one in four businesses polled (26%) indicated that they currently have limited influence over the parts of their supply chain where waste is most acute.

This combination of poor visibility and limited control results in produce spoiling during shipment in

unrefrigerated containers, meat packages becoming unsellable due to inefficiencies in processing and distribution, and bakery products becoming unsellable within hours because of overproduction or excess inventory.

Collaboration and targeted innovation can help to address some of these challenges. Digital identification technologies and connected packaging enabled with RFID, NFC, QR and ambient IoT can significantly reduce these assumed losses, as

they provide end-to-end supply chain visibility of a food item.

This not only helps pinpoint issues in the supply chain but also supports accurate inventory management and faster recalls. When paired with materials innovation, such as freshness-extending labels and recyclable reclosable packaging, these solutions both track food and actively extend its shelf life.

# 61%

of businesses recognized that they do not yet have full visibility of food waste across their operations.

## Tackling food waste in manufacturing

One in five businesses surveyed struggling with meat waste say manufacturing is where the biggest challenges lie.

In processing plants, this can mean pallets of meat lost due to mislabeling, production lines stalled when batches cannot be traced or shipments held at distribution centers because expiry data is unclear. Intelligent labels and connected packaging bring item-level visibility into these facilities.

For example:

- Batch traceability allows every cut of meat to be tracked from processing line to outbound pallet, preventing costly write-offs from “orphaned” inventory.

- Real-time expiry tracking, combined with temperature and humidity monitoring, alerts operators when a batch is nearing the end of its shelf life or when environmental conditions risk accelerating it. This enables rapid re-routing or markdown decisions before products expire.
- Automated quality checks using digital identification reduce human error at labeling points, so fewer products are wasted due to misapplied dates or unreadable barcodes.

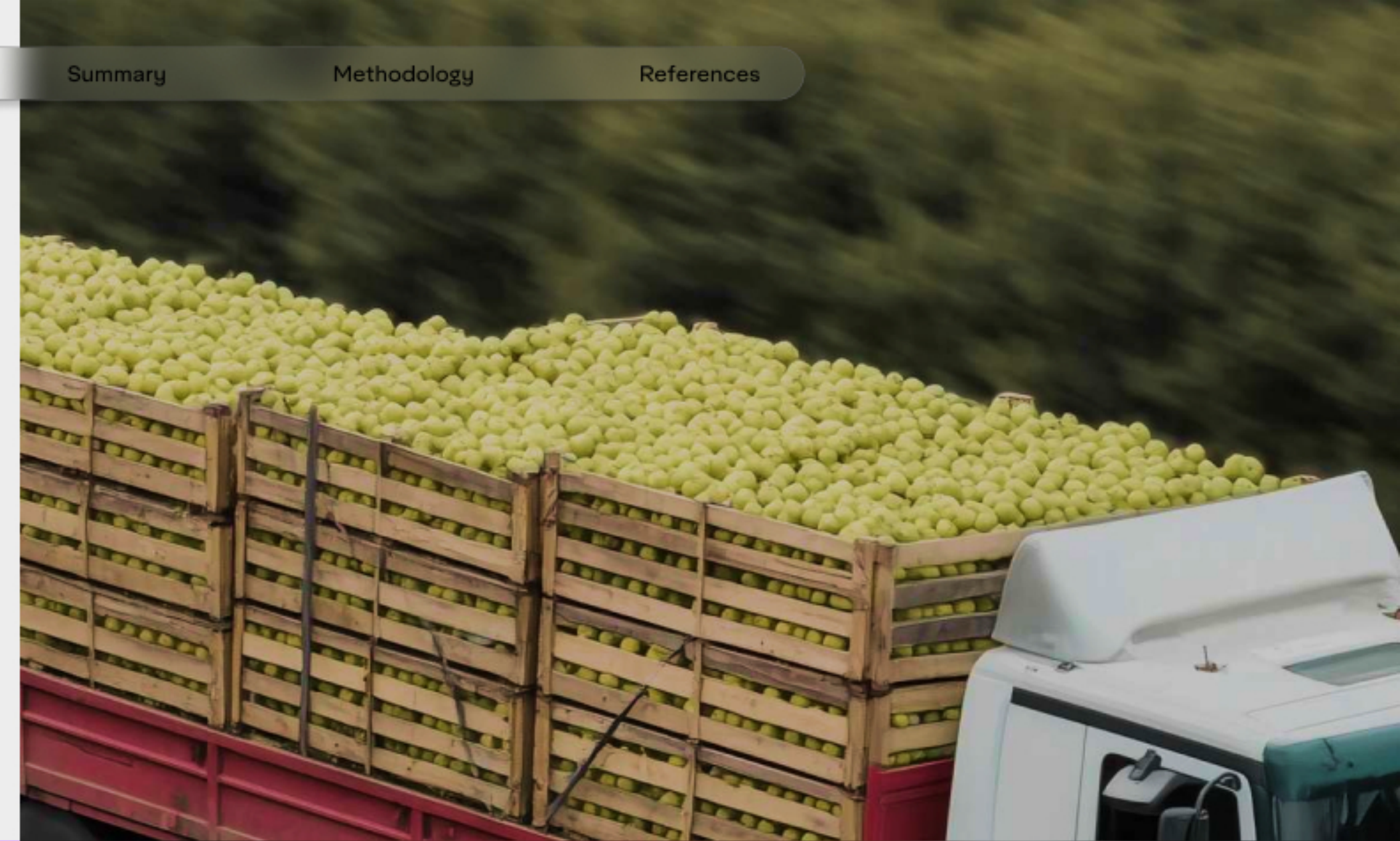
Embedding intelligence at the manufacturing stage enables businesses to cut waste, safeguard throughout and strengthen compliance — transforming a visibility gap into a controllable source of efficiency and value.

