

Reflect. Rethink. Reconsider.

WHY FOOD WASTE IS
EVERYBODY'S PROBLEM



[#GetTheFutureYouWant](#)

Introduction

Around 811 million people on the planet are undernourished¹ and around 45% of deaths among children under five years of age are linked to undernutrition.² Yet almost 2.5 billion tons of food produce goes uneaten annually.³ Amazingly, saving just 50% of the food currently lost or wasted each year could end world hunger.⁴ Furthermore, the biggest environmental impact of food waste is related to the food supply chain. If food waste were a country, it would be the third-largest emitter of greenhouse gases (GHGs) globally (8-10% of global emissions), after the US and China.⁵

Resources deployed to produce, process, transport, and dispose of food likewise generate a huge amount of waste and expense. Coupled with raging food-price inflation and persistently high energy prices (raising

the cost of transporting goods),⁶ food loss and waste constitute one of the most urgent and daunting challenges to our society.

Lucia Avila Bedregal, Consultant - Agriculture and Food Global Practice at The World Bank, agrees: ***“In the current context where food security is being targeted because of COVID-19, current geopolitical tensions, and increasing food prices, food loss and waste should be the most critical issue. Only transformation of the global food system will ensure that the world is not worse off in the future.”***

But it's not all doom and gloom. Transforming the global food ecosystem would present an opportunity for agricultural producers, distributors, food manufacturers, and retailers. The financial cost of food waste is

Introduction

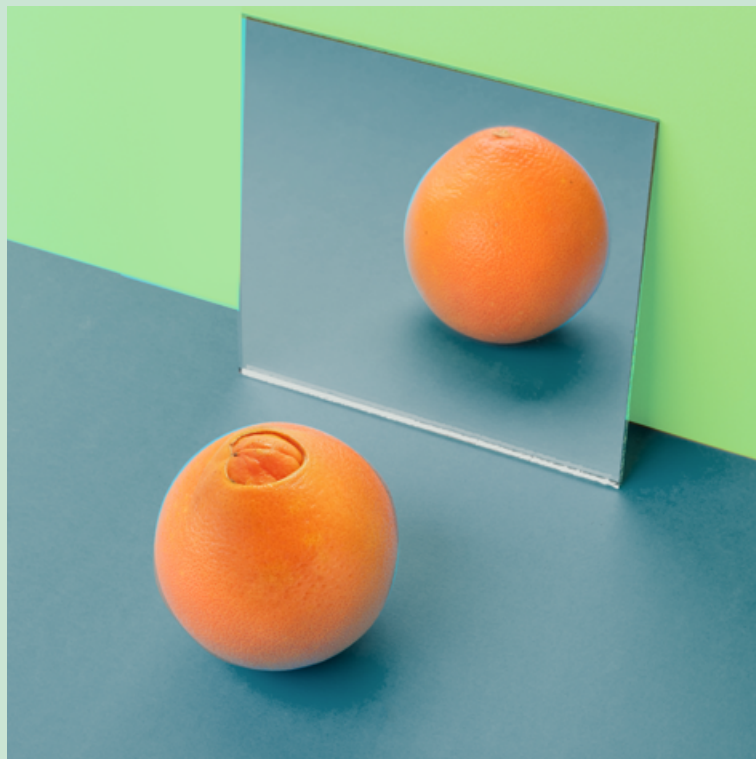
estimated at \$1 trillion.⁷ Organizations can tap into this negative cash mountain to lower costs, enhance sustainability, and capitalize on new revenue-generating opportunities emerging from the redistribution of surplus food. Organizations handling food directly can also contribute to the achievement of UN Sustainable Development Goal (SDG) 12, which is intended to ensure sustainable consumption and production patterns, with the aim of halving global food waste at retail and consumer levels, as well as reducing food loss during production and supply.

Food loss or waste occurs across the lifecycle of food – almost 1.2 billion tons of food is lost on farms during pre-and-post-harvest/slaughter operations. Nearly 930 million tons of food is wasted in retail and final consumption levels, with the bulk occurring at

the consumer end.⁸ As Zeynep Ozkan, Head of the Department of EU Harmonization in Turkey's Ministry of Agriculture and Forestry sums up pithily: ***"Everyone is part of the problem, and everyone could be part of the solution."***

To understand the issue of food loss and waste and potential solutions from the perspectives of both organizations and consumers, we conducted a detailed survey of 10,000 consumers and 1,000 large organizations in the food manufacturing and food retail space, and also interviewed experts from academia, organizational supply chains, and startups. We supplemented the research with a consumer listening study on social media channels (for details, please see the methodology in the appendix).

Introduction



Through the research, we aim to understand:

- 01**
consumer awareness on the topic of food waste and the impact it has on how they behave and buy
- 02**
issues for consumers in managing food waste at home, as well as their **expectations** of food production and distribution organizations
- 03**
the **benefits** organizations are deriving from reducing food waste
- 04**
current organizational **maturity and challenges** in managing food waste
- 05**
the role of **technology** in reducing food waste across the value chain and **leading practices** to prevent, reclaim, and manage food waste

Executive Summary

Consumer consciousness of food waste has risen dramatically

With as much as 40% of global food production being wasted, consumers are becoming increasingly aware of this situation and are eager to change. In the backdrop of rising food prices and supply chain issues, 72% of consumers have become more conscious about their level of food waste, compared with 33% before the pandemic.

72%

of consumers have become more conscious about their level of food waste post the pandemic.

In the last 12 months, there has been an 80% growth in online searches for methods to increase the shelf life of food at homes. An increased level of consciousness about food waste has likely impacted consumer behaviors, from pre-purchase to post-consumption. For example, a majority of consumers plan food consumption and use a list for shopping to avoid waste; many are also open to buying imperfect produce if it is at a lower price point.

Consumers want organizations to take joint responsibility to reduce household food waste

Food waste is an emotive subject for consumers. While they themselves feel guilty of wasting food (60% of them), they also express discontent with retailers and food manufacturers, wanting them to curb it. Today, 61% of consumers feel brands, stores, and supermarkets should do more to help reduce waste, and

Executive Summary

57% feel disappointed in these entities for not caring enough about the issue. In the last 12 months, 56% of conversations on social media around food waste carried a negative sentiment, and anger was the predominant emotion expressed by consumers.

Consumers express discontent with organizations' actions on food waste. Although organizations believe they are taking positive action to reduce food waste, consumers want them to do more in areas such as product innovation, packaging, clarity of date labels, and

61%

of consumers feel brands, stores, and supermarkets should do more to help reduce waste

consumer education. For instance, consumers like to see digital labels (QR codes, etc.) that will provide them with more information on the product's journey and quality; only 33% are happy with the current labelling.

Organizations derive significant benefits from reducing food waste

Our research finds a strong connection between food waste-related initiatives and business benefits, including cost savings, increased revenue, new revenue streams, better ESG ratings, as well as higher consumer confidence. For instance, on average, the cost associated with food waste is around 5.6% of total sales for organizations. More than half (56%) of organizations cited reduction in costs as a top benefit from their food waste-related initiatives. Furthermore, 91% of consumers said they would prefer to purchase food from organizations that are taking steps to reduce food waste. More than half (58%) of these consumers have stated they have increased spending with companies that focus on reducing waste.

Executive Summary

Organizations' food waste initiatives fail to achieve scale

Most organizations stated they are focusing their food-waste initiatives on their own operations. Very few organizations indicated they are working with their suppliers to reduce food loss in agricultural production, distribution, and storage. Only 28% of food manufacturing and retail organizations are focusing on reducing household food waste. Many initiatives are still in the evaluation stage, and a handful of organizations have scaled these across geographies and business functions.

How can organizations accelerate the fight against food waste?

We recommend a three-pronged approach to tackle food waste, powered by technology:

Engage consumers and employees in food waste management initiatives: On the consumer side,

organizations need to bolster awareness-related initiatives. If programs are already in place, redouble efforts to create visibility to consumers, and if not, start. They can use technology to inculcate waste-avoiding behaviors among consumers. For employees, a focus on incentivizing proactive behavior is required.

Collaborate across the value chain: Implement and scale technology solutions such as data-driven demand forecasting, temperature monitoring, inventory management, etc. that generate maximum impact. Build visible, agile, and intelligent supply chains with data sharing ecosystems in place. Closely collaborate with the wider ecosystem, including government-industry coalitions, agricultural co-ops, startups, regulators, etc., to accelerate progress.

Set, monitor, and report food waste-related metrics: Set up goals, measure progress, and have the right governance structure in place to understand root causes of waste, and course correction mechanisms. Use technology to track, assess, report, and reduce food waste across the value chain.

WHAT IS FOOD LOSS AND WASTE?

“Food loss and waste refer to the decrease in mass (quantitative) or nutritional value (qualitative) of food – edible parts – throughout the supply chain. Essentially, food that was originally meant for human consumption, but for various reasons is removed from the human food chain, even if it is then directed to a non-food use (feed, bioenergy, etc.).”⁹

Food loss refers to food that gets spilled, spoiled, or otherwise lost, or incurs a deterioration in quality and value before reaching the final product stage. Food loss typically occurs at the production, post-harvest, distribution, or processing stages. Estimates suggest that more than 15% of food produced around the world is lost during harvest or slaughter operations.¹⁰

15%

of food produced around the world is lost during harvest or slaughter operations.

Food waste refers to food that has progressed to become a consumable product but is not consumed. Food waste may occur for any of a variety of reasons:

01

Fresh produce that deviates from its optimal state, for example in shape, size, or color, is often removed from the supply chain during sorting operations.

02

Foods that are close to, at, or beyond their best before dates are often rejected by consumers and/or discarded by retailers.

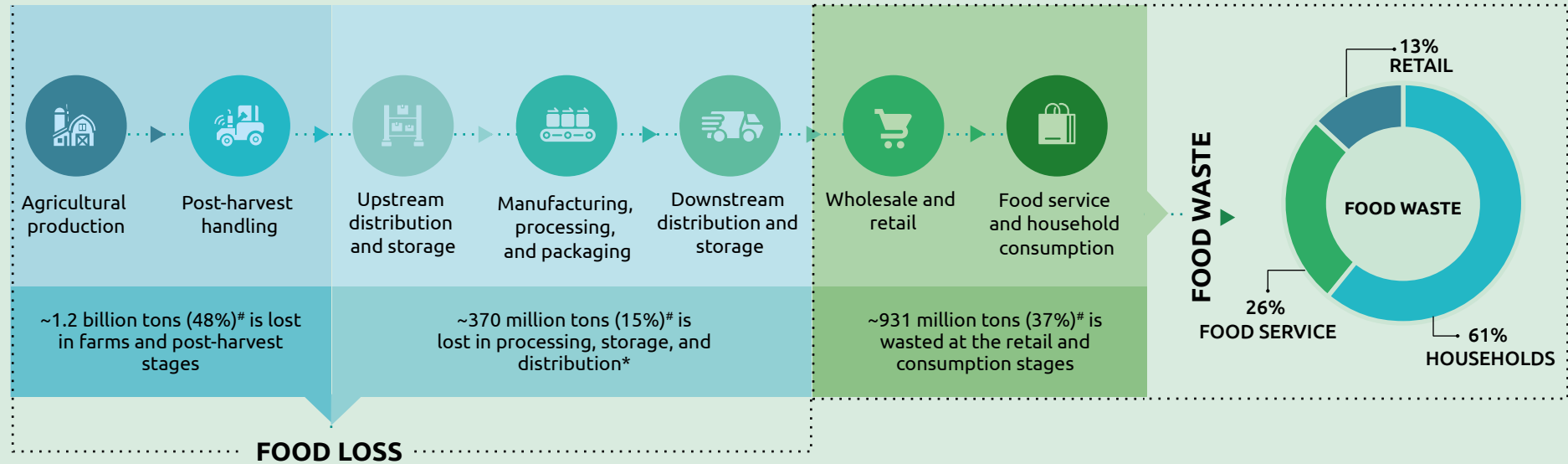
03

Large quantities of wholesome, edible food are often surplus to requirements and subsequently discarded by household kitchens and eating establishments.

Food waste takes place at retail and consumption stages. Nearly 931 million tons is wasted annually, accounting for 17% of the total food available to consumers.¹¹ To put this in perspective, this is roughly equivalent to 23 million fully loaded 40-ton trucks – enough to circle the Earth seven times. Furthermore, 61% of food is wasted at the household level (23% of combined food waste and loss), which highlights how critical it is for organizations to create solutions at the consumer end.

Fig.1

Food loss and waste



*derived; [#]as a percent of total food loss and waste
Sources: UNEP; FAO; WWF.



01

**CONSUMER
CONSCIOUSNESS OF
FOOD WASTAGE HAS
RISEN DRAMATICALLY**

Fig.2

Top 5 of 11 responses from consumers on motivation to reduce food waste

Seventy-four kilograms of food per person is wasted each year by consumers.¹² This is equivalent to nearly 570 million tons of food at the household level.¹³ Our survey suggests that consumers are increasingly conscious of this situation and are eager to change, but they want help from the brands and supermarkets that supply them. As with so many other socioeconomic trends, the pandemic has catalyzed food-waste consciousness: 72% of consumers now claim awareness, compared with 33% before the pandemic. The rise in consumer consciousness has been consistent across age groups, genders, and income levels, boosted by food inflation and sustainability concerns. The most likely reasons are consumers' recent experiences of shortages of essential commodities during the pandemic and the rise in food and energy prices.

Over 62% of consumers say they are aware of the concomitant wastage of resources (land and water use, labor, etc.) in food production. Moreover, a majority (58%) of consumers expect food prices to further go up in the next 12 months. Against this backdrop, 56% of consumers want to save costs by cutting food waste, and a similar percentage stated that they "care about world hunger and want to contribute towards alleviating it."

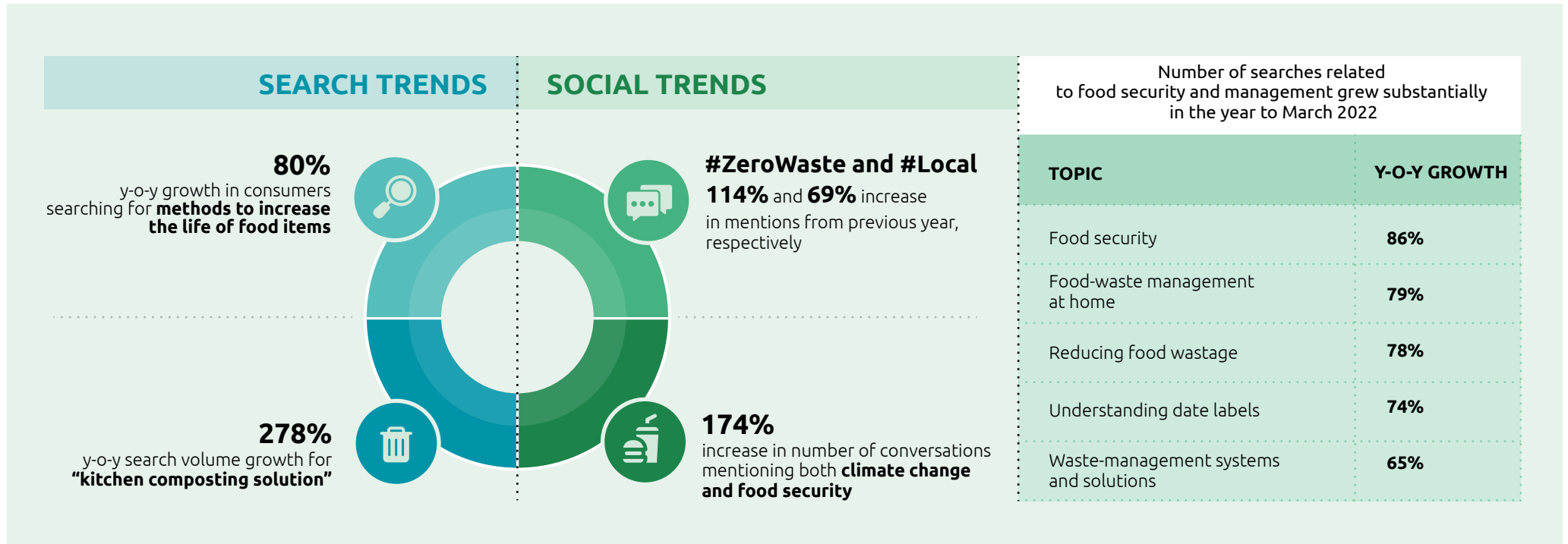


Source: Capgemini Research Institute, Food Waste Survey, April–May 2022, N=10,000 consumers.

We also conducted social listening on the topic of food waste and management to understand how consumer awareness and interest in the topic has developed over the past 12 months; we found that consumer interest in food waste has been rising (see Figure 3).