# The trouble with transit

Fifty-six percent of companies report that they do not have a clear understanding of how much waste occurs in transit.

While the data highlights where challenges are most acute across different stages, transit remains the connecting thread between them — a point where vulnerabilities across manufacturing, handling and distribution often converge.

The risk grows during periods of high demand or extreme weather when pressure on systems is already strained by labor shortages and outdated infrastructure, increasing the probability of waste.



# 56%

of companies report that they do not have a clear understanding of how much waste occurs in transit.

## USE CASES: INNOVATION IN ACTION

# Mr. Fresh: Extending lychee freshness and accelerating growth across China

## 艾鲜生™

**The innovation**

Avery Dennison's proprietary freshness-extending packaging solution, Mr. Fresh (developed for the Chinese market), was developed to tackle one of the most significant challenges in food retail — keeping highly perishable fruits fresh across long, complex supply chains.

Our innovative packaging materials are specifically designed for climacteric fruits, offering tailored solutions that regulate ethylene, moisture, oxygen and CO2 levels. By controlling these key factors, we effectively slow ripening and extend the optimal shelf life of fruits.

When combined with complementary temperature and humidity storage technologies, our packaging delivers maximum freshness preservation.

Here's how this technology transformed lychee sales in China:

**The challenge**

Climacteric fruits are highly susceptible to spoilage during ripening, especially when facing unpredictable logistics delays caused by weather conditions.

Transport delays, fragmented distribution networks and climate volatility — including typhoons and high

and climate volatility — including typhoons and high humidity in Guangdong Province, the country's largest lychee-producing area — all contribute to spoilage. For lychees, a delay of just two days in transit can mean total product loss, driving customer dissatisfaction and reduced profitability.

This is a common industry challenge — fresh fruit in China travels through a fragmented supply chain with multiple tiers of distribution where the total value chain takes up to a week and damage rates can reach 30% in traditional models.

# 艾鲜生™

### Partnering with Tao Ying Jin Xuan

In 2024, Tao Ying Jin Xuan, a leading e-commerce fresh fruit company, partnered with Avery Dennison to deploy Mr. Fresh across its lychee and fig shipments. By addressing shelf-life uncertainty, the company was able to reduce spoilage, build customer trust and increase repeat purchase.

### Innovation in action

Since adopting Avery Dennison’s packaging, Tao Ying Jin Xuan has seen results across:

- Shelf-life extension: Lychees remain fresh for an additional 3-5 days.
- Customer complaints: Reduction from 10% to just 5%, reflecting significant improvement in

freshness upon delivery.

- Repeat purchase behavior: The improved experience has directly influenced higher customer retention and trust.

These results align with broader pilot outcomes, where Mr. Fresh demonstrated up to a 90% improvement to save the best taste of lychee through ethylene absorption and inner atmosphere control.

### Commercial impact

- Customer sentiment: Consumers consistently cite packaging and freshness as a reason for reordering.
- Sales uplift: Contributing to a 20% year-on-year increase in lychee sales by 2025.

### What’s next

Encouraged by results in the lychee and fig categories, Tao Ying Jin Xuan is now exploring Mr. Fresh across its wider fruit portfolio. With the Chinese fresh fruit retail market projected to grow to ¥1.7 trillion by 2026, solutions like Mr. Fresh will be critical in supporting both growth targets and waste reduction goals.

# Labeling for a fresher, more circular system

For manufacturers, producers and retailers, labeling and traceability technologies are becoming essential tools for improving freshness and reducing waste.

At the pallet level, ambient IoT technologies, such as passive Bluetooth Low Energy (BLE)<sup>23</sup>, enable real-time inventory tracking and condition monitoring, helping identify where delays or temperature fluctuations could shorten shelf life. On-shelf, item-level digital identification and accurate and consistent expiry labeling help retailers to better manage freshness and reduce waste.

While accurate and consistent expiry labeling informs consumers of a product's freshness, there is still no

global standard for expiration or "Use By" date labeling. Yet globally, labeling practices remain inconsistent. For example, Asia produces about 425 million tons of fresh fruit and vegetables each year, yet only a small fraction — around 10% of fruit and 1% of vegetables — are labeled.<sup>24</sup>

This lack of clear expiry information can limit consumer confidence but also contributes to unnecessary loss. Establishing standardized labeling practices worldwide could dramatically improve both food safety and waste reduction.

# Cutting waste through scientific and packaging innovation

**Over half of retail leaders (51%) said inventory management and overstocking contribute to food waste in their supply chains.**

The manufacturing and processing stages of the supply chain have a vital knock-on effect on how the end product is displayed and consumed.

# 51%

**Fifty-one percent of leaders said that inventory management and overstocking contribute to food waste in their supply chains.**

## USE CASES: INNOVATION IN ACTION

# Fresh Inset: Unlocking global produce markets by extending freshness

**Fresh**inset**The innovation**

Vidre+™ is a freshness-extending labeling solution developed by Fresh Inset, supported by Avery Dennison, to address the challenge of excessive food waste by improving fresh produce quality and extending shelf life.

Vidre+™ solved the application bottleneck of 1-MCP (1-methylcyclopropene) by ensuring the timed and gradual release of 1-MCP from stickers — enabling product deployment in packaging used for fresh produce. Vidre+ temporarily blocks ethylene receptors — the natural hormone in produce that drives ripening — actively slowing the ripening signal in order to extend the freshness, appearance and quality of fruits and vegetables.

This industry-first innovation turns an everyday, passive label into an active packaging freshness solution, demonstrating the potential for labels and packaging to be more than just information and protection. Designed with flexibility in mind, Vidre+ is adaptable across a wide range of crops, seamlessly integrating into existing packaging solutions and equipment without the need to redesign operations.

**The challenge and commercial impact**

For exporters, every additional day of shelf life can mean the difference between profit and loss. Freshness-extending technology has the scope to make substantial growth opportunities for growers and packers by helping them reach more distant markets without fear of loss in transit.

For retailers, Vidre+ reduces markdowns, enhances differentiation through higher-quality produce, and minimizes waste from rejected items due to color or appearance. The shelf-life extension varies by product and conditions, with Vidre+ achieving:

- Spinach: up to 10 days of good to excellent quality<sup>25</sup>
- Raspberries: up to 20 days of good eating quality<sup>26</sup>

The logo for Fresh Inset, featuring the word "Fresh" in a bold, sans-serif font, followed by "Inset" in a lighter, sans-serif font. A small leaf icon is positioned above the "i" in "Inset".**Partnering with Fresh Inset and scaling the solution**

Avery Dennison's industrial scale capabilities, scientific insights and infrastructure have enabled swift scale-up for Fresh Inset, allowing the start-up to meet global demand through the two businesses' shared vision that labels can be more than just information carriers.



KRZYSZTOF CZAPLICKI  
COO & CO-FOUNDER  
FRESH INSET

“Our ambition is to make Vidre+ the global gold standard for perishable-goods packaging, extending freshness while reducing food waste and emissions. This collaboration proves packaging can be both innovative and practical, extending freshness without disrupting the supply chain.”

USE CASES: INNOVATION IN ACTION

# Resealable packaging: A key tool against food waste



“At Nestlé Colombia, we set out to solve a clear challenge: how to keep our confectionery products fresh in a hot, humid climate while reducing packaging waste.

Brands such as Cocosette Choco Sandwich, Morenitas and Deditos originally used flexible packaging inside folding boxes, which meant the product had to be consumed immediately after opening.

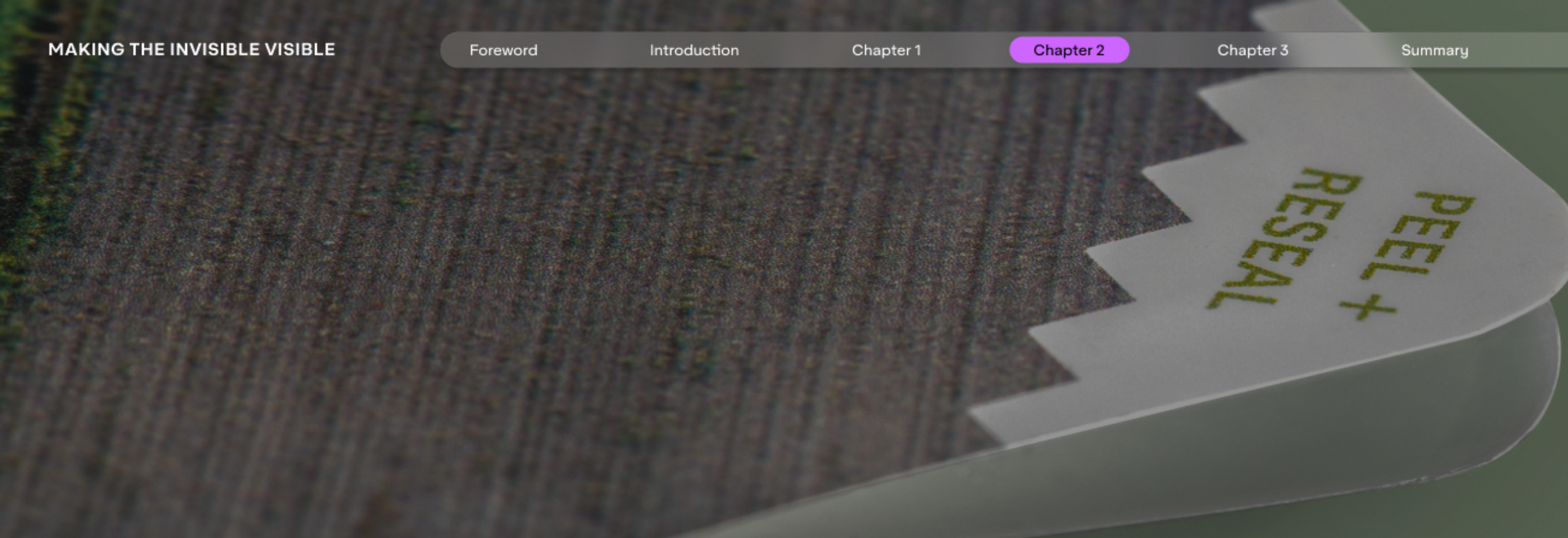
Guided by our global Fit-for-Purpose sustainability policy, we sought a smarter, lower-impact solution.