Fig.3

Consumers are increasingly aware of food waste and want to respond

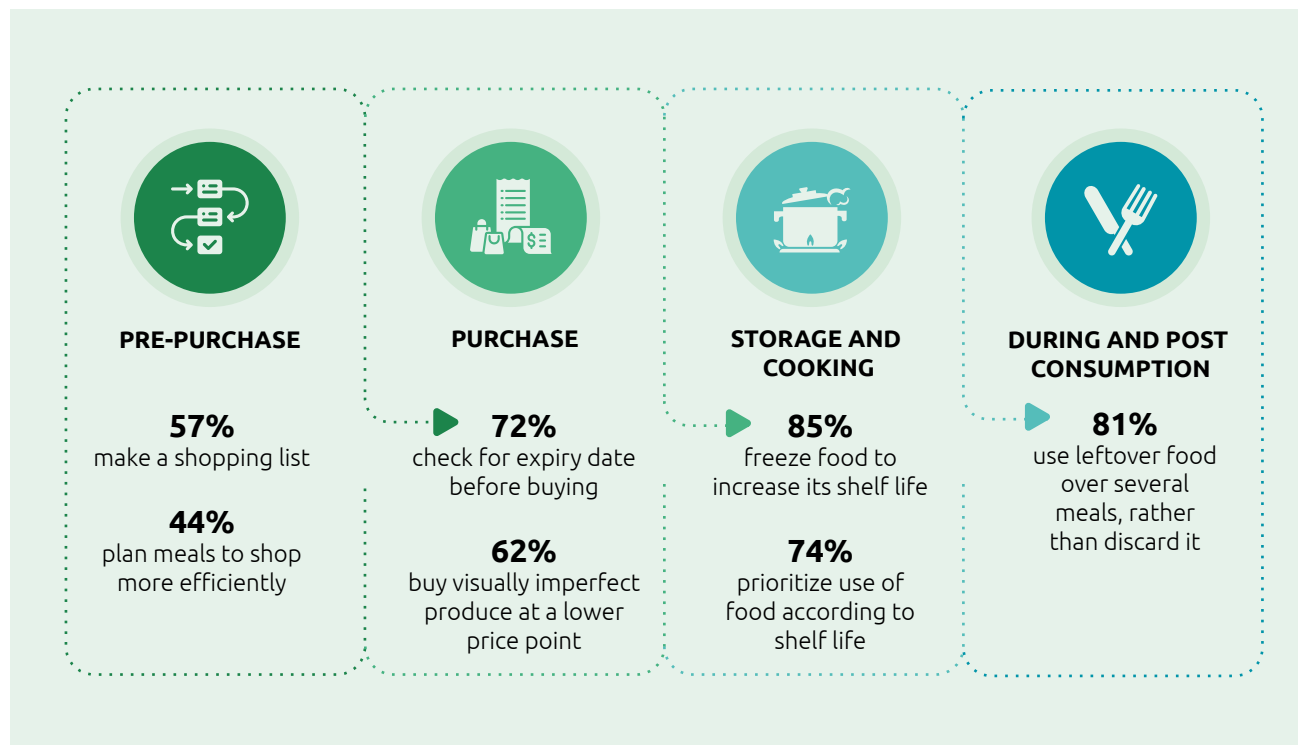


Source: Capgemini social media analysis, June 2020–April 2022; Capgemini search analytics, April 2018–March 2022.

Fig.4

Consumers are actively reducing household food waste

An increased level of consciousness about food waste has likely impacted consumer behaviors, from pre-purchase to post-consumption. For example, a majority of consumers plan food consumption and use a list for shopping to avoid waste; many are also open to buying imperfect produce if it is at a lower price point (see Figure 4).



Source: Capgemini Research Institute, Food Waste Survey, April–May 2022, N=10,000 consumers.

02

**CONSUMERS WANT
ORGANIZATIONS TO TAKE
JOINT RESPONSIBILITY
TO REDUCE HOUSEHOLD
FOOD WASTE**



Food waste is an emotive subject for consumers

While consumers themselves feel guilty of wasting food (60% of them), they also express discontent with retailers and food manufacturers, wanting them to curb it. They want brands and retailers to take joint responsibility of food waste generated at their end. As Figure 5 shows, 61% of consumers feel brands, stores, and supermarkets should do more to help reduce waste, and 57% feel disappointed in these entities for not caring enough about the issue.

61%

of consumers feel brands, stores, and supermarkets should do more to help reduce waste

Fig.5

Three in five consumers blame brands/stores/supermarkets for household waste



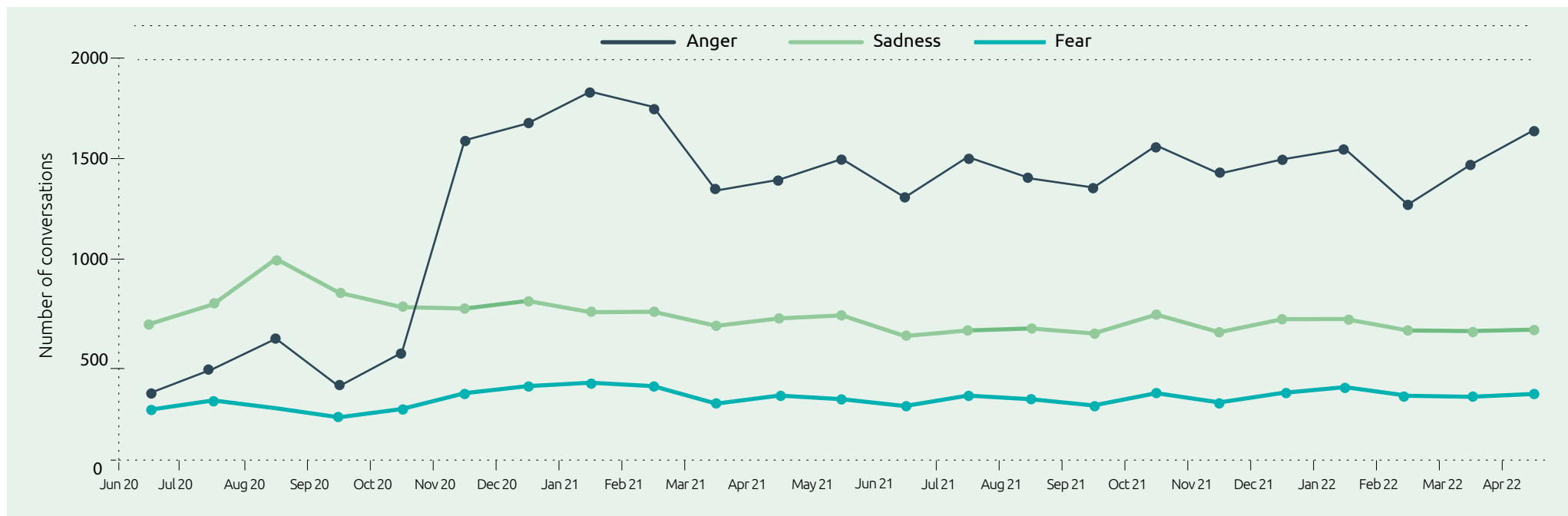
Source: Capgemini Research Institute, Food Waste Survey, April–May 2022, N=10,000 consumers.

We also analyzed consumer opinions on food waste, as expressed on social-media platforms such as Twitter and Reddit; 56% of conversations around food waste carry a negative sentiment, and anger was the predominant emotion expressed during the period June 2020 to April 2022 (see Figure 6). The rise began

in October 2020, when the pandemic-related infection count approached 50 million globally. It coincided with the World Food Day (October 16) and onset of the festive season with Halloween, Thanksgiving, etc., when people are more engaged about food and related conversations.

Fig.6

Since June 2020, anger is the predominant emotion expressed in posts about food waste on Twitter and Reddit



Source: Capgemini social media analysis, June 2020–April 2022.

Consumers are shaming those whom they perceive to be responsible by using social media to highlight the wastage of food at stores. Even frontline employees have expressed anger and frustration at regular food wastage at the outlets where they work, as in the anonymized quotes below:

“The amount of food waste I witness working at [a leading food retailer] ... I can't tell you about how sad, depressed, and angry it makes me.”

“Really upset to lose 10% of the net product [ketchup] as it sticks inside the tube – really disappointing in a hungry world.”

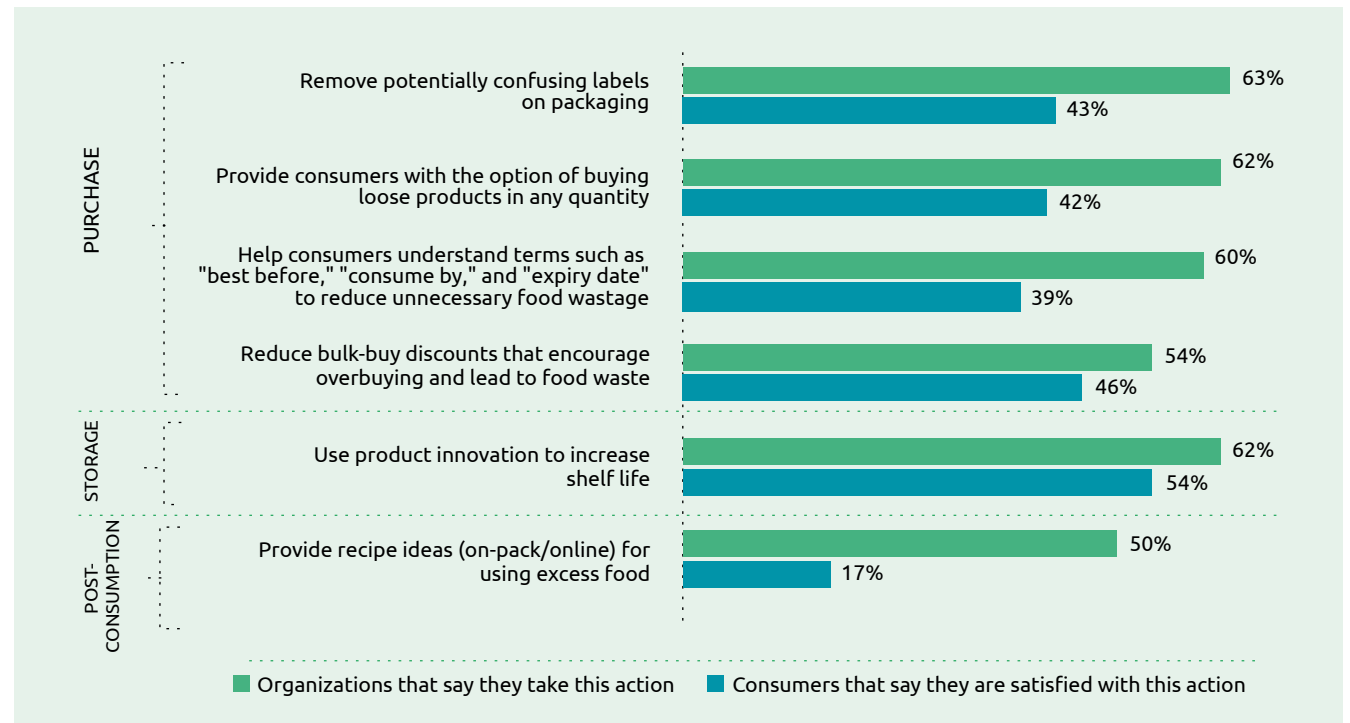


Consumers express discontent with organizations' actions on food waste

As Figure 7 shows, while organizations believe they are indeed taking positive action to reduce food waste, consumers are not always happy. This is concerning for food manufacturers and retailers, since consumers also say they would modify their interactions with organizations that they believe do not care about food waste. For instance, almost half of the consumers surveyed said they would urge friends and family not to interact with such an organization, and almost 40% would use social media or other online platforms to spread word about the organization not doing enough.

Fig.7

Organizations believe they are taking action to help consumers reduce food waste, but consumers are not satisfied



Source: Capgemini Research Institute, Food Waste Survey, April–May 2022, N=10,000 consumers, N=1,000 organizations, including N=400 food-manufacturing organizations and N=600 food-retail organizations.

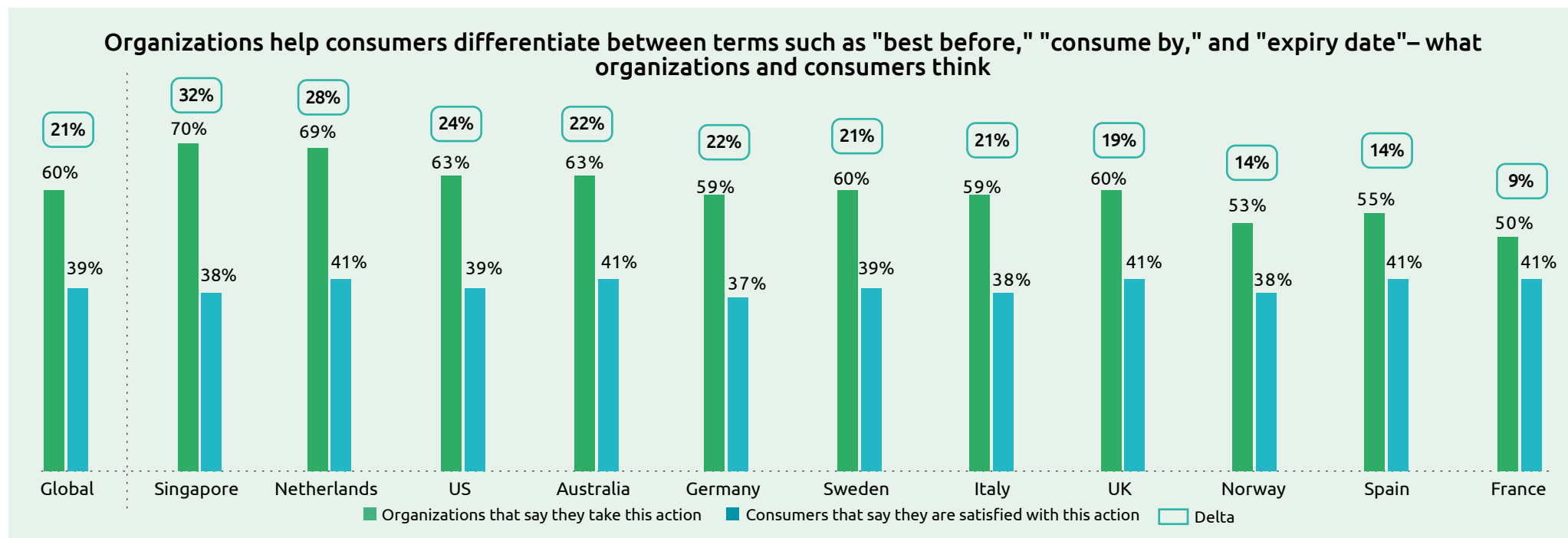
1. Purchase:

As an effort to promote use of all consumable food, 60% of organizations state they help consumers to differentiate between terms such as "best before," "consume by," and "expiry date." However, only 35%

of consumers say they fully understand the difference between the date labels. This perception gap is widest in Singapore, while French organizations are more aligned (see Figure 8).

Fig.8

On clarity of date labels – gap between consumer satisfaction and organization action highest in the US, Italy, and Singapore



Source: Capgemini Research Institute, Food Waste Survey, April–May 2022, N=10,000 consumers, N=1,000 organizations, including N=400 food-manufacturing organizations and N=600 food-retail organizations.

Consumers would also like to see digital labels (QR codes, etc.) that will provide them with more information on the product's journey and quality; only 33% are happy with the current labelling.

Consumers sensitive to food waste often prefer to buy from the "bulk bins" section, which allows consumers to buy loose products in any quantity. To date, only 34% of consumers indicate contentment with retailer provision in this area. Nevertheless, there is movement. Waitrose Unpacked is an alternative shopping template from the UK retailer that encourages customers to bring their own containers to fill with groceries, such as dried pasta, cereal, coffee, frozen fruit, meat, and fish.¹⁴

Over half of retailers say they are working to reduce offers and discounts on big pack sizes, which often lead

to consumer food waste. However, less than half of consumers are satisfied with their efforts.

2. Storage:

Once food is in the consumer's home, it needs to stay fresh long enough to be used. Around 62% of food-manufacturing organizations say they use product innovation to maximize product life for customers, and 54% of consumers seem satisfied.

Naomi Pendleton, Group Sustainability Director for fresh produce distribution company AM Fresh, talks about how the freshness of produce can be maintained, *"We often use post-harvest treatments such as fungicides and waxes to prolong life of produce, or we might use a solution from Apeel – a plant-based coating that can*

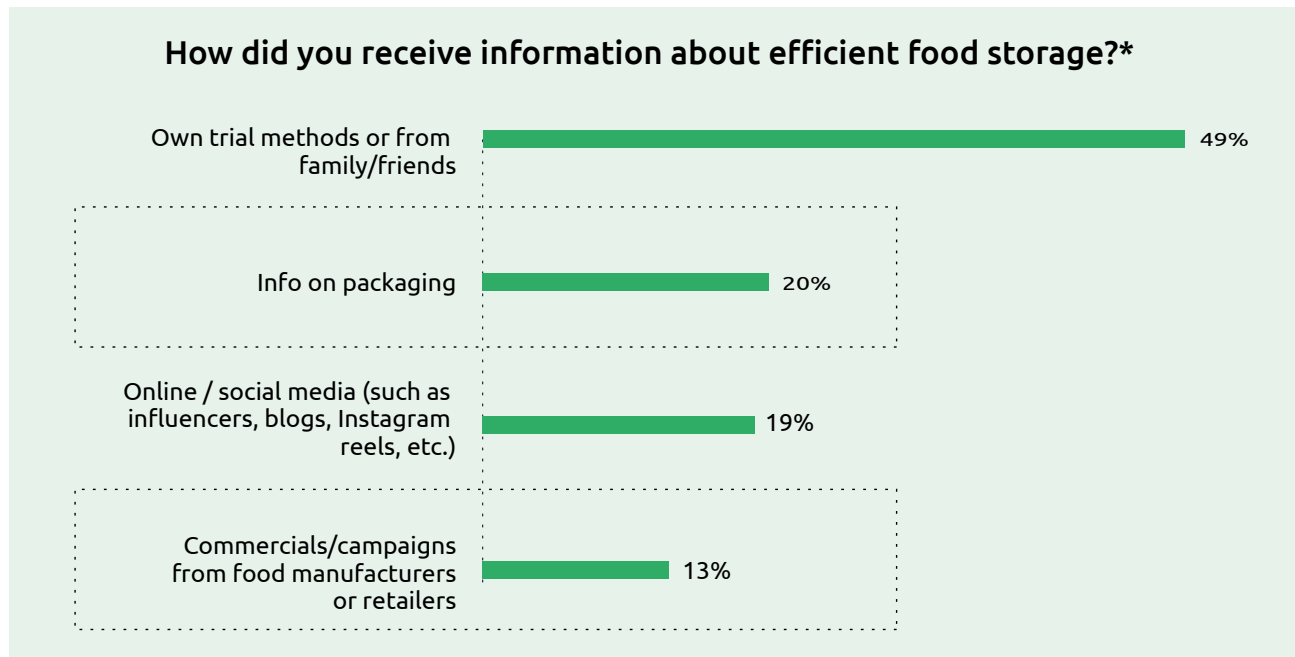
be used as an alternative. Gas flushing is also selectively used in grape punnets for our customers to maximize freshness."

However, there is only so much product and packaging innovation can do if perishables are not stored correctly at homes. Consumers also expect organizations to educate them on how to best store food for longevity. Indeed, 57% of consumers mention that one of the reasons they find it difficult to act against food waste is because product labels do not clearly indicate how to best store and consume food. When consumers were asked how they received information about food storage, only 20% said they get it from the information on packaging, and only 13% mentioned commercials or campaigns from food manufacturers or retailers (see Figure 9).



Fig.9

Consumers largely rely on their own research to increase food longevity



*Percentages averaged over food categories such as fresh produce; breads, cakes, and baked goods; meat and fish; dairy; plant-based meat and dairy alternatives; ready meals and snacks; dry packaged foods; leftovers; and meals ordered from food-service establishments

Source: Capgemini Research Institute, Food Waste Survey, April–May 2022, N=10,000 consumers.

3. Post-consumption:

In our survey, 12% of consumers admitted that 100% of leftovers from cooked meals had been wasted in their homes in the preceding month. Post-consumption is clearly a problem area: while 50% of organizations assert that they provide recipe ideas (on-pack or online) for leftover food, only 17% of consumers feel they receive sufficient support in food preparation. Unilever's mayonnaise brand, Hellmann's, is leading in this area: it has created a website that showcases "flexipes" – flexible recipes for meals made with the most frequently wasted ingredients.¹⁵

Organizations have a huge opportunity to get creative. For instance, Morton Salt has developed an augmented reality (AR) Erase Food Waste experience that consumers can access through QR codes on the packaging. Nine character-animated vignettes encourage people to "erase" food waste by revealing unique leftover-based recipes.¹⁶

03

**ORGANIZATIONS
DERIVE SIGNIFICANT
BENEFITS FROM
REDUCING FOOD WASTE**



A study of 700 food-manufacturing, retail, and service companies found that half of those organizations that invested in measures to reduce food waste saw a **14-fold or greater** return on their investments.¹⁷

Our research also finds a strong connection between food waste-related initiatives and business benefits:

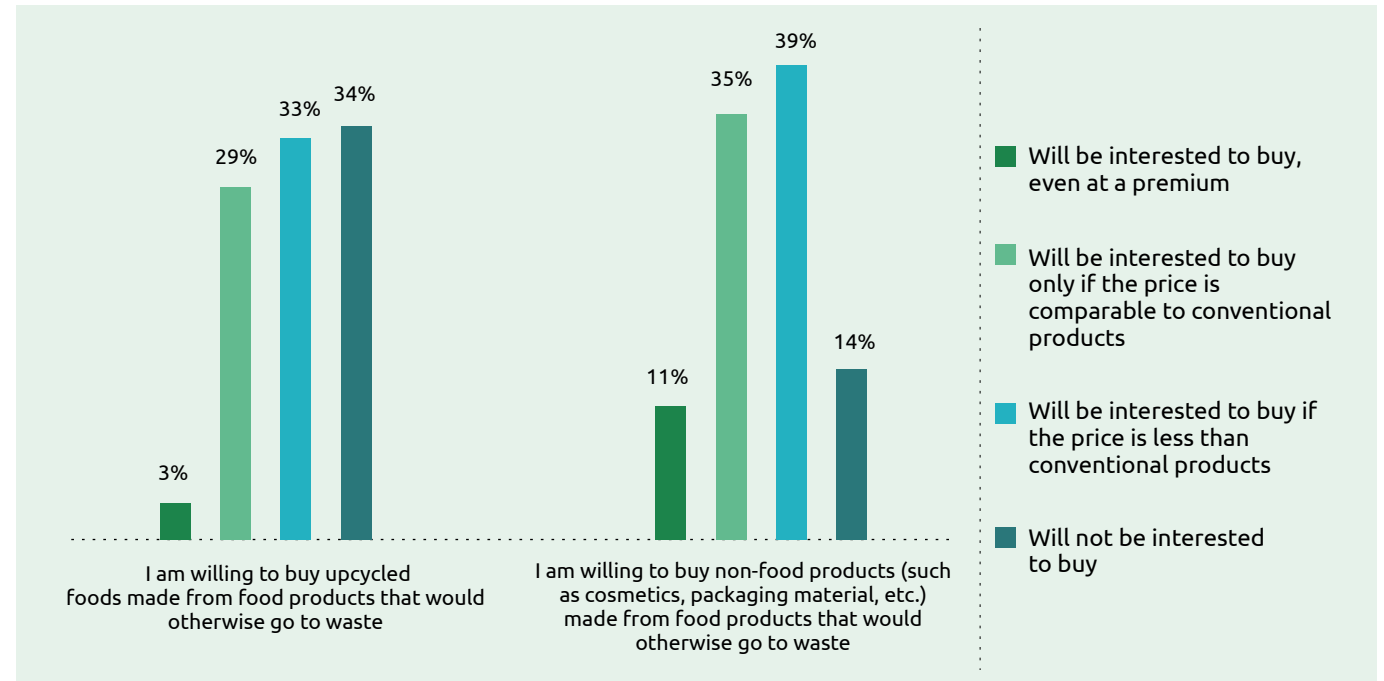
- **Cost savings:** On average, the cost associated with food waste is around 5.6% of total sales. For retail organizations, it is 5.8%, and for food manufacturing it is 5.3%. More than half (56%) of organizations cited reduction in costs as a top benefit from their food waste-related initiatives. Through its Eden technology solution, Walmart, for instance, is projecting that it will save \$2 billion over five years by improving the quality and flow of fresh groceries from farm to shelf.¹⁸
- **Increased revenue:** In March 2019, an Italian retailer implemented a dynamic pricing solution in its poultry category to address food waste. In 12 weeks, the company saw a waste reduction of 39% and a revenue increase of 110% for the category.¹⁹
- **New revenue streams:** A recent report found that the market for products developed from food waste was already worth more than \$52.9 billion in 2022 and is expected to grow at a CAGR of 4.6% to reach \$83.3 billion by 2032.²⁰

Those food-manufacturing organizations that upcycle unused elements in food products themselves derive

at least 4% of their revenue from these “upcycled foods.” Moreover, 66% of consumers say that they are willing to buy upcycled foods to reduce waste, and 86% are willing to buy non-food products (such as cosmetics, packaging material, etc.) made from food products that would otherwise go to waste (see Figure 10).

Fig.10

A majority of consumers are willing to buy upcycled products



Source: Capgemini Research Institute, Food Waste Survey, April–May 2022, N=10,000 consumers.



Unilever's Cremissimo ice cream team has developed a process to "rescue" unused ice cream and mix it with high-quality ingredients to create exciting new products, such as the Cremissimo Chocolate Hero, which is made from up to 40% "would-be-wasted" ice cream. Over 1.2 million Cremissimo Chocolate Hero tubs had been sold as of February 2021, representing a waste reduction of 160 tons (300,000 tubs) of ice cream a year.²¹

- **Achieving ESG goals:** Food loss and waste is responsible for roughly 8% of global emissions.²² For 90% of food-waste management programs, a top objective is the "commitment to climate action and conservation of natural resources." Food-waste reduction can help organizations meet mandatory and/or voluntary environmental commitments, such as zero-waste-to-landfill, the Paris Agreement on

Climate Change, and the UN SDGs. Ignacio Gavilan, Director of Sustainability at the Consumer Goods Forum (CGF) – a global, industry network says, *"One of the most cost-effective climate change mitigation strategies is to take control of your food loss and waste upstream, which directly tackles part of your Scope 3 emissions."* More than one-third (35%) of organizations suggest that food-waste initiatives have already boosted their environmental, social, and governance (ESG) ratings.

- **Increased consumer confidence:** A large majority (91%) of consumers would prefer to purchase food from organizations that are taking steps to reduce waste. Moreover, 58% of these consumers say that, in the past year, they have increased spending with companies that focus on reducing waste – in 27% of cases, significantly (see Figure 11).

8%

of global GHG emissions are generated by food loss and waste.

Fig.11

Consumers are rewarding organizations that reduce food waste



The above examples of organizations using innovative approaches to reduce their food waste, and, in return, gaining consumer trust, confidence, brand value, revenue, profitability, and cost savings, highlight that tackling food waste is not only good for the planet, but also for business.

Heidi Alvestrand is Director of Business Development at Norilia (a subsidiary of Norwegian agricultural cooperative Nortura) – a company responsible for development and sales of plus products from the meat and egg industries. She sums it up saying, *“You have to show the value of the products. If we are not taking care of these ‘plus’ products, it is an added cost for us in terms of paying the rendering gate fee etc. If we manage to find other better utilization of these in the markets – not only will this make business sense, but we will be utilizing these raw materials that have a great nutritional value in terms of proteins, minerals, fats, and essential amino acids, etc. It is more and more important for the businesses to take responsibility of doing things in a sustainable direction along with generating business value.”*

Source: Capgemini Research Institute, Food Waste Survey, April–May 2022, N=10,000 consumers.

04

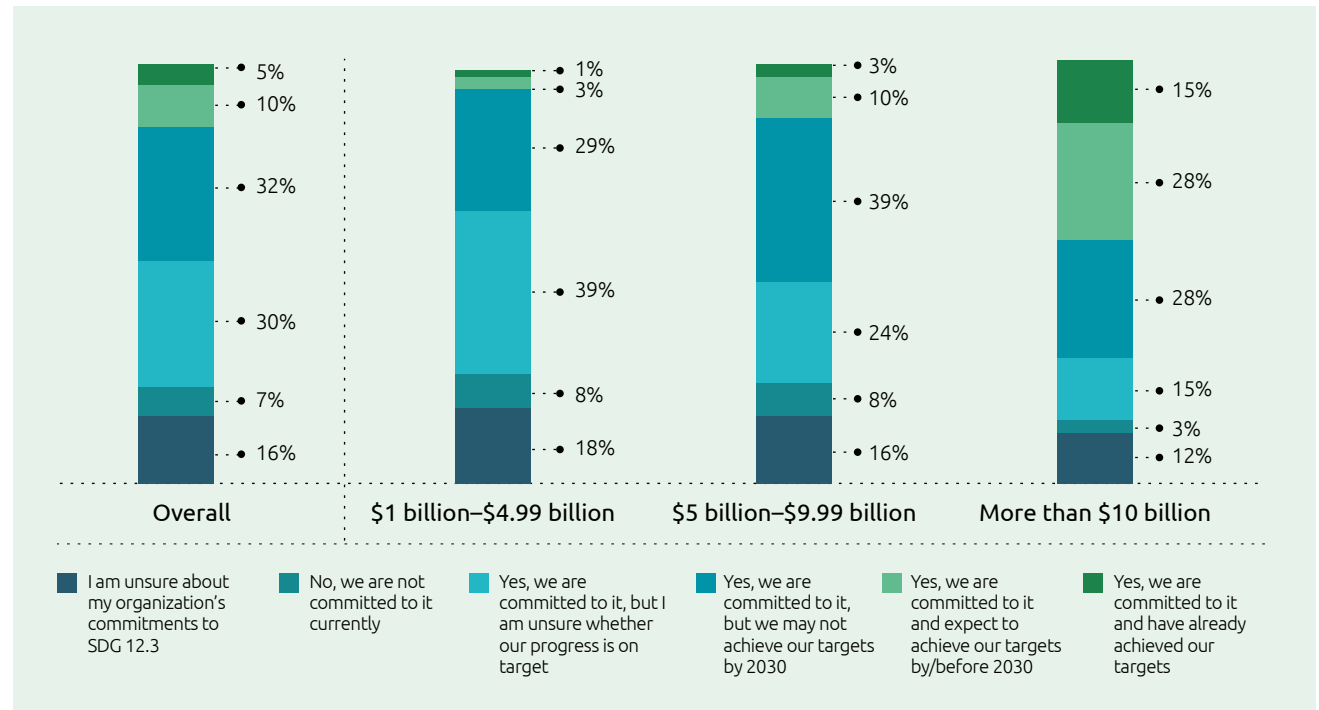
ORGANIZATIONS' FOOD-WASTE INITIATIVES FAIL TO ACHIEVE SCALE



Fig.12

Fewer than one in five organizations are on-track to meet SDG 12.3

A majority (77%) of organizations in our research say they have committed to UN SDG 12.3, which focuses on halving per-capita food waste at retail and consumer levels and reducing food losses along production and supply chains, including post-harvest losses, by 2030. However, only 15% of organizations have achieved (or are on track to achieve) their targets. Although COVID-19 has also set back progress in organizations in some respects, larger organizations (with annual revenue above \$10 billion) seem to do better on this aspect than others (see Figure 12).



Source: Capgemini Research Institute, Food Waste Survey, April-May 2022, N=1,000 organizations, including N=400 food-manufacturing organizations and N=600 food-retail organizations.

Fig.13

Downstream supply-chain and consumer-related initiatives are not priorities



With fewer than 3,000 days until 2030, organizations need to mobilize quickly to meet such ambitious targets. Many initiatives receive significant attention, but there is a lack of consistent focus. Most of the organizations are focusing their food-waste initiatives on upstream operations, such as distribution and transportation, or processing and packaging. However, as Figure 13 shows, very few organizations are working with their suppliers or consumers to reduce food loss and household food waste.

Source: Capgemini Research Institute, Food Waste Survey, April–May 2022, N=1,000 organizations, including N=400 food-manufacturing organizations and N=600 food-retail organizations.

Within these value-chain areas, very few initiatives are implemented at a larger scale across locations, business units, and categories. More importantly, many organizations have either declined to undertake these initiatives or are still evaluating them (see Figure 14).