We had the concept but needed a partner to bring it to life, and so we teamed up with Avery Dennison. Together, we tested materials, adhesives and cutting methods until we found the right approach.

The result is a new resealable package that maintains an airtight, moisture-resistant barrier even after the seal is broken. Consumers can open the pack, take one or two pieces, and close it again without compromising freshness, allowing the product to stay in peak condition for weeks.

“We had the concept but needed a partner to bring it to life, and so we teamed up with Avery Dennison. Together, we tested materials, adhesives and cutting methods until we found the right approach.”

MARIO ANDRÉS MORALES HURTADO  
PACKAGING DEVELOPMENT SPECIALIST  
NESTLÉ



PEEL +  
RESEAL



This innovation has transformed how and when people consume our products, allowing us to unlock new possibilities with this product. Consumers now purchase these treats not only for parties or gatherings but also as everyday snacks to take to the office or enjoy at home. We saw a double-digit sales increase, and we've reduced secondary packaging, improving sustainability credentials without sacrificing quality.

This project demonstrates how careful engineering and true collaboration can transform the consumer experience and advance environmental goals. Following our success in Colombia, Nestlé is now exploring how to integrate this solution into products globally.”

“We saw a double-digit sales increase, and we’ve reduced secondary packaging, improving sustainability credentials without sacrificing quality.”

MARIO ANDRÉS MORALES HURTADO  
PACKAGING DEVELOPMENT SPECIALIST  
NESTLÉ

# Leadership perspective from Avery Dennison



PASCALE WAUTELET  
VICE PRESIDENT, GLOBAL R&D AND SUSTAINABILITY  
FOR AVERY DENNISON MATERIALS GROUP

“Addressing food waste requires a holistic and comprehensive approach that considers every stage of the food value chain — from responsible material sourcing to smarter inventory management.

Innovation across the supply chain plays a pivotal role: Through enhanced tracking and traceability, businesses can better monitor stock rotation, manage expiry and “Use By” dates and optimize markdowns and promotions

to keep products fresher for longer and reduce spoilage. At the same time, connected packaging solutions can link consumers to product data and recycling information, turning every label into a tool for transparency and more intelligent consumption.

Together, these advances are helping to reduce waste and build a more resilient, sustainable food system.”

# Conclusion: Unlocking the smart moves to reduce waste in the supply chain

Not all food waste is equal, with significant differences in valuation and causation existing across food categories. Improving focus and visibility into existing supply chain blind spots can help business leaders drive targeted actions to address inefficiencies.

With investments in transparency and monitoring, retailers can reduce waste, turn potential losses into gains, and protect and expand margins. Improved visibility across the supply chain also prevents.

inventory challenges and captures missed sales opportunities while keeping businesses ahead of legislative and climate pressures.

## Taking action: A checklist for business

### 1

Connect the physical and digital to tackle perishability.

The greatest opportunity for businesses lies in investing in connecting physical products with digital solutions to drive visibility, identify issues and enable action.

### 2

Close the gaps in manufacturing and transport: Use supply chain visibility tools to cut errors and reduce waste.

The leaders we polled believe the biggest food waste challenge for meat is in manufacturing and processing, while for fruit and vegetables, it is in distribution. But mislabeling, lost batches and unclear expiry dates in facilities are silent drivers of waste. Platforms like Optica™ give operators real-time oversight, turning manufacturing food waste visibility gaps into points of control.

### 3

Navigating the elements: Use packaging innovations to maintain freshness in changing temperatures.

Meat and other fresh produce are particularly challenging to keep from spoiling in warmer climates. Data clearly shows that transportation and distribution therefore require particular attention as they are not only a significant source of waste but one where external stressors, such as temperature, are only set to worsen. Leveraging the latest in materials science — such as functional coatings to help manage freshness or temperature sensing and tracking — will be critical to driving transformation.

Chapter 3

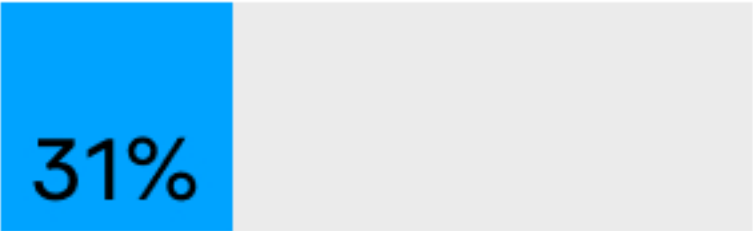
# Systemic issues addressed with long-term leadership



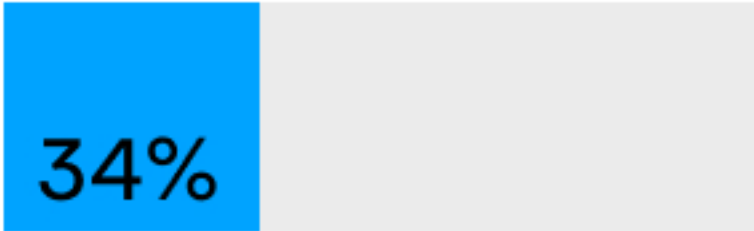
# Retailers hold the key to unlocking a food waste breakthrough

The retail environment is where global supply chains meet consumer expectations — and where food waste presents a substantial opportunity. Today, retailers face significant pressure to balance a seamless shopper experience with operational efficiency. Retailers have an opportunity to achieve a double win by reducing waste through optimal inventory management while creating differentiation (and driving revenue) by creating a superior shopping experience that meets customer needs and expectations.

But that's far from simple. Stakeholders across the food value chain are navigating shifting global supply chains, with 31% of businesses saying supply chain volatility makes forecasting challenging and stock levels less predictable. Meanwhile, a third (34%) of retail leaders say shifting consumer demand, such as health and wellness trends, can make it difficult to manage produce. These challenges are symptoms of a food system that was not designed to be agile.



Thirty-one percent of businesses say supply chain volatility makes forecasting challenging and stock levels less predictable.



Thirty-four percent of retail leaders say shifting consumer demand, such as health and wellness trends, can make it difficult to manage produce.

“Amid growing volatility and higher consumer expectations, every inefficiency in the food supply chain — every wasted pallet, unsold shipment or stockout — is felt more sharply than ever. In this environment, retailers are uniquely placed to orchestrate a system that unlocks value for all involved.

We are sitting on a \$540B opportunity to transform retail, and many of the answers already exist. By monitoring food products through every stage of the value chain, we can turn data into action and proactively prevent waste.”



LUNA ATAMIAN HAHN-PETERSEN  
SENIOR MANAGER SUSTAINABILITY STRATEGY  
ACCENTURE

# Fresh solutions to meat waste

## The future of retail is in your hands

Seventy-two percent of retailers said managing meat-related food waste is their biggest challenge. Sixty-seven percent of leaders globally said the way meat is packaged and labeled makes it harder to reduce waste at scale. Given that meat is a high-unit-cost item in grocery and food retail, even small reductions in waste can deliver significant financial gains.

Retailers that embrace and deploy digital identification technology across the value chain and integrate data into existing workflows can maximize the return on investment.

Consumer behavior continues to evolve. Price remains a competitive point for retailers, as does freshness.<sup>27</sup> Growing sustainability awareness also gives brands that demonstrate credible progress a reputational competitive edge with consumers.

Moreover, in the next five years consumer expectations around supply chain transparency, particularly as it relates to food safety and sustainability, are likely to shift from a “nice-to-have” to a “must-have.” The research indicated that over a quarter (26%) of business leaders have invested in technology that tells consumers about food provenance. Real-time product visibility helps retailers guarantee freshness and safety, bolstering consumer trust and reducing waste.



# 72%

of retailers said managing  
meat-related food waste is  
their biggest challenge

USE CASES: INNOVATION IN ACTION

# Walmart's RFID breakthrough: Fresher food, less waste, greater efficiency



Looking to help develop a solution to a longstanding industry challenge of using RFID technology in high-moisture, cold environments like meat cases, Walmart teamed with Avery Dennison to create and test a first-of-its-kind sensor technology that brings RFID-enabled labels to the meat department.

By using Avery Dennison's RFID solutions in meat, along with bakery and the deli department, Walmart associates can track inventory faster and more accurately — making sure products stay stocked and ready when customers want them.

With digital use-by dates right at their fingertips, associates can also rotate products more efficiently and make smarter markdown decisions, helping cut down on unsold food.

The collaboration also ties nicely with Walmart's broader sustainability goals, including its aim to cut global operational food loss and waste intensity in half by 2030. By introducing automated item-level identification, Walmart and Avery Dennison are transforming how fresh food is managed — making operations smarter, faster and more sustainable.