Fig.14

Food chain maturity is fragmented

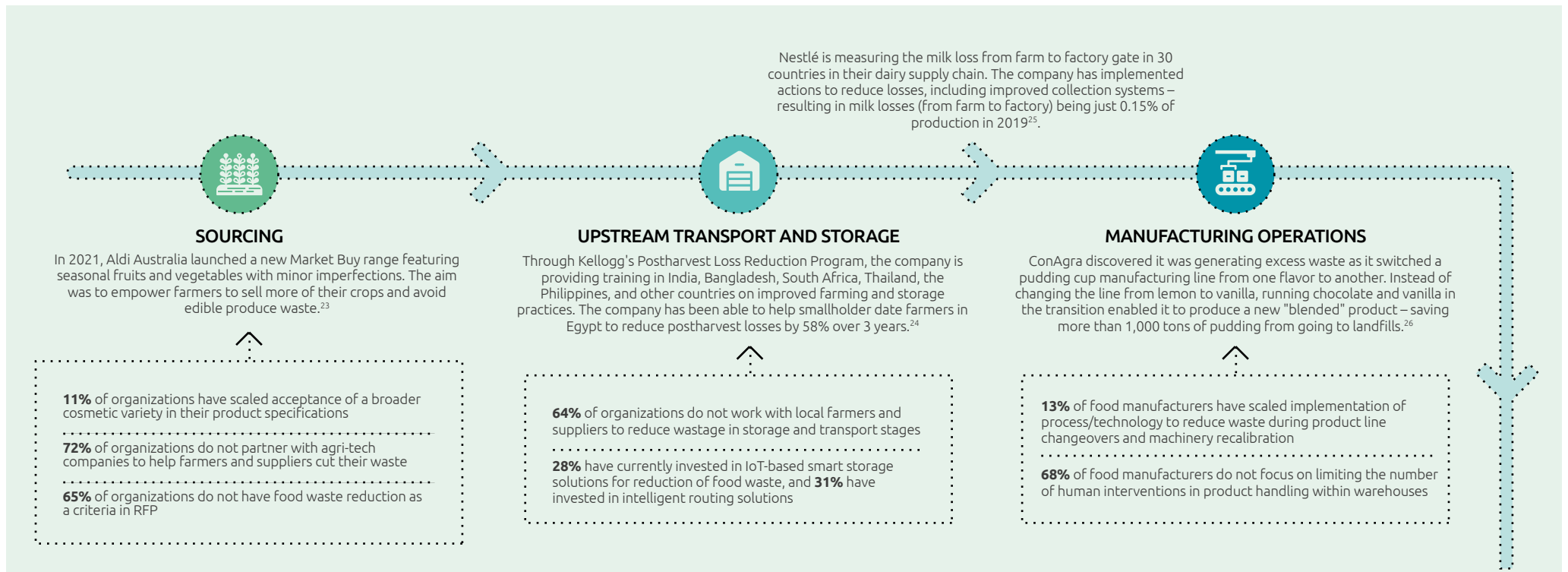


Fig.14

Food chain maturity is fragmented

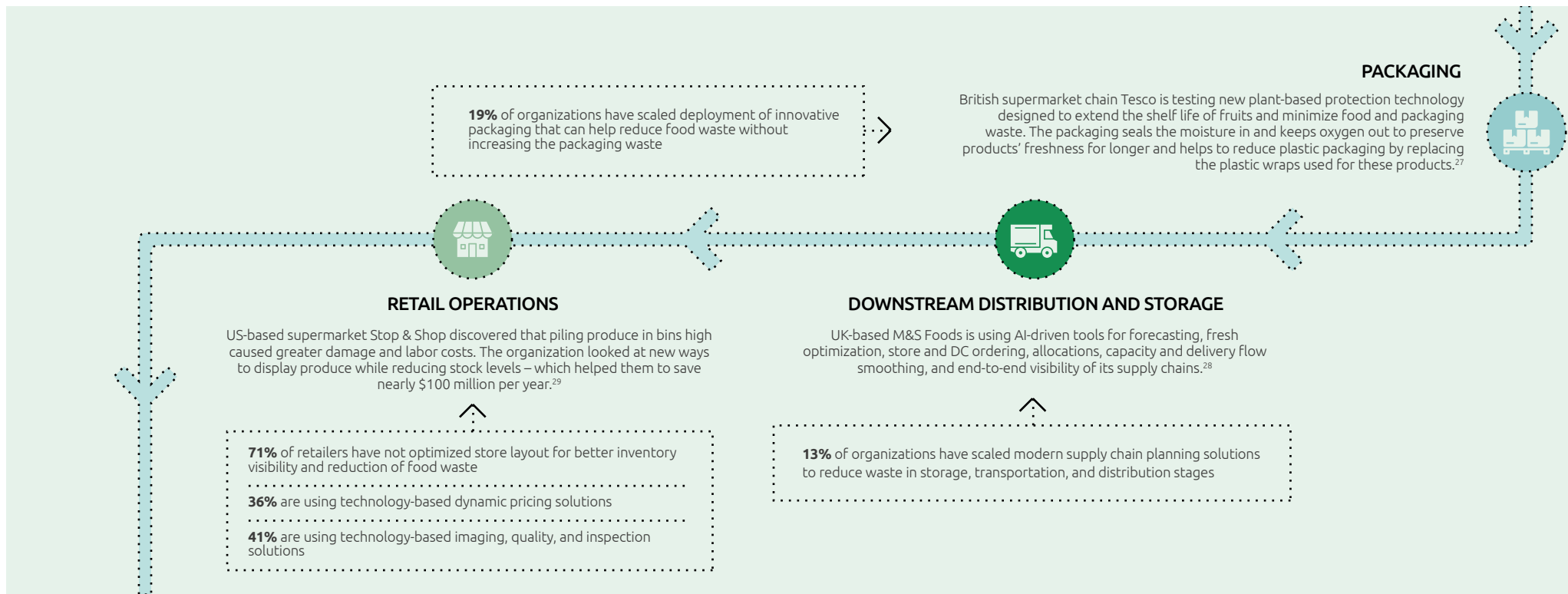
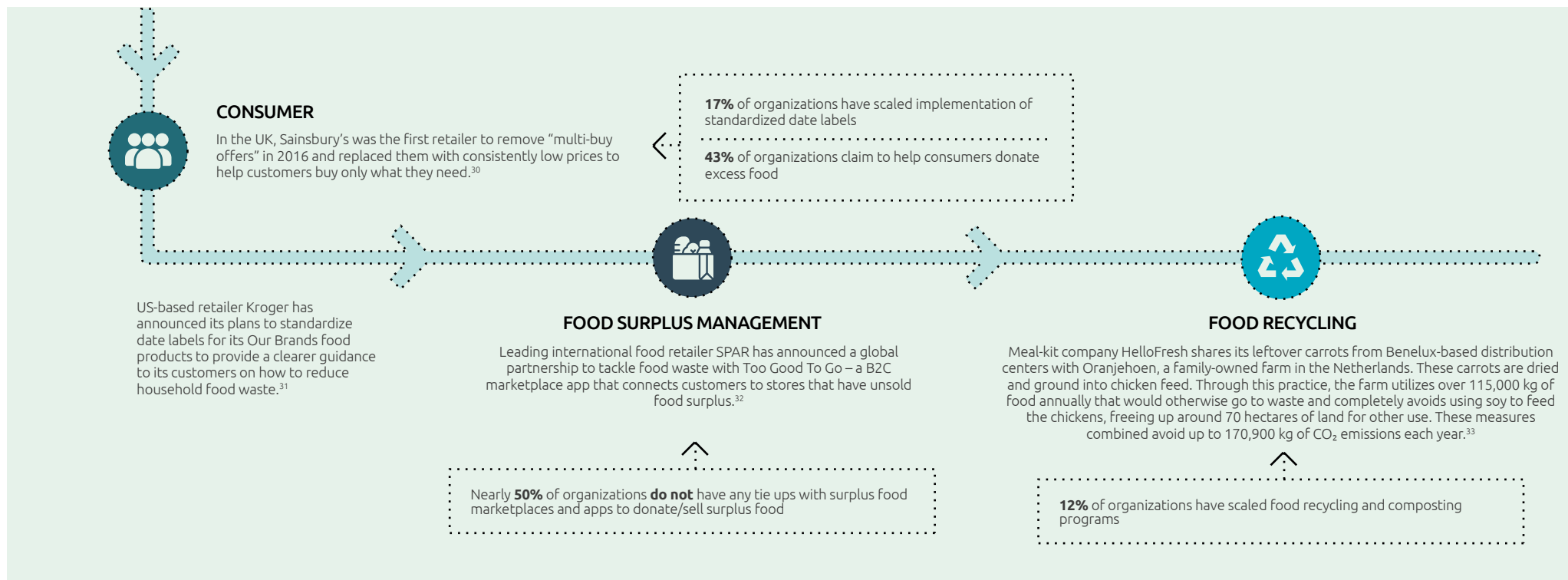


Fig.14

Food chain maturity is fragmented



Source: Capgemini Research Institute, Food Waste Survey, April–May 2022, N=1,000 organizations, including N=400 food-manufacturing organizations and N=600 food-retail organizations.


SKILL-RELATED, REGULATORY, AND TECHNICAL CHALLENGES DERAILED FOOD-WASTE INITIATIVES

Fig.15

Limited data sharing and lack of clarity on regulations are key challenges hindering organizational progress towards food waste reduction



Source: Capgemini Research Institute, Food Waste Survey, April–May 2022, N=1,000 organizations, including N=400 food-manufacturing organizations and N=600 food-retail organizations.



"If we manage to find other better utilization of these ['plus' products] in the markets – not only will this make business sense, but we will be utilizing these raw materials that have a great nutritional value in terms of proteins, minerals, fats, and essential amino acids, etc. It is more and more important for the businesses to take responsibility of doing things in a sustainable direction along with generating business value."



- Heidi Alvestrand,
Director of Business Development at Norilia
(a subsidiary of Norwegian agricultural
cooperative, Nortura).

05

HOW CAN ORGANIZATIONS ACCELERATE THE FIGHT AGAINST FOOD WASTE?



We suggest three key action areas for organizations to focus on, with technology playing a fundamental role:

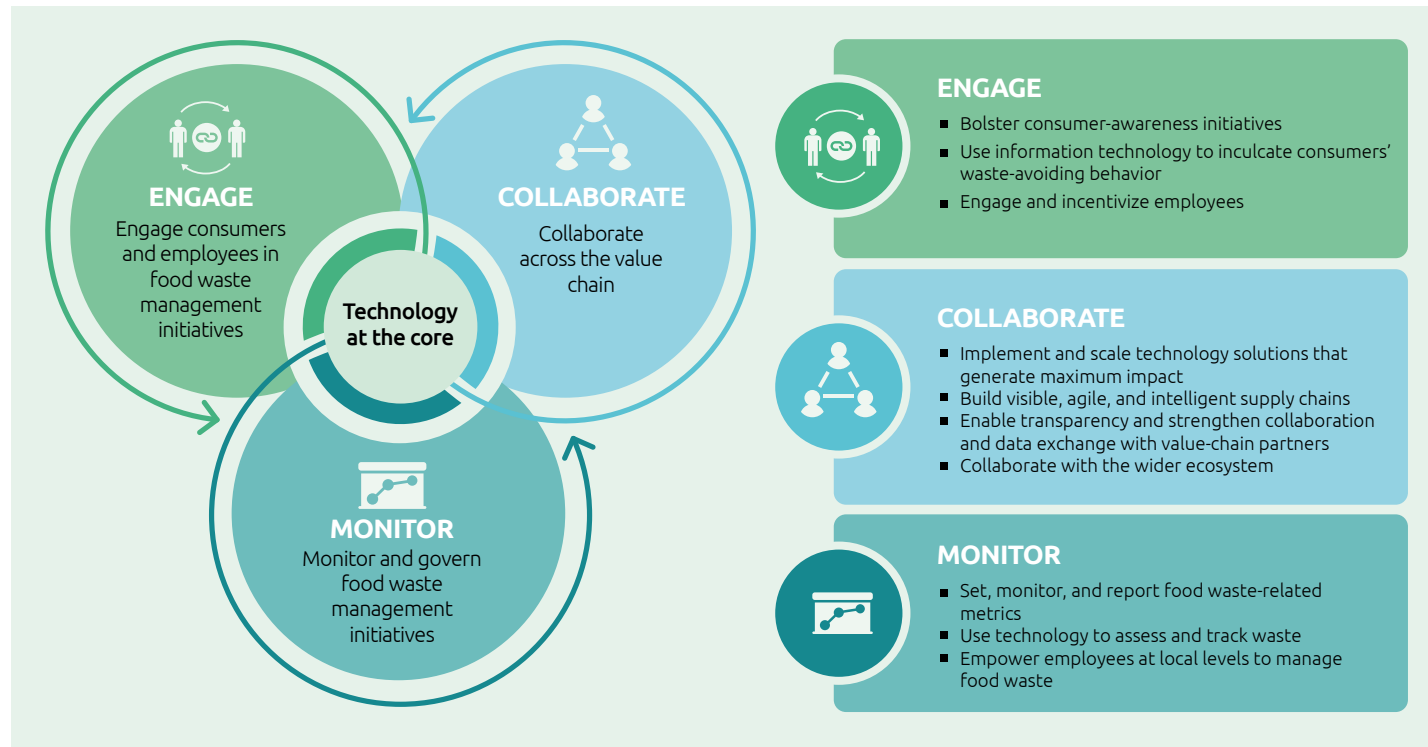


Fig.16

A three-pronged approach to fighting food waste, powered by technology

Technology can form the basis of collaboration, monitoring, and employee or consumer awareness. In fact, with the right technology solutions, scaling, and integration across the value chain, organizations have been able to create broad impact. Kevin Akaloo, Vice President Global Health Safety & Environment at Mondelēz International, says, *"We continue to design processes and lines to avoid waste generation. We are using high-speed cameras to analyze processes, improving inspections and maintenance to reduce line stoppages, and developing more efficient changeover processes. As a result, we achieved a 28% reduction [versus the base year of 2018] in food waste in internal manufacturing sites in 2021 and a 65% reduction of waste in distribution."*

Source: Capgemini Research Institute Analysis

Below we highlight three key recommendations for organizations to fight against food waste and also showcase how technology can help:

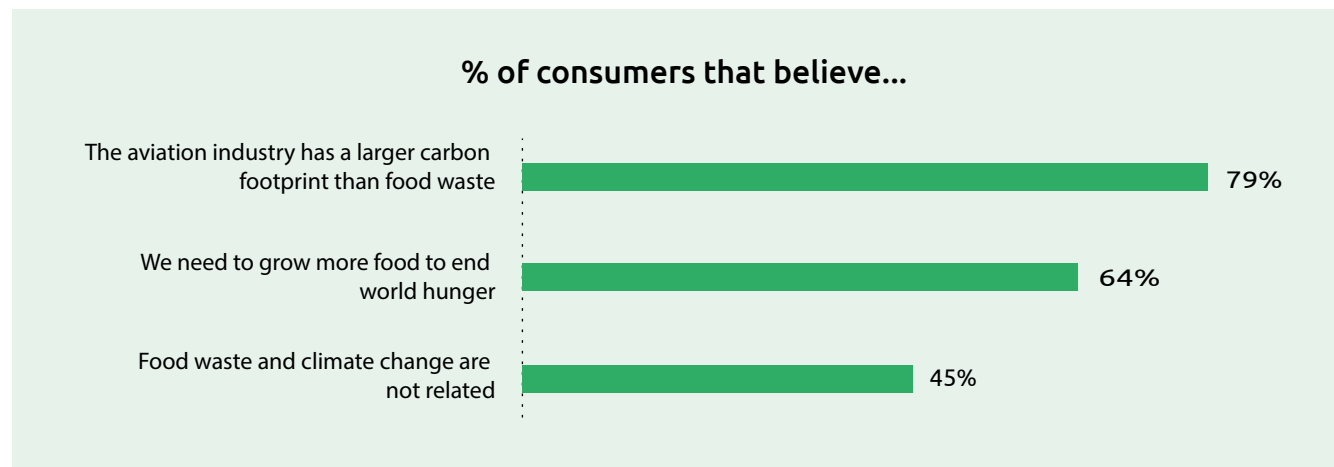
I. Engage consumers and employees in food waste management initiatives

1. Bolster consumer-awareness initiatives

Limiting food waste requires action across the value chain – including from consumers. Globally, consumer awareness of the magnitude of the problem, its impacts, and how individuals can help is still lacking. Nearly half (45%) of consumers do not link food waste to climate change, and 64% of consumers believe growing more food is necessary to end world hunger, unaware that reducing food waste could end food insecurity. A whopping 79% believe that the aviation industry has an equivalent or higher carbon footprint than food waste, whereas in reality food waste is a far higher emitter of greenhouse gases (see Figure 17).³⁴

Fig.17

Misconceptions regarding food waste among consumers



Source: Capgemini Research Institute, Food Waste Survey, April–May 2022, N=10,000 consumers.

64%

of consumers believe growing more food is necessary to end world hunger, unaware that reducing food waste could end food insecurity.