**“We believe technology should make things easier for both our associates and our customers. “By cutting down on manual work, we’re giving our associates more time to focus on what really matters — helping our customers.”**

**CHRISTYN KEEF**  
VP OF FRONT END TRANSFORMATION  
WALMART U.S.



“Supporting Walmart with first-to-market RFID innovation across multiple fresh food categories underscores our mutual commitment to people and the planet. By giving each item its own digital identity, associates instantly know the freshness of the foods they are handling, enabling better inventory management and resulting in less waste.

This is a landmark moment for the industry, and chimes with our own personal milestone as Avery Dennison celebrates 90 years of helping to solve some of the world’s most complex challenges.”

JULIE VARGAS  
VICE PRESIDENT & GENERAL MANAGER  
ENTERPRISE INTELLIGENT LABELS GROWTH  
AVERY DENNISON

## USE CASES: INNOVATION IN ACTION

# Kroger: Leading digital transformation in bakery retail for a fresher future



In October 2024, Avery Dennison announced a partnership with Kroger, launching a strategic RFID initiative enabling item-level digital identification in its bakery department. This was an important first step toward adoption in broader fresh categories.

Over an 18-month period, Kroger is rolling out the RFID solution across most of its 2,750 store chains, including banners such as Fred Meyer, Fry's and Ralphs. This collaboration delivers more frequent and accurate inventory insights and is helping Kroger maximize product freshness, reduce food waste and improve the overall customer experience.

- **Inventory optimization:** Since implementing RFID, Kroger has achieved a significant reduction in bakery-related food waste, improving margins to contribute to a stronger bottom line.
- **Customer engagement:** Improved on-shelf availability and fresher products have translated into stronger customer satisfaction and repeat purchases.

“Our work with Avery Dennison has improved inventory visibility, which means products will be on the shelves when our customers want them, while enabling our associates to spend more time with our customers.”

**JORDAN POFF**  
VICE PRESIDENT OF RETAIL OPERATIONS  
KROGER

# AI is only as powerful as the data it receives

The emergence of AI comes with the promise of tackling big challenges like food waste, but this promise is only possible if it's fed accurate and detailed data.

Until recently, much of that information was fragmented, invisible to retailers and decision-makers. Digital identification solutions change that by feeding

accurate, highly detailed item-level data into AI tools equipped to analyze the entire supply chain. It is actionable intelligence that allows retailers to align their operations with consumer demand, supplier capacity and the realities of logistics. By reflecting on how products move through connected data, retailers can act as conveners for change, drawing on their networks across the supply chain.

## Using technology to design out waste

With connected packaging generating vast data streams, the next frontier is turning that insight into predictive action. Retailers can optimize systems and tackle waste using a combination of physical and digital innovations.



# Sell smart to meet shopper values

“Grocery retail has long been optimized for linear efficiency, but this system is no longer fit for purpose. We need to create a more resilient supply ecosystem that makes best use of all resources within it. While consumer behavior plays a role, it is retailers who have the agency and leverage to coordinate change.

Food waste is a symptom of flawed system design. Activities that focus solely on one part of the supply chain, often only succeed in shifting the problem elsewhere. Instead, we must design out waste at every stage by convening businesses and ensuring they are acting cohesively. We know the appetite for change exists; now we need to demonstrate how they can scale innovation together across the supply chain.”



BETH MANDER  
PROGRAM MANAGER  
IN THE ELLEN MACARTHUR  
FOUNDATION'S RETAIL MISSION

In-store leadership on food waste does not end with operations. It extends to the shopper experience. Here, keeping pace with the cultural zeitgeist of food is one of retail’s toughest challenges. Consumer preferences move fast and often unpredictably. Retail shelves continue to mirror shifting consumer priorities. Products with active health claims are seeing steady growth, with “high/source of protein” still appearing on 49% of launches and a notable 32% now carry “high/source of fiber” claims.<sup>28</sup>

**Thirty-four percent of retail leaders say demand for healthier products means it's difficult to keep up with trends.**



Each new wave creates pressure on retailers to pivot assortments quickly, often without clear visibility of how long a trend will last. This can lead to frequent over-ordering, short-term spikes in demand followed by sudden drops and, ultimately, higher levels of waste.

Retailers have a powerful opportunity to influence consumer decisions by making the invisible visible. By serving as a single source of truth for each product’s journey, connected data unlocks a new level of transparency.

Smartphones can read data from NFC technologies embedded in packaging. A scan of a QR code can tell a shopper where their produce was grown, when it was harvested, how long it will stay fresh and the practices used along the way. This level of transparency builds trust and can also encourage more sustainable choices.

So when 56% of organizations find it difficult to understand the food provenance of all of their items, a clear missed opportunity stands out, particularly in China and India where percentages were higher (76% and 68% respectively).

When shoppers know a product has days of shelf life remaining, they are more confident buying it, even if it is discounted. This is especially apparent in high-value categories; in fact, 30% of businesses say shoppers' unwillingness to purchase meat that is close to its expiry date is preventing them from accelerating the reduction of food waste. By providing clearer information on provenance and the journey to the shelf, retailers can help reassure shoppers of quality and safety, with the potential to reduce behaviors that currently contribute to unnecessary food waste.