Brands have the power to influence, to their own benefit. Tim Calkins, Clinical Professor of Marketing at the Kellogg School of Management at Northwestern University, corroborates this point: ***“The best causes [for companies] to support are the ones most closely associated with their brands. For food brands, dealing with food waste is directly relevant to their business.”***³⁵ Unilever’s Use-Up Day campaign aims to cut food waste by one-third by encouraging consumers to use ingredients they already have at least once a week (which also helps augment usage of the company’s Hellmann’s mayonnaise).³⁶ Jessica Raneri, Nutrition Sensitive Agriculture Advisor to the Australian Centre for International Agricultural Research, emphasizes the value of consumer awareness: ***“People need to have simple messages to shake them up. Organizations can work with cooking shows, for example, to***

spread the message with episodes focusing on food waste. I think tapping into mainstream media opportunities and integrating this messaging is extremely powerful.”

Ensuring comprehensible labelling is also critical. B2C Too Good to Go has partnered with multiple brands for its Look, Smell, Taste, Don’t Waste campaign.³⁷ Partnering brands have stamped foods that carry a best before date with the campaign pictogram, which prompts consumers to sense-check food instead of blindly throwing it out due to a lapsed date. Touting the benefits of the initiative, Adam Grant – Regional VP at Danone, UK & Ireland, says: ***“With some of the nation’s favorite yogurt brands making this move, we will play a role in preventing unnecessary household food waste, while supporting consumers to understand when food is still safe to eat.”***³⁸

People need to have simple messages to shake them up. Organizations can work with cooking shows, for example, to spread the message with episodes focusing on food waste. I think tapping into mainstream media opportunities and integrating this messaging is extremely powerful.”

Jessica Raneri

Nutrition Sensitive Agriculture
Advisor to the Australian Centre for
International Agricultural Research



2. Use information technology to inculcate consumers' waste-avoiding behavior

The “Internet of Groceries” also has the potential of connecting organizations and consumers from the very moment the product is picked up at the supermarket, through its storage and cooking, up to its disposal, or ideally, the absence thereof. Consumers could create online shopping lists and add ingredients to their shopping basket based on recommended recipes, as well as validate the freshness of the product through smart labels. Organizations could reach consumers in real time to offer them personalized suggestions, while prices could be adjusted in real time to instantaneously improve the uptake of products with a shorter shelf life. David Kat, VP Business Development at Wasteless – an Israel-based startup that helps retailers with dynamic pricing based on machine learning, adds, *“Retailers have so much to win when they insert data into the food system. Our dynamic pricing approach creates the business cases benefit up- and downstream in the value chain. If retailers know that a consumer has bought a salmon today, it would be good for them to send consumers recipes about that salmon tomorrow or the day after. We need to use data to educate, to create actionable awareness, but also to support consumers to cook with what’s in the fridge sustainably.”*

ONLINE GROCERY AND FOOD-DELIVERY APPS CAN REDUCE EXCESS BUYING

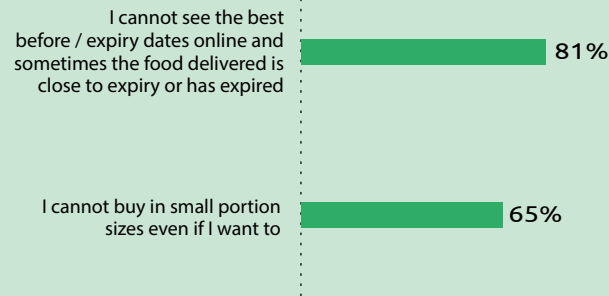
Our consumer survey reveals that online food ordering through delivery apps is the greatest generator of consumer waste, with 73% of consumers citing this as a source of waste. Online grocery orders are not far behind, with 70% of consumers saying they end up wasting more with online grocery orders.

As Figure 18 shows, over 80% of consumers cite lack of expiry information online as an issue. To help consumers, online grocer Farmstead has recently developed the Eat This First feature.³⁹ Its email receipts have now been updated to alert customers to consume particular products (e.g., fresh fish) sooner than others, reducing in-home food waste.

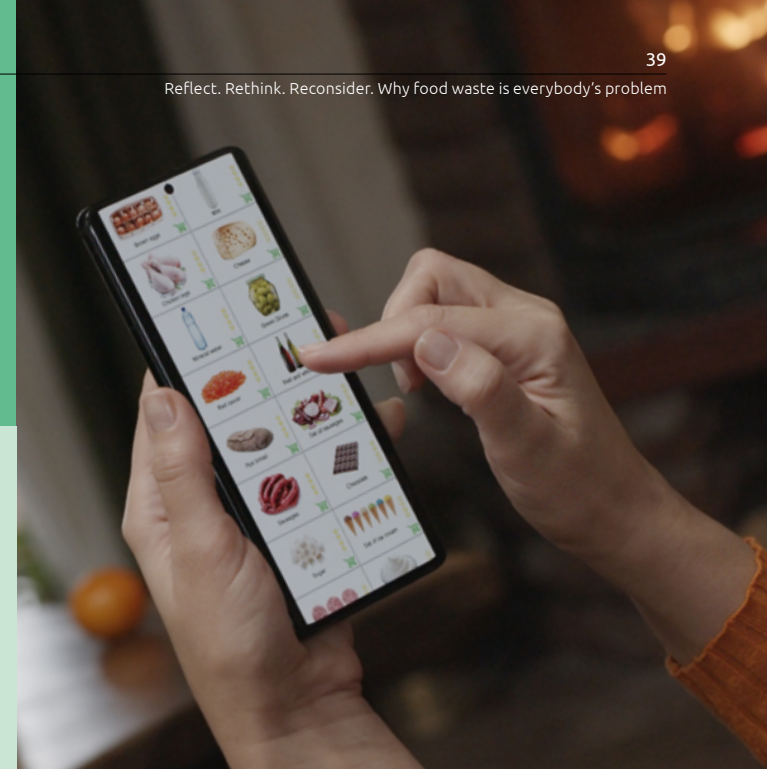
Fig.18

Lack of visibility on expiry information and minimum quantity requirements contribute to wastage at the consumer's end

“When I order groceries online, there is more waste because...”



Source: Capgemini Research Institute, Food Waste Survey, April–May 2022, N=10,000 consumers, N=6,990 consumers who order groceries online.



Moreover, deals that encourage online shoppers to buy excessive amounts or the need to fulfil a minimum order cost to qualify for delivery are both key elements promoting wastefulness.

3. Engage and incentivize employees

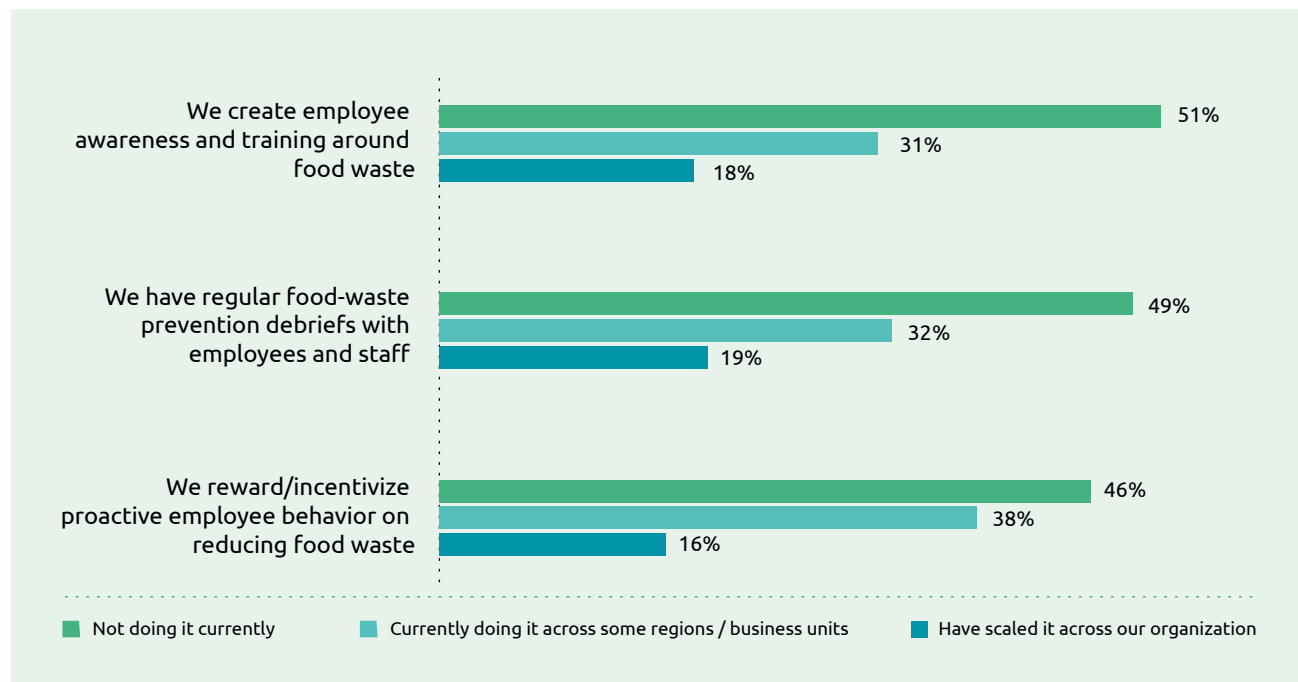
Food manufacturing and retail employees can have a significant bearing on reducing the organization's food-waste footprint. However, close to half of the organizations surveyed do not currently offer awareness and training programs, or even incentivize waste reduction.

56%

of food retailers claim they incentivize proactive employee behavior on reducing food waste

Fig.19

Few organizations are focusing on employee initiatives to combat food waste



Source: Capgemini Research Institute, Food Waste Survey, April–May 2022, N=1,000 organizations, including N=400 food-manufacturing organizations and N=600 food-retail organizations.

Retailers are a bit ahead of food manufacturers on this aspect. For instance, 56% of food retailers claim they incentivize proactive employee behavior on reducing food waste, whereas only 50% of food manufacturers take this action.

At Portugal-based food distribution and retail group Jerónimo Martins, staff select products that fall short of supermarket standards – but remain perfectly edible – to be used in soups and salads, processed into prepared and washed ready-meal ingredients, or donated to charities. The group has trained its 32,000-strong workforce in food safety to better select foods for donation.⁴⁰



“Everyone is part of the problem, and everyone could be part of the solution.”



- Zeynep Ozkan,
Head of the Department of
EU Harmonization in
Turkey's Ministry of
Agriculture and Forestry.

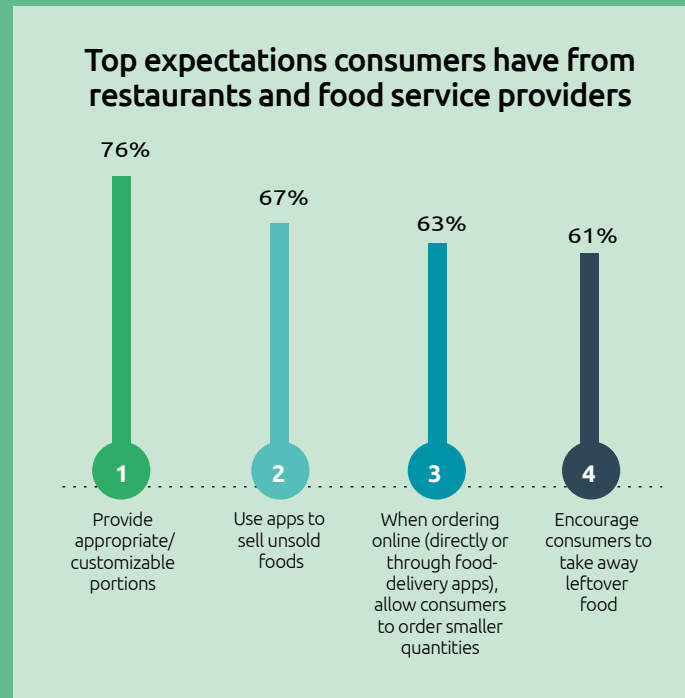
FOOD-SERVICE OUTLETS SHOULD PROVIDE MINDFUL PORTIONS

Consumers expect restaurants and other food-service providers to help reduce food waste. One key way in which they can do so is by offering reasonably sized portions that do not encourage customers to leave food on their plates.



Fig.20

Consumers expect customized portion sizes



Source: Capgemini Research Institute, Food Waste Survey, April–May 2022, N=10,000 consumers.

Technology can also help restaurants and food-service providers in their drive for food efficiency. Talking about the organization's waste-management initiatives, a food and retail transformation director from a large food services company says: ***"We are using what we call WasteWatch LeanPath. [This tool allows us to] get insights into what and how much is being wasted, and why. We have put in place stricter governance and compliance around some of the recipes as a result and seen significant reductions in waste."***

Good kitchen culture and a high standard of staff behavior can go a long way towards preventing waste. Key Smith, Interim Manager at Chick-fil-A says, ***"We have an extensive training program ... teaching employees about the importance of reducing waste, how it affects our bottom line, and the world, socially. We have rules against eating in the kitchen and for accountability of ingredients. We try to build a culture of being good stewards of what we have and taking good care of the product that we're entrusted with."***

II. Collaborate across the value chain

The food-waste challenge cannot be solved by businesses or individuals acting alone. It requires strong collaboration across the value chain. Toine Timmermans, Director at the Netherlands-based Food Waste Free United foundation (Samen Tegen Voedselverspilling), adds, *“The solutions are in collaboration and innovation. Today organizations are not paying enough attention to influence the entire food chain to reduce waste. For instance – demand-driven production is not trickling down the entire food chain. Procurements and supply chains have very different KPIs. A retailer’s KPI model needs to include having the lowest possible waste throughout the supply chain.”*



“Based on what we’ve learned, one of the biggest barriers for action on upstream food loss is the limited bargaining power of suppliers. If they don’t have flexibility in their relationships with clients, a lot of edible food can go unharvested or is too expensive for them to find an alternative market. Buyers could contribute to on-farm food loss reduction by fostering more long-term, secure relationships with their suppliers.”

Aliya Kumekbayeva

Manager, Environmental Sustainability
at the Consumer Goods Forum
(a global industry network).

TESCO: “FARM TO FORK” – COLLABORATING TO CUT WASTE

Tesco has taken a range of measures to reduce food waste across its supply chain:



- **Agricultural production:** Tesco has been working to prevent food loss at farm level by selling surplus produce (generated due to harvest gluts or overproduction) at reduced prices. It is also linking farmers and food processors to fast-track imperfect produce to readymade meals or other food products. Tony McElroy, Head of Waste Campaigns at Tesco, underlines this, *“We see our role as a connector. We help to join different suppliers up, with the aim of creating a shared purpose.”*⁴¹
- **Suppliers:** Tesco encourages its suppliers to publish their food-waste data. To date, 79 of Tesco’s suppliers have complied.⁴²
- **Operations:** In 2019, Tesco launched a drive to reduce bread waste by turning unsold baguettes and batons from its in-store bakeries into a range of olive crostini and bread puddings.⁴³ It is also trialing a plant-based protection from Apeel to extend the shelf life of fresh produce.⁴⁴
- **Customers:** Tesco’s It’s No Time For Waste challenge encourages a shift in consumer behavior by helping with meal planning, including leftover-inspired

cooking sessions with professional chefs. The challenge resulted in a 76% decrease in edible food waste over the six-week trial period.⁴⁵

- **Surplus management:** In 2020, Tesco teamed up with zero-waste app Olio to make more of its surplus food available to households for free.⁴⁶ It has also partnered with FoodCloud, an app that helps transfer food from Tesco’s stores to community groups in the UK, Republic of Ireland, Czech Republic, and Slovakia.⁴⁷
- **Recycling:** In 2021, Tesco trialed an innovative new solution to tackle back-of-store food waste using black soldier fly grubs. The grubs in an insect farm can consume 300 kg of food waste per day and become feed for animals once fully grown. Tesco is working with startup AgriGrub on exploring how these grubs could be used as a replacement for meat-based protein in dog food and for soy in chicken and fish meal.⁴⁸ Jo Halstead, AgriGrub’s Managing Director, says, *“Sending all the UK’s food waste to insect farms would reduce the UK’s emissions by about 1% – the same as taking 2.2 million cars off the road.”*⁴⁹

Aliya Kumekbayeva, Manager, Environmental Sustainability at the CGF, adds, *“Based on what we’ve learned, one of the biggest barriers for action on upstream food loss is the limited bargaining power of suppliers. If they don’t have flexibility in their relationships with clients, a lot of edible food can go unharvested, or it is too expensive for them to find an alternative market. Buyers could contribute to on-farm food loss reduction by fostering more long-term, secure relationships with their suppliers.”*

1. Implement and scale technology solutions that generate maximum impact:

Solutions such as demand forecasting, temperature monitoring, inventory management, geographic information system (GIS) mapping, and remote sensing were rated highly effective by survey respondents on “ease of implementation” as well as offering “high impact.” Within sourcing, for example,

56% and 81% of organizations, respectively, rated demand forecasting as easy to implement and having high potential.

Within transportation and storage, 51% of organizations rated temperature-monitoring solutions as easy to implement, and 72% of them rated them as high-potential in terms of benefits. As technologies and use cases advance in tandem, they can be honed simultaneously to provide the optimum anti-waste technological infrastructure for each sector.



Fig.21

Emerging technology use cases can accelerate waste-reduction initiatives.

CATEGORY	PRODUCERS	MANUFACTURERS	DISTRIBUTORS AND RETAILERS
SOURCING	Demand forecasting	Demand forecasting	Demand forecasting
	GIS and remote sensing		
<i>US-based Cargill uses machine vision to predict chicken body weight in real time. This helps optimize harvesting times for the birds (saving feed) and helps to anticipate feeding issues.⁵⁰</i>			
TRANSPORTATION AND STORAGE	Early spoilage detection	Early spoilage detection	Early spoilage detection
	IoT-based smart storage	IoT-based smart storage	Temperature-monitoring solutions / Cold chain monitoring
		Temperature-monitoring solutions / Cold chain monitoring	Intelligent routing solutions
<i>Fonterra trialed a new ML system that detects improperly sealed or faulty bags of powdered milk to avoid wastage at retail level.⁵¹</i>			
COMMERCIAL OPERATIONS	Automated order-fulfillment systems	Inventory management	Inventory management
	Imaging, quality, and inspection solutions	Real-time inventory visibility	Markdown alerts
		Automated order-fulfillment systems	Real-time inventory visibility
			Dynamic pricing
			Automated order-fulfillment systems
		Smart bins	


Capgemini Research Institute analysis.

Fig.21

Emerging technology use cases can accelerate waste-reduction initiatives.

CATEGORY	PRODUCERS	MANUFACTURERS	DISTRIBUTORS AND RETAILERS
COMMERCIAL OPERATIONS	<p><i>Fresh Thyme Market has implemented a produce-specific platform based on AI/ML to optimize inventory and order management. As a result, the organization experienced a 2% sales lift, 25% less shrinkage, and an 80% reduction in stockout.⁵²</i></p> <p><i>Retailer Metro AG, together with digital partner Wasteless, has implemented a dynamic pricing model in two countries, that allows automatic price adjustments to perishable food items nearing expiry, making them more attractive as cost-saving options for consumers.⁵³</i></p>		
PACKAGING AND CONSUMPTION	Active packaging (packaging that augments shelf life or preserves produce freshness)	Smart labelling using QR codes for item identification, product tracking, and providing information to consumers	Food-waste monitoring apps
	Intelligent packaging with additional benefits such as sensors, indicators (temperature, freshness), and data carriers (RFID etc.)		
SURPLUS-FOOD MANAGEMENT AND RECYCLING	<i>Israel-based Evigence Sensors uses food packaging labels with embedded sensors to detect freshness, with each sensor engineered to correspond to the time-temperature effects for the food it is designed for.⁵⁴</i>		
	Surplus-food marketplaces and apps	Surplus-food marketplaces and apps	Surplus-food marketplaces and apps
		Technology solutions creating upcycled products from waste	Technology solutions to prevent food waste during trade promotions
		Technology solutions to prevent food waste during trade promotions	Technology to monitor insect or animal farms that recycle food waste
	<p><i>Meijer reduced food waste by 10% by introducing a customer-facing app at its 255 supercenters. Using the app, customers can purchase food nearing its sell-by date at discounts of up to 50%. Customers can then pick up the food from designated areas in Meijer stores.⁵⁵</i></p> <p><i>Biotechnology firm Better Origin, which uses larvae to convert food waste into animal feed, deployed a machine vision system to evaluate the status of larvae, such as healthy, hungry, diseased, or ready for harvest, and to inform central control.⁵⁶</i></p>		

Capgemini Research Institute analysis.

A photograph of a single red and yellow apple resting on a light-colored wooden surface. A hand with fingers spread is positioned above the apple, as if about to pick it up. The lighting is soft, highlighting the texture of the wood and the skin of the apple and hand.

“At Kesko, food waste metrics are already a part of performance metrics, and we are also looking at developing that model to trickle down.”



- Laura Ihanainen,
Development Manager
at Kesko - K-Group
(a Finnish retail conglomerate).

When implementing technology solutions, discuss the new approach with all internal and external participants in the process that will be upgraded – allowing them to contribute and calibrate their own work methods to integrate with the new solution. *“For example, to impact water wastage, start with measuring your usage and then engage with the vendors that provide water treatment services or effluent disposal or recycling equipment etc.”* suggests Aamir Mehdi, Director Supply Chain - Asia Pacific at Fonterra, a New Zealand-based dairy cooperative. This is an important aspect of collaboration, among others.

2. Build visible, agile, and intelligent supply chains

Our previous research shows that 60% of global organizations are increasing their investment in supply-chain digitization.⁵⁷ The smart use of information technologies along food supply chains promotes common standards, supply-chain transparency, real-time information-sharing practices, and reductions in food loss and waste. To build resilient, intelligent supply chains, organizations need to:

- **Build an understanding of current supply chains** in terms of agility, visibility, transparency, sustainability, and localization. This will isolate the food waste pain-points, be they excess inventory, inaccurate forecasting, extended order times, or food lost during distribution and transportation.
- **Adopt systems and processes to enable end-to-end supply-chain visibility:** Supply-chain visibility can be greatly enhanced by implementing supply-chain control towers. Control towers capture and use the data across the supply chain and provide enhanced visibility to organizations for short- and long-term decision-making. They also help in monitoring and managing inventory and transportation across the supply chain.

In addition to control towers, track and trace technologies help organizations to determine inventory at warehouses, in transit, and at retailers; monitor the condition (temperature, humidity, etc.) of the goods during transit; track the provenance of goods; and establish consumer trust in the sustainable credentials of the organization. Walmart, for instance, uses blockchain technologies to speed up trace-back (from seven days to two seconds), to improve food safety and reduce waste.⁵⁸

“To impact water wastage, start with measuring your usage and then engage with the vendors that provides water treatment services or effluent disposal or recycling equipment etc.”



Aamir Mehdi
Director Supply Chain - Asia Pacific
at Fonterra (a New Zealand-based
Dairy Cooperative).

- **Invest in supply-chain analytics and AI/ML:** Our previous research highlights that more than one in two organizations are planning to use supply-chain analytics across areas such as demand forecasting and inventory optimization. At the same time, close to two-thirds (64%) of organizations intend to use AI and ML capabilities for transportation optimization.⁵⁹ Using smart solutions to automate scheduling and loading levels in the face of fluctuating demand helps organizations manage stock levels.
- **Boost local supply chains:** Localization can give benefits such as reduced spoilage and waste, quicker turnaround times, a smaller carbon footprint, and reduced cost of transportation. In our consumer research, 61% of consumers are interested in buying locally produced/made food. Post COVID-19, regionalizing and localizing of the supplier base has been a priority for 65% of CPR organizations.⁶⁰
- **Focus on IoT-enabled cold-chain solutions:** Developing the right infrastructure, including adequate cold-chain provisions, is instrumental in reducing waste; using IoT solutions in cold chains can help organizations harness data-driven insight, enhance traceability, and monitor the quality of perishables.



61%

of consumers are interested in buying locally produced/made food.

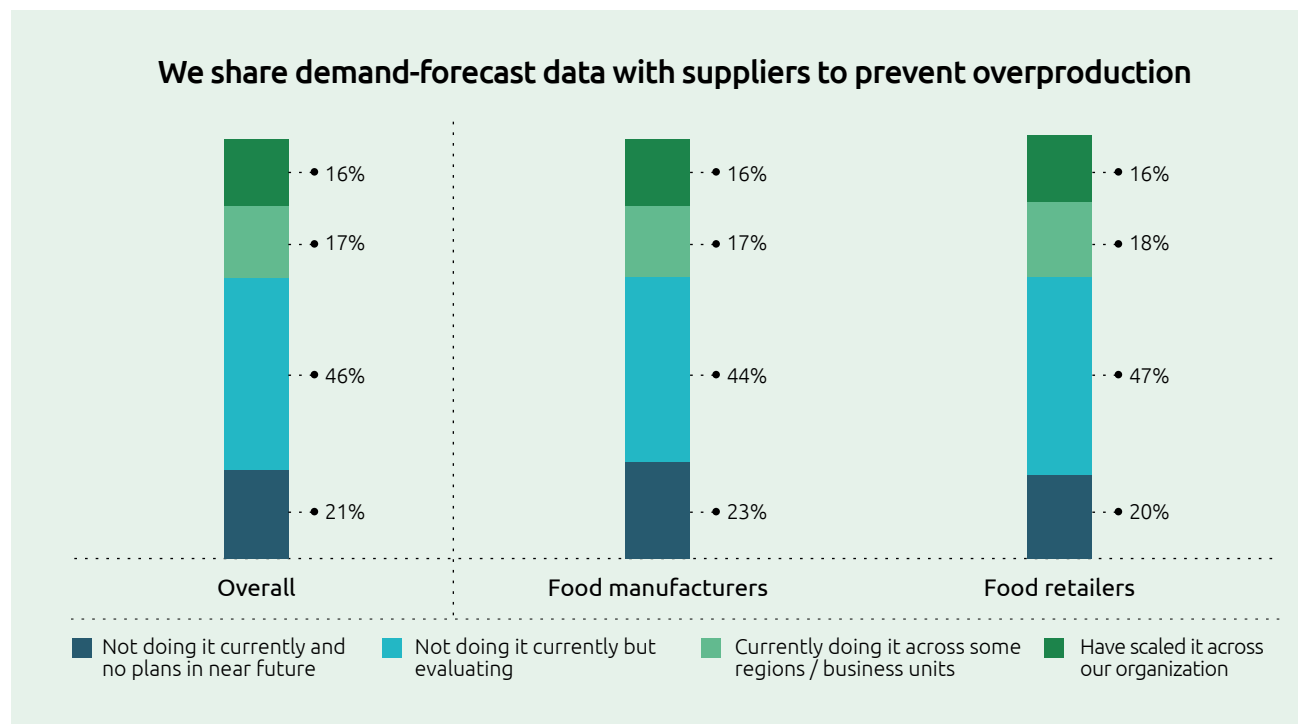
Fig.22

Data sharing across the value chain is a challenge

3. Enable transparency and strengthen collaboration and data exchange with value-chain partners

Clearly, data sharing across the food value chain – upstream and downstream – is key to stamping out food loss and waste. However, only 14% of organizations are currently engaged in highly collaborative data-sharing models with their supply-chain partners.⁶¹ In our current research, we found that 67% of food manufacturing and retail organizations do not share demand forecast data with suppliers (see Figure 22).

Michiel Muller, CEO and co-founder of Dutch online retailer Picnic, explains how it can work: *“We order from our suppliers what our customers have ordered from the app. Take fresh bread; when the Picnic checkout closes at 10 pm the night before, our baker, Klaas Fuite, bakes the loaves of bread our customers have ordered for the following day. That way, we never have to throw anything away.”*⁶²



Source: Capgemini Research Institute, Food Waste Survey, April–May 2022, N=1,000 organizations, including N=400 food-manufacturing organizations and N=600 food-retail organizations.



"We have decided to dedicate a greater focus towards food waste in 2021. We transitioned to a new metric of "total food waste" focused on absolute levels of waste, not just in terms of percentage of sales or production. By 2025, we will reduce absolute food waste from baseline year of 2018 by 15%, by 2025. Given that overall business is growing at 3-4% annually, we have set a high benchmark for ourselves,"

- Kevin Akaloo,
Vice President Global Health Safety &
Environment at Mondelez International.

To implement and sustain winning data ecosystems, organizations should:

- Formulate a **data-ecosystem strategy**. This involves identifying data-sharing use cases that create value by reducing waste for you and your ecosystem partners. It also involves assigning a business leader and a team responsible for data sharing and governance.
- Build a strong **data-management foundation**. This involves setting processes for data ingestion, preparation, and processing, and delivering it in real time to business users. Setting up governance systems to implement clear data-sharing protocols regarding formats, duration, processing rights, etc. is also important.
- **Harness data to enhance all aspects of decision-making**, from corporate-level strategy to developing digitally enabled data solutions on the shop floor.

4. Collaborate with the wider ecosystem

Zeynep Ozkan, Head of the Department of EU Harmonization and Save Your Food (Gıdanı Koru) Campaign Coordinator at Turkey's Ministry of

Agriculture and Forestry, says *"You have to have a 360-degree approach to managing food waste, because you need to involve not only government but also academia, public institutions, non-governmental organizations, the private sector, and households."*

Organizations should seek to collaborate with an ecosystem of partners, including competitors, policymakers, startups, universities, and think tanks, in order to accelerate progress on their food-waste initiatives. We highlight some examples of collaborative models that organizations should consider:

- **Joining industry coalitions:** Industry associations and coalitions can establish a common approach to the challenges involved in food loss and waste mitigation. For instance, the CGF's CEO-led Coalition of Action on Food Waste brings together 23 of the world's largest consumer goods retailers and manufacturers (including Unilever, Tesco, Walmart, General Mills, Nestlé, and many more) with the goal of halving global food loss at retailer and consumer levels. Ignacio Gavilan, Director of Sustainability at the CGF, says, *"Collaboration between organizations, to share learnings and accelerate best practice, is hugely important. The Food Waste Coalition is all about joining forces to drive change, underpinned by*

tangible commitments – with members working to align themselves on the most effective methods of measurement and reporting, supply-chain engagement, and loss prevention."

- **Collaborating with startups:** Organizations should also look at partnering with startups to inject new life and dynamism into their attempts to meet food-management goals. Timothy Donohue, Director of Sales Operations and Planning at the Kraft Heinz Company, says, *"We have partnered with an organization called Spoiler Alert. Their digital platform, powered by advanced analytics, helps us market for sale all of our at-waste-risk inventory to our entire customer base on a weekly basis. Each item's bidding starts at a competitive price point that allows us to cover our costs, and then the customers bid against each other until the product's prices gets to that week's fair market value. So, on our end, we ensure that we get the most value or recovery on the sale of that product – while keeping perfectly good product from ending up in landfills."*
- **Working with regulators:** In our survey, nearly half (47%) of organizations mentioned the lack of adequate information on governmental regulations in the area of food waste as one of the top challenges.



- Organizations can and should work with regulators on areas such as setting up common industry standards in order to help remove barriers to surplus food redistribution. At present, 74% of organizations rank “ambiguity regarding government regulations on what you are allowed to do with waste” as one of the top challenges. *“Still only a few companies take their food and give it to charity or food banks. There is lack of clarity regarding regulations and donations, and secondly there is also no economic incentive for organizations to do so. It is far cheaper to dump food in landfill than to repurpose,”* says Tim Prewitt, CEO and board member of The Hunger Project, a non-profit enterprise.
- UK retailer Tesco is a huge proponent of food waste reporting and has been publishing its own food waste results since 2016, and also encourages other organizations to do so. Since the group started their reporting initiative, Tesco has reduced food waste as a percentage of food handled by 45% and redistributed 83% of food surplus safe for human consumption to humans or animals in UK retail operations and 87% in Central Europe retail operations.⁶³ Dave Lewis, Tesco CEO, says, *“Publishing food-waste data is vital and must be mandatory if the UK is to achieve SDG 12.3 to halve food waste by 2030. The government has indicated it will introduce mandatory reporting and we call on them to do this urgently.”*⁶⁴
- **Adopting self-regulation and certification:** SnackFutures, the innovation and venture hub of Mondelez International, has announced its membership in the Upcycled Food Association, a non-profit dedicated to preventing food waste by growing the upcycling economy. *“By creating brands built on the promise of reducing food waste, we provide a growing generation of ‘ethical consumers’ a snackable way to act on their convictions, do right by the planet and build our relevance, reputation, and revenue streams as a snack leader,”*⁶⁵ says Brigette Wolf, Global Head of SnackFutures, Mondelez International. Mondelez’s snack brand CaPao’s new Quinoa Squares is one of the first products to carry the Upcycled Certified™ mark on its packaging.⁶⁶
- **Partnering for food-surplus management:** In the US, General Mills partners with a non-profit organization, Feeding America, and continues to scale the MealConnect food-recovery technology platform, which gives food donors such as grocery stores, restaurants, farmers, and cafeterias a streamlined way to transform their surplus into nourishing meals.⁶⁷