# 54%

of businesses have not connected carbon emission reduction goals with food waste reduction.



## Lowering retail's carbon footprint

Over half (54%) of businesses said that they had not connected carbon emissions reduction goals with food waste reduction, despite the widely quoted analogy that, if food waste were a country, it would be the fourth largest carbon emitter globally.<sup>29</sup>

Carbon is, of course, embedded in foods — from how and where it's grown to the journey it has been on from farm to fork. Digital technologies can enhance food provenance tracking and support better insight into waste and carbon impact. Tracking a product's journey through the supply chain can capture and calculate its estimated carbon footprint, enabling retailers to make

decisions not just on waste, but on reducing their scope 3 emissions — an increasingly hard-to-tackle target when balanced with other business priorities.

Making this data available to consumers through an NFC-enabled label or QR code can also help to influence purchase behavior.

Technology, therefore, becomes not just a tracking tool but also a lever to influence consumer behavior and strengthen a retailer's leadership position on both waste and climate action, as well as a brand's reputation in terms of provenance and carbon footprint.

# Minimizing waste at peak season

Inflation and forecasting:

74%

of businesses say inflation makes it harder to predict demand for fresh meat.

Revenue risks:

67%

of businesses expect meat waste will noticeably reduce holiday margins.

Logistics gaps and staff shortages:

65%

of businesses report shortages make waste harder to manage.

Cost of waste:

67%

of businesses say meat food waste is set to cost more money to their business this year than ever before.

Portion control:

73%

of businesses report rising demand for smaller meat portions or alternatives.

Consumer behavior:

71%

of businesses see shoppers buying less overall — not just in relation to meat.

Peak season is when profitability should be at its highest, yet it is also when food waste becomes most acute. For retailers handling meat, the pressures of holiday demand combined with inflation and logistics bottlenecks create a “perfect storm” of waste.

Rising costs distort forecasts and make it more challenging to interpret traditional models. This uncertainty is directly linked to higher waste levels, with two-thirds of retailers forecasting that meat waste will dent holiday revenue and margins. Innovations in RFID mean this technology can now be used on meat products. The unique sensor technology has been specifically designed to withstand tough conditions

like moisture and cold temperatures that have notoriously been obstacles to applying the technology within this high-value category. By tagging each package with a unique digital identity, RFID enables item-level inventory tracking, expiry date management and demand velocity.

Combined with passive BLE technologies such as Wiliot, retailers can now accurately track atmospheric conditions — including humidity, temperature and the exact location of produce across the supply chain — creating new opportunities to improve efficiency and reduce waste from source to store. Staff shortages and logistics challenges add another layer of difficulty,

limiting the ability to move product quickly through the chain. At the same time, seven in ten (69%) retailers admit that managing meat waste has become a bigger operational concern than in previous years. RFID enables automatic verification of complex pick-and-pack orders without opening cartons or packages. It reduces labor requirements, improves speed and ensures accuracy when demand is at its most volatile.

Consumer behavior is shifting in ways that complicate planning for key points in the retail calendar. For example, many retailers report that holiday traditions are changing, with shoppers buying less overall, while

demand for smaller meat portions or meat alternatives rise. This dual shift fragments demand, leading to overproduction or under-utilization of stock. The financial consequences are significant. Two-thirds of businesses expect the cost of meat waste to be higher than ever before. With margins already under strain, waste has become an operational and financial risk that retailers can no longer treat as the cost of doing business.

Without innovations such as real-time visibility and freshness tracking, the mismatch between demand and supply will continue to erode holiday profits.

# Leadership thoughts from Avery Dennison



**JULIE VARGAS**  
VICE PRESIDENT & GENERAL MANAGER  
ENTERPRISE INTELLIGENT LABELS GROWTH  
AVERY DENNISON

“The retail ecosystem is changing, but not enough retailers are changing with it. Our existing food systems are not fit for the challenges of today; consumer trends and preferences are shifting faster than ever before, coupled with instability from climate shocks and supply chain volatility that are only set to become more visible. Sitting at the juncture of global challenges and consumer trends, retailers serve a uniquely important role in the supply chain.

As the most visible indication of food waste, the in-store shelf is where much of the debate will play out. This means leading global businesses

have the ability to transform food systems if they choose to work alongside their suppliers and partners to integrate waste reduction into every touchpoint.

It is promising to see the appetite to adopt innovation that can do this, but now is the time to act. We must traverse the barrier between thinking and doing, or risk a food system that continues to drain resources despite the solution being in front of our eyes. As evidenced in this report, those businesses that embrace technology as an addition to their supply chains will see direct returns and increased profitability.”

# Conclusion: Empowering retailers to turn waste into value

Not all food waste happens upstream — significant losses occur from processing to shelf, where forecasting failures, shelf-life limitations and visibility gaps converge.

Through smarter demand planning, dynamic pricing, and item-level tracking, retailers can take control of this critical stage, while also influencing the decisions made within their own supply chain.

Innovation in freshness sensors, intelligent labeling and packaging science now enables better decisions which can help keep products on shelf longer and reduce waste before it happens.

With these tools in hand, retailers can turn shelf-edge waste into a competitive advantage, reclaiming lost margins, delighting customers, and future-proofing their business against volatility.

## Taking action: A checklist for business

1

**Leverage technology to extend shelf life:** Fully embrace innovation that boosts transparency and maintains product quality.

Adopting proven innovations — from compounds that slow ripening to smart packaging, reclosure solutions and freshness-tracking tools — is critical to keeping produce fresher for longer. Early action means first-mover advantage. It improves margins, protects supply chains and demonstrates sustainability leadership.

2

**Be prepared for peak season and changes in consumer trends:** Allow for flexibility by removing the guesswork.

Relying on outdated sales strategies risks compounding waste at precisely the wrong time. Innovations in demand forecasting allow retailers to align stock more accurately with seasonal shifts and holiday demand. Planning continuously, not just in-season, reduces costly overproduction and protects margins during critical periods.

3

**Empower people with tech:** Leverage AI to improve human decision-making and tell a transparent story to consumers.

Shifts in consumer behavior and demand can destabilize operations. By supporting human decision-making with intelligent labeling, businesses can leverage accurate data to better identify and respond to shifting demand, creating a more resilient supply chain. Connected packaging offers transparency on provenance and carbon impact, building trust and influencing shopper choices. Storytelling at the shelf level goes beyond building trust — it transforms perceptions of waste and encourages conscious consumption.

# Summary



# A better future is within our grasp

“Solutions are increasingly available and retailers are uniquely positioned to steer the supply chain away from this urgent global issue and toward a future where collaboration and innovation can unlock tremendous value.”



**MICHAEL COLAROSS**  
VICE PRESIDENT, HEAD OF ENTERPRISE  
SUSTAINABILITY  
AVERY DENNISON

While food waste has long been recognized as a complex and critical problem that must be addressed, it continues to be absorbed into already-challenged P&Ls as a cost of business. We found \$540 billion to be gained by tackling food waste across the global supply chain in 2026. Considering the fact that we will require more food in the next 40 years than the previous 10,000 combined<sup>30</sup>, addressing food waste can be reimagined as a driver of retail growth and profitability and part of a broader solution for addressing increasing food insecurity.

Without urgent action, food waste will continue to silently drag down business growth and profitability and create social and environmental inequities.

Solutions are increasingly available and retailers are uniquely positioned to steer the supply chain away from this urgent global issue and towards a future where collaboration and innovation can unlock tremendous value. We remain committed to driving collaboration with retailers and their value chain partners to unlock innovation and develop solutions that generate value and galvanize lasting change.

The tools exist. The imperative is clear. It's now up to all of us to seize the opportunity at hand.

**To learn more about how businesses can drive growth, reclaim profit and reduce food waste, [get in touch](#).**



# Methodology



# Methodology



**Censuswide:  
Quantitative research**

Research of 3,502 business leaders was conducted by Censuswide between June 13–26, 2025.

There were 500 business leaders participating in each of the seven markets: US, UK, France, Germany, China, India and Brazil.

Decision makers were across food businesses from grocery, food brands (CPG), food distribution and logistics and food packaging.

Job titles polled included: Head of Sustainability, Chief Supply Chain Officer, Head of Procurement, Head of Product Development, Head of Manufacturing, Director of Logistics.

The majority of participants were part of organizations that had revenues of \$750,000 or above. The sample size was skewed towards larger sized businesses.

Censuswide abides by and employs members of the Market Research Society and follows the MRS code of conduct and ESOMAR principles.

**Centre for Economics and Business Research (Cebr):  
Economic modelers**

Cebr found that the average cost of food waste across the supply chain (from processing to retail) for a business is equivalent to 33% of its turnover, globally. The quantitative survey found this percentage at a country level too.

To estimate the wider economic impact of food waste, Cebr applied this percentage to food supply chain revenues from each participating country’s national accounts. Next, a GVA-to-turnover ratio was applied, arriving at both country-specific and total economic output figures.

Using GVA allowed the economists to strip out intermediate costs and avoid compounding losses already accounted for earlier in the chain.

**Steps included:**

Sizing each retail market: using national accounts data at the most granular industry level available (ideally 4-digit codes).

Forecasting food waste rates from the Censuswide survey: Calculate the revenue-weighted average of “food waste as a % of turnover,” so larger retailers, who drive more of the market, carry proportionally more weight.

Converting waste into economic value: Apply the weighted food waste % to each country’s 2024 retail turnover to get the value of wasted stock. Convert this to an economic value using the GVA-to-turnover ratio from national accounts.

Multiplying the value of wasted stock by the GVA-to-turnover ratio estimates the lost economic value from food waste.

Further, the revenue-weighted product shares were also calculated to allocate the total cost across: dairy, meat, fish, produce, baked goods, deli and other.



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# Thank you

To learn more about how businesses can drive growth, reclaim profit and reduce food waste:

[Get in touch with our experts](#)



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