III. Monitor and govern food waste management initiatives

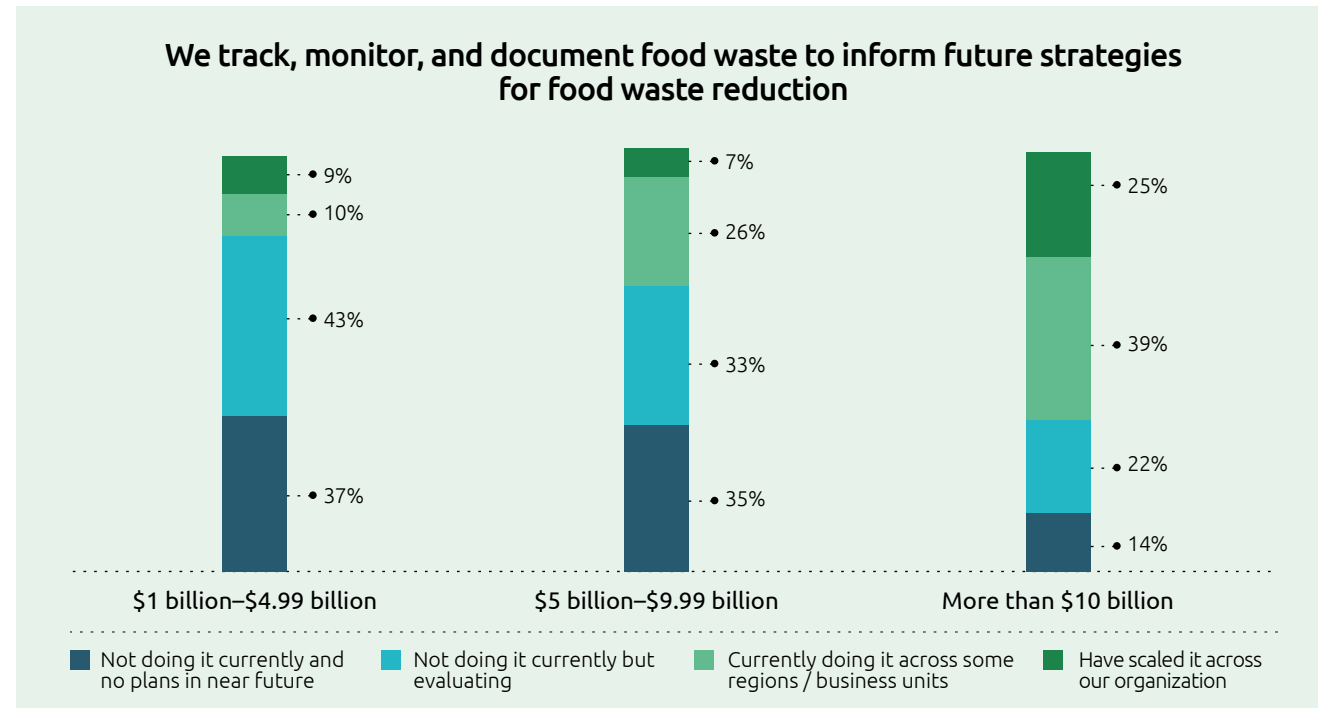
1. Set, monitor, and report food waste related metrics

Consumer and employee awareness initiatives are effective only when these are done systematically, as part of a well-laid strategy. Most organizations handling food products have a direct responsibility to manage food waste. Under the purview of SDG 12.3, organizations need to set goals, establish relevant metrics, track, and report progress against them.

What gets measured gets managed. Yet, measurement is currently limited to larger organizations (see Figure 23).

Fig.23

Larger organizations are ahead in tracking, monitoring, and documenting food waste



Source: Capgemini Research Institute, Food Waste Survey, April–May 2022, N=1,000 organizations, including N=400 food-manufacturing organizations and N=600 food-retail organizations.



Mondelēz International has outlined and communicated ambitious goals to cut food waste. *“We have decided to dedicate a greater focus towards food waste in 2021. We transitioned to a new metric of ‘total food waste’ focused on absolute levels of waste, not just in terms of percentage of sales or production. By 2025, we will reduce absolute food waste from the baseline year of 2018 by 15% by 2025. Given that overall business is growing at 3-4% annually, we have set a high benchmark for ourselves,”* says Kevin Akaloo, Vice President Global Health Safety & Environment at Mondelēz International.

In 2017, Italian food manufacturer Barilla analyzed three of its supply chains (for pasta, tomato sauce, and soft bread) in accordance with food loss and waste. The analysis quantified the amount and source of food loss and waste generated, as well as the quantity that could be reused.⁶⁸ Reducing food loss and waste is also beneficial for company economic sustainability since, for every dollar invested in reducing food loss and waste, there is a saving of \$14 in operating costs.⁶⁹ Barilla’s pasta and tomato-sauce supply chains were found to be examples of true circular economies, where almost nothing is lost.

“In CRISP, as a founder, I’m accountable for corporate responsibility. I’ve got a small team coordinating the efforts and we also have consultants for certain types of engagement (e.g., packaging). But the main point is that it’s part of our proposition – and that’s why it’s part of everybody’s job.”



- Michiel Roodenburg,
Co-founder and CFO, CRISP
(a Netherlands-based online
supermarket).



2. Use technology to assess and track waste:

Leading companies are already using technology and taking a systems-based approach to managing food waste through precision metrics. Furthermore, technology can enable proper segregation of waste into edible/inedible or grade food products based on quality. This improves efficient waste-processing and sends lower volumes to landfill.

“We’re able to signal to our line operators, process control engineers, and utility engineers when a certain action or a tweak is going to result in lower or optimal waste in that batch. They can then adjust their process parameters in real time to achieve that outcome,” enthuses Fonterra’s Mehdi.

Organizations have implemented waste-tracking systems to assess accurately the magnitude of the problem. This will also help in reporting the tonnage of waste and attaching a dollar value to food waste. With these insights, companies can create a strong business case and better align organizational resources, as they can link prevention of food losses with cost improvement, revenue growth, or brand enhancement.

- Campbell Soup Company is deploying technology to reduce waste during processing on its farms. It has joined a pilot project that provides farmers and food companies with data on crops left behind after harvest, and to provide strategies to reduce these inefficiencies. Having tested the food-loss metric tool with one of its tomato growers, Campbell’s now plans to deploy it for other crops.⁷⁰

- Thai Beverage, one of Southeast Asia’s largest beverage companies, implemented a waste inventory database to reduce waste, for example through the standardization of restaurant databases to adapt inventory levels to improve analytical capabilities.⁷¹
- Food-services company Sodexo has implemented a data-driven food-waste prevention program, which has already cut the organization’s food wastage by around half. Sodexo teams have rapid access to food-waste data so that they can highlight and focus on alleviating problem areas with targeted operational and consumer-behavioral changes.⁷²

“We have partnered with an organization called Spoiler Alert. Their digital platform, powered by advanced analytics, helps us market for sale all of our at-waste-risk inventory to our entire customer base on a weekly basis. Each item’s bidding starts at a competitive price point that allows us to cover our costs, and then the customers bid against each other until the product’s prices gets to that week’s fair market value. So, on our end, we ensure that we get the most value or recovery on the sale of that product – while keeping perfectly good product from ending up in landfills.”

Timothy Donohue

Director of Sales Operations and Planning at the Kraft Heinz Company.



3. Empower employees at local levels to manage food waste

Once clear targets on food waste are set, it becomes vital to set up the right governance for monitoring their progress, reasons for deviations, and course correction mechanisms:

- Establish SOPs at a central level:** At a central level, sustainability leaders should provide regular updates to the board on the metrics related to food waste. Apart from setting the targets, sustainability leaders need to establish teams that can create SOPs to deal with food surplus across different processes, such as manufacturing, supply chain, and retail. At Netherlands-based online supermarket CRISP, food-waste accountability starts at the top. Michiel Roodenburg, Co-founder and CFO, says, *“In CRISP, as a founder, I’m accountable for corporate responsibility. I’ve got a small team coordinating the efforts and we also have consultants for certain types of engagement (e.g., packaging). But the main point is that it’s part of our proposition – and that’s why it’s part of everybody’s job.”*
- Establish the right incentives:** Organizations are linking employee compensation with food waste management targets. Laura Ihanainen, Development Manager at Kesko - K-Group, says: *“At Kesko, food waste metrics are already a part*
 - of performance metrics, and we are also looking at developing that model to trickle down.”*
- Operationalize at local levels:** Dealing with food waste requires quick action at the operations level. Production or supply chain operations, or frontline store associates, need to have regular data on food waste being generated to enable swift action. Leaders in manufacturing, supply chain, and retail operations need to communicate clear targets for their teams, in alignment with the overall business objectives.
 - At Walmart Mexico, a tool called Fresh in Action allows store associates to see how much food is thrown away in their store each day. The tool also establishes monthly waste limits for each food department, including produce, deli, bakery, meat, and seafood, and shows whether the store is on track to meet its goals.⁷³
 - Meal-kit company HelloFresh incorporated weekly donation and waste reporting as a performance metric for US distribution center operations, and food waste reports are sent to all distribution centers and relevant HQ teams quarterly. The distribution centers are benchmarked against each other on these surplus metrics and are required to report weekly, not only on surplus rates and the associated lost cost of goods sold (COGS), but also on diversion and donation rates.⁷⁴

CONCLUSION

Addressing the food waste problem uniquely contributes to social, environmental, and economic sustainability. A combination of increased consumer awareness about food waste, surging food prices, and food shortages due to geopolitical tensions calls for a systemic response.

Organizations at every stage of the food value chain need to manage food waste better. They need to communicate better across their upstream and downstream partners, as well as to consumers. Recent technological leaps in IoT, AI/ML, etc. can play a fundamental role. Solutions are available to build agile and intelligent supply chains, which enable transparency and strengthen collaboration among ecosystem partners. Similarly, technology can help in tracking and assessing food

waste, enabling action at the right time, as well as making consumers a participant in waste reduction.

Still, technology works best only when people harbor the right mindset. Organizations need to set up strong monitoring and governance processes to manage food waste within their operations, such as establishing food waste-related metrics, setting the right incentives, and empowering frontline employees to take quick action. They also need to invest in creating awareness among consumers on how to manage waste at their homes.

Tackling food waste is the right thing to do. Brands need to reflect this as part of their core values by taking the right actions.



RESEARCH METHODOLOGY

To understand the issue of food loss and waste and potential solutions from the perspectives of both organizations and consumers, we carried out extensive research with both qualitative and quantitative components.

The study findings reflect the views of the people who responded to our online questionnaire for this research and are aimed at providing directional guidance. Please refer to the methodology for details of respondents and get in touch with a Capgemini expert to understand specific implications.

In-depth interviews

We conducted 23 in-depth interviews with experts from large organizations, universities, startups, NGOs, and regulatory bodies involved in the areas of food manufacturing, food retail, restaurants and food platforms, food co-operatives, and food packaging and distribution.

Executive survey

We surveyed executives from 1,000 large organizations in the food manufacturing and food retail space. The global survey took place in April and May 2022. The distribution of selected respondents and their organizations is provided below.

Fig.24

Organizations by country

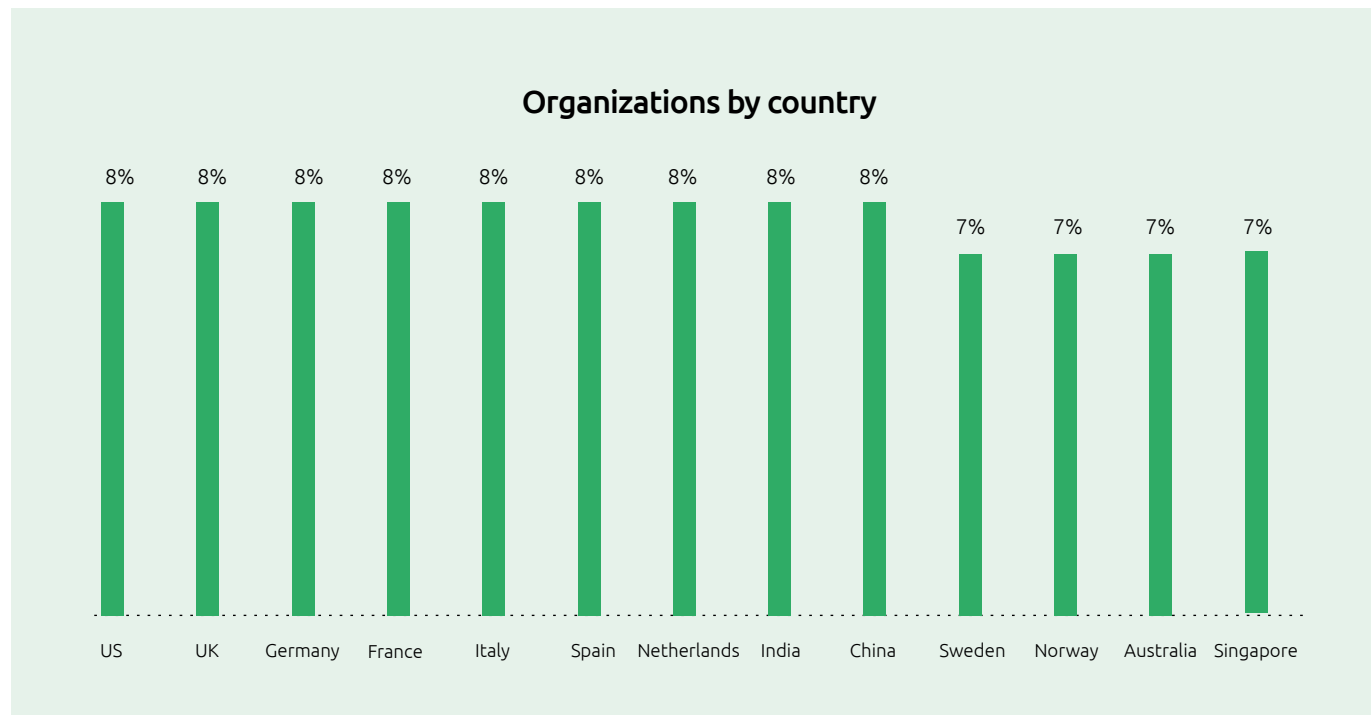


Fig.25

Organizations by sector

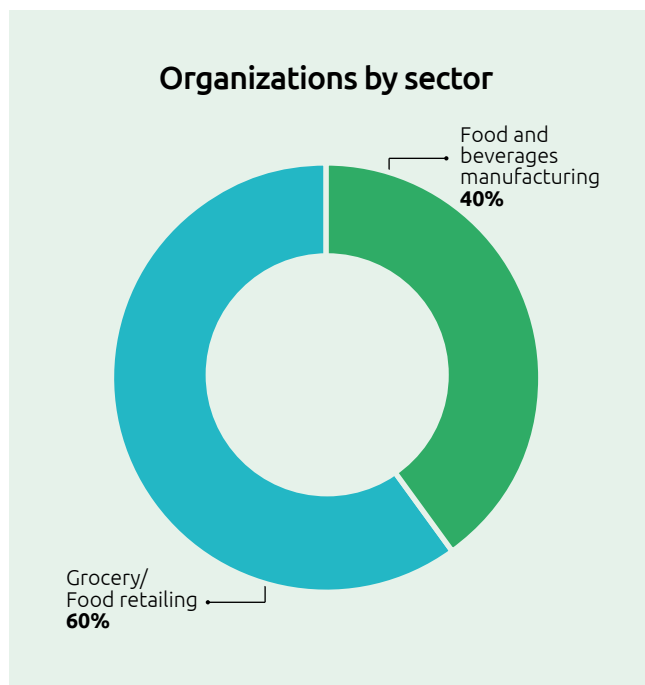


Fig.26

Organizations by annual revenue

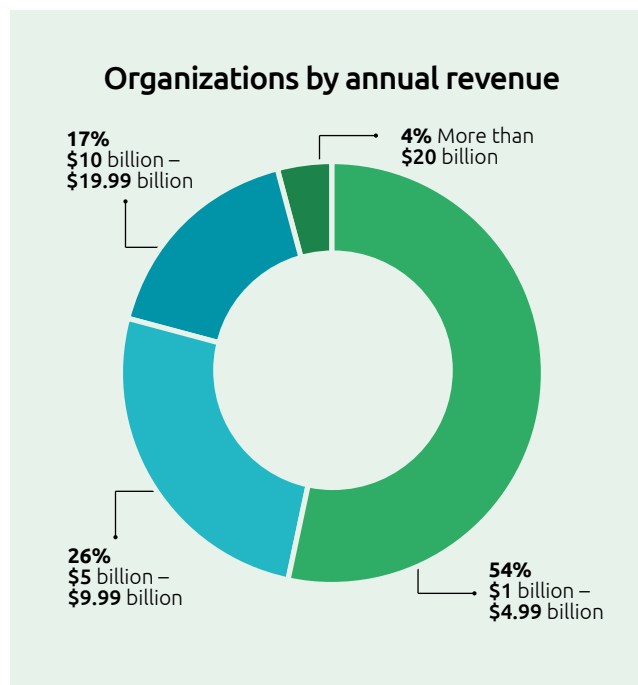


Fig.27

Executives by role

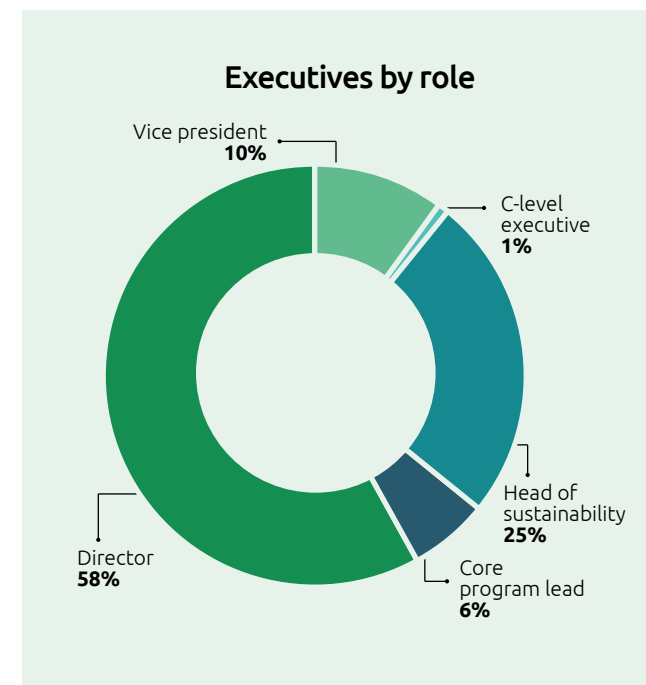
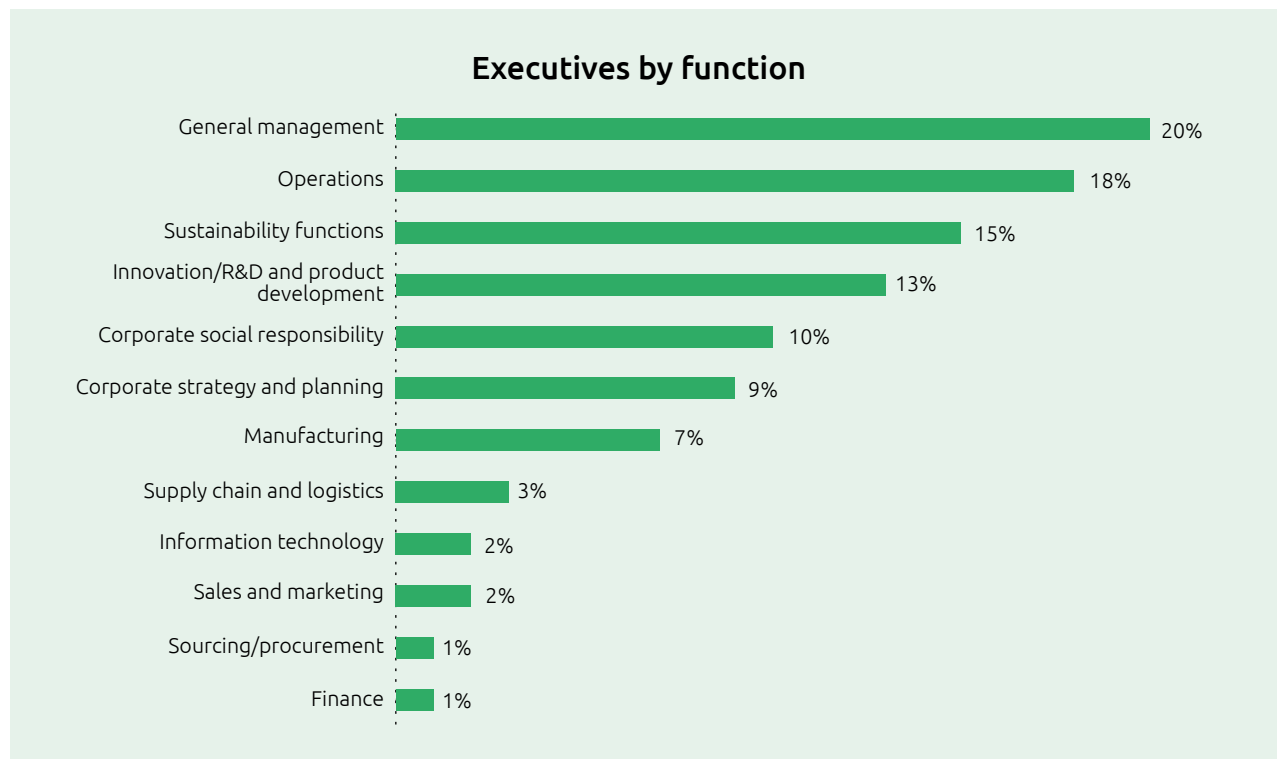


Fig.28

Executives by function



Consumer survey

We surveyed 10,000 consumers over the age of 18 in 10 countries across North America, Europe, and Asia Pacific. The global survey took place in April and May 2022. The demographic details of consumers are given below.

Fig.29

Consumers by country of primary residence

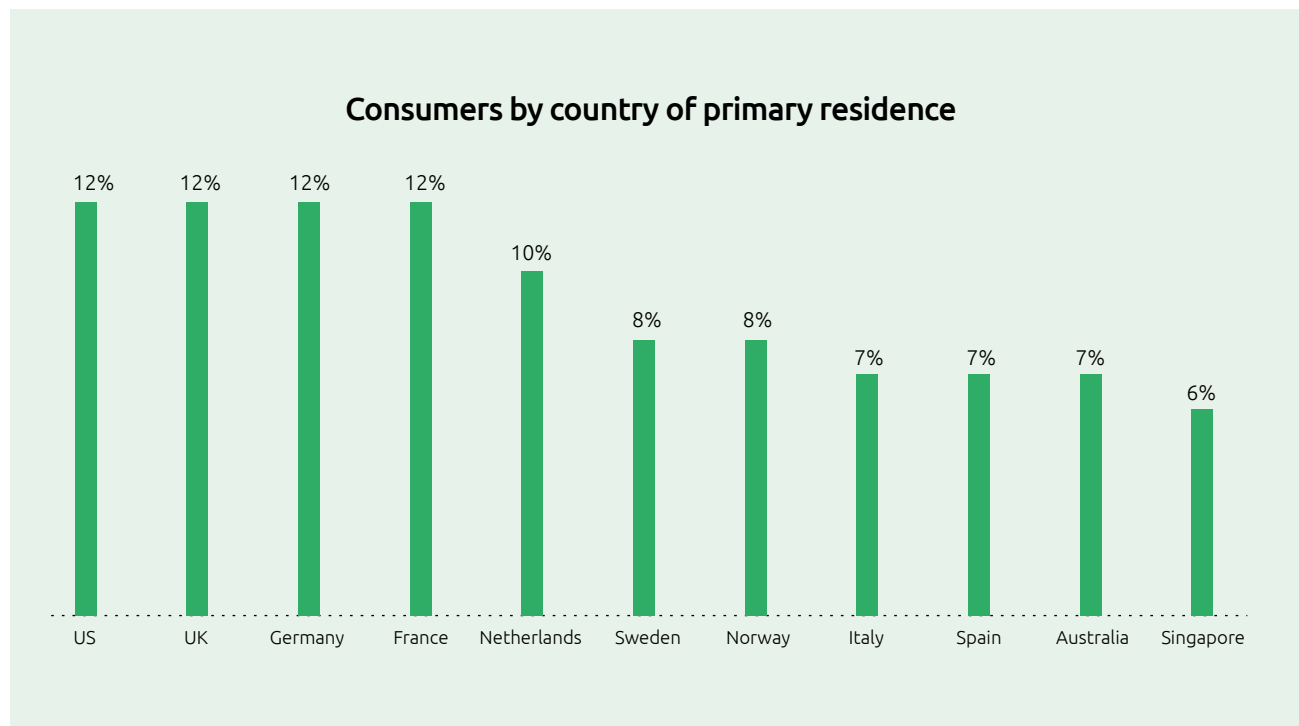


Fig.30

Consumers by age

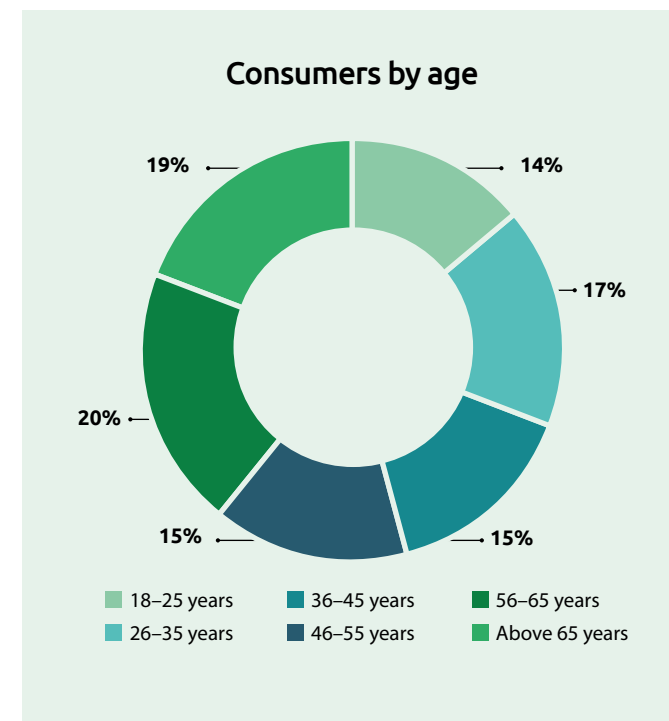
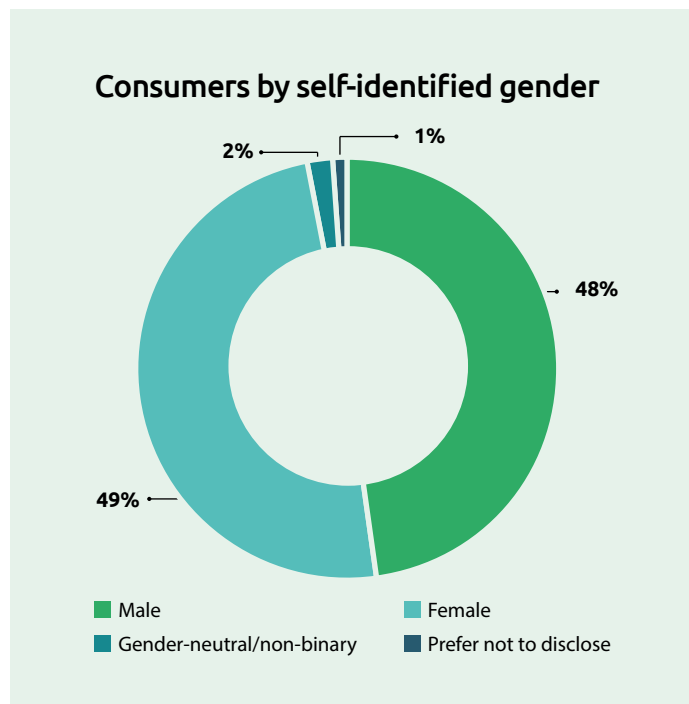


Fig.31

Consumers by self-identified gender

**Fig.32**

Consumers by work status

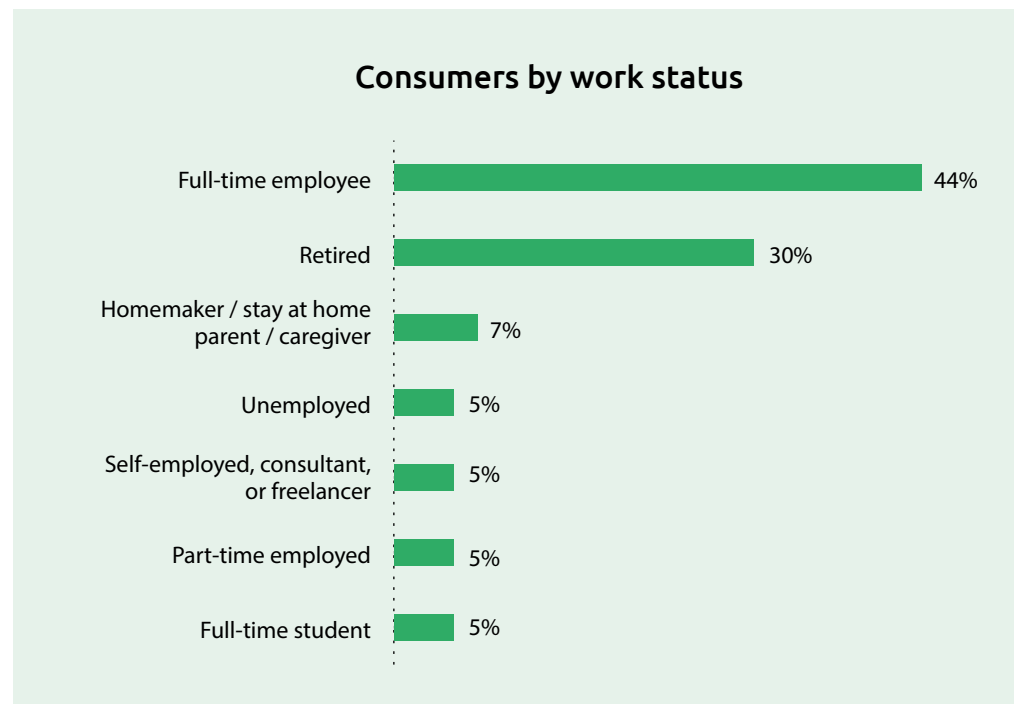
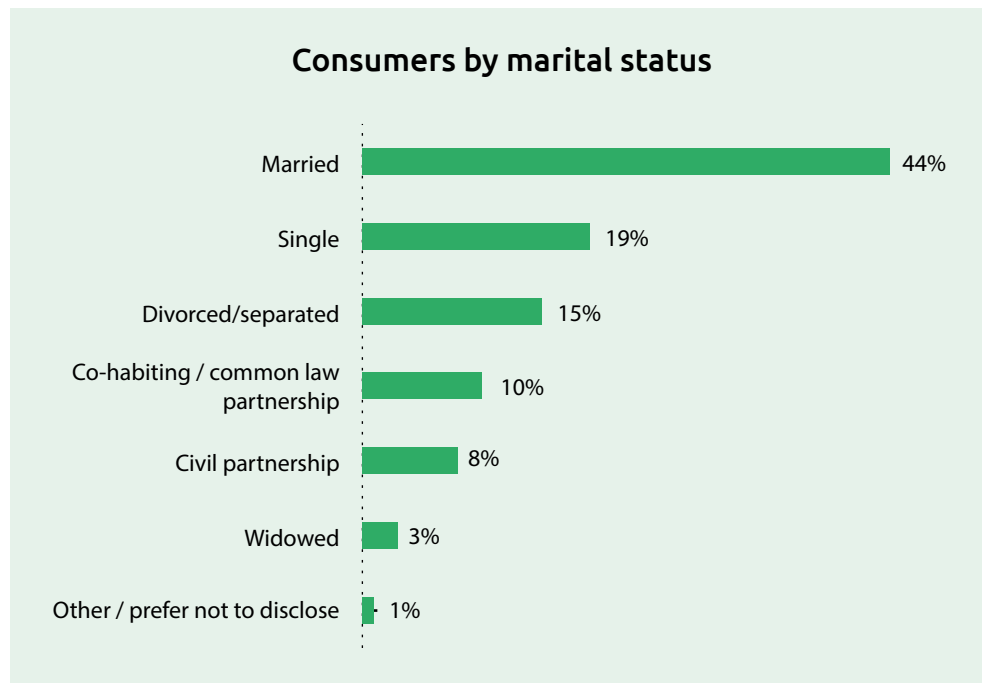


Fig.33

Consumers by marital status



Social media analysis

Search and social media listening study conducted in May 2022 in three parts:

1.

Google search analytics:

Google keyword planner data on 2,800 search keywords related to food waste, food security, expired food, etc. was analyzed with a total search volume of 35 million (timeline: April 2018–March 2022)

2.

Social media analytics:

Talkwalker, a consumer intelligence platform, was used to conduct social media analytics on Twitter and Reddit (timeline: June 2020–April 2022). Around 183,000 results were obtained with 5% sampling.

3.

Sentiment analysis and emotion detection:

Based on results from Talkwalker, which uses machine learning to classify sentiments into positive, negative, or neutral (90% claimed accuracy) in 92 languages (timeline: June 2020–April 2022).

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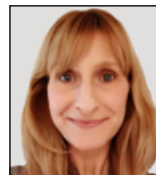
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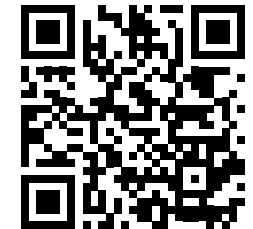
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