

# CHAMPIONS 12.3

## SDG TARGET 12.3 ON FOOD LOSS AND WASTE: 2019 PROGRESS REPORT

An annual update on behalf of Champions 12.3

12 RESPONSIBLE CONSUMPTION AND PRODUCTION



### EXECUTIVE SUMMARY

#### Highlights

- Sustainable Development Goal (SDG) Target 12.3 aims to halve global food waste at the retail and consumer levels and reduce food losses, including postharvest losses, along supply chains, by 2030.
- More governments and businesses should adopt the Target-Measure-Act approach to reduce food waste: (1) **set** a reduction target aligned with SDG 12.3, (2) **measure** their food loss and waste to identify hotspots and to monitor progress, and (3) **act** boldly to reduce food loss and waste.
- Governments representing 50 percent of the world's population have set an explicit national target in line with SDG 12.3. However, governments representing just 12 percent of the population are measuring food loss and waste, and countries representing just 15 percent of the world's population are pursuing reduction actions at scale.
- Of the world's 50 largest food companies, more than two-thirds have set targets in line with SDG 12.3, more than 40 percent are measuring their food loss and waste, and one-third are pursuing actions at scale to reduce waste in their own operations.
- In order for SDG 12.3 to be achieved, more governments need to urgently set targets, measure, and act boldly to reduce food loss and waste. Businesses need to increase efforts to engage their suppliers (thus multiplying action) and increase public reporting of their food loss and waste inventories.
- Reducing food loss and waste is an overlooked strategy for helping countries meet their commitments to the Paris Agreement on climate change. More countries should include food loss and waste reduction in their Nationally Determined Contributions (NDCs) as they enhance them between now and year end 2020.

#### ABOUT THIS PUBLICATION

*SDG Target 12.3 on Food Loss and Waste: 2019 Progress Report* is the fourth in an annual series of publications providing an assessment of the world's progress toward achieving SDG 12.3. SDG 12.3 aims to "by 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses." Prepared on behalf of Champions 12.3, this publication seeks to inform decision-makers in government, business, academia, and civil society about recent advances and what remaining steps need to be addressed if the world is to achieve the target. The 2016, 2017, and 2018 Progress Reports can be found at <http://www.champions123.org>.

#### AUTHORS

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#### ABOUT CHAMPIONS 12.3

Champions 12.3 is a unique coalition of more than three dozen leaders from around the world dedicated to inspiring ambition, mobilizing action, and accelerating progress toward achieving SDG Target 12.3. The Government of the Netherlands and the World Resources Institute jointly provide secretariat support to Champions 12.3.

## Background

**In September 2015, the United Nations General Assembly adopted a set of 17 Sustainable Development Goals (SDGs) as part of the 2030 Agenda for Sustainable Development. SDG 12 seeks to “ensure sustainable consumption and production patterns.”** The third target under this goal (Target 12.3) calls for halving per capita global food waste at the retail and consumer levels and reducing food losses along production and supply chains (including postharvest losses) by 2030.

**To what degree has the world made progress toward achieving SDG 12.3?** This fourth annual progress report assesses advances by governments and companies over the past 12 months (September 2018–September 2019) relative to a three-step approach for reducing food loss and waste: Target-Measure-Act.

**Targets set ambition, and ambition motivates action.** Therefore, a first step toward reducing food loss and waste is for governments and companies to set specific reduction targets aligned with SDG 12.3. This past year has seen a growth in governments and companies setting targets in support of SDG 12.3, with notable additions including the United Arab Emirates and a number of cities, including Paris, San Francisco, and Sydney. A number of new company commitments have also been announced. In September 2019, the Sustainable Rice Platform, made up of the largest rice producers in the world, has committed to halve on-farm and near-farm losses among members by 2030.

**What gets measured gets managed.** Quantifying food loss and waste within borders, operations, or supply chains can help decision-makers better understand how much, where, and why food is being lost or wasted. Such data are also the foundation for prioritizing reduction strategies and for monitoring progress. One highlight of the past 12 months is that the European Commission adopted a measurement methodology to support member states in quantifying food waste. The methodology is expected to enter into force in late 2019, and member states will be required to monitor their food waste from 2020 onward using this agreed methodology, with the first published results expected by mid-2022 (European Commission 2019). Progress is also being made at the global level, with the Food Loss Index, which estimates food losses occurring within countries between the farm-gate and the retail store, approved as an official indicator for monitoring SDG 12.3. This is a significant step forward in tracking global progress toward achieving SDG 12.3.

**What ultimately matters is action.** Reducing food loss and waste is everyone’s responsibility. Exactly what needs to be done varies around the world, and achieving SDG 12.3 will require big acts by big players, as well as millions of acts by everyone from farmers to consumers. Working across supply chains is an important way for farmers, both large and small, to be involved in and benefit from efforts to achieve SDG 12.3, as well as ensuring that companies can better understand the needs of farmers. One noteworthy development that promises to scale up the number of food companies actively working to reduce food loss and waste is the new 10x20x30 initiative, launched in September 2019. Through it, 10 of the world’s largest global food retailers and providers will each engage 20 of their own priority suppliers to apply the Target-Measure-Act approach to reduce their food loss and waste by 50 percent by 2030.

**The past year witnessed many hopeful signs of progress.** But is the world on track to achieve SDG 12.3 by 2030? To answer this question, this report reviews progress by governments, companies, and other actors around the world relative to a road map introduced in the *2017 Progress Report* that shows a pathway for achieving SDG 12.3. The road map proposes a series of milestones for governments and companies for every three-year period from 2016 to 2030 covering the Target-Measure-Act approach. While these milestones are only indicative, they provide a useful mechanism for assessing progress overall.

**This report’s authors have assessed progress against the 2019–2021 milestones,** with the color green indicating developments that are on track to achieve this first milestone, yellow indicating that some progress has been made but below the pace needed to achieve this milestone in time, and red indicating that progress is not on track to meet this milestone by 2021. The assessment for the milestone period of 2019–2021 has the following results:

### Governments

- **TARGET: Milestone = Countries with >95 percent of the global population have set specific food loss and waste reduction targets aligned with Target 12.3 (yellow).** Countries or regional blocs that have set specific food loss and waste reduction targets aligned with SDG 12.3 cover an estimated 50 percent of the world’s population. These regions include the African Union, Australia, China, the European Union, Japan, Malaysia, the United Arab Emirates, the United States, and Vietnam. Although there is a growth in the number of cities setting food waste targets,

the pace at which national governments are setting specific food loss and waste targets has slowed, and many more governments will need to set specific food loss and waste reduction targets for this milestone to be met by 2021.

- **MEASURE:** *Milestone = Countries with 40 percent of the global population have quantified base-year food loss and waste and have started reporting on food loss and waste (red).* Australia, Canada, Denmark, Estonia, Finland, Israel, Japan, Italy, Mexico, the Netherlands, New Zealand, Norway, Saudi Arabia, Slovenia, Spain, the United Kingdom, and the United States—representing around 12 percent of the world’s population—measure their food loss and/or waste. This percentage should increase as member states of the European Union start measuring food waste according to a uniform methodology in 2020, with the first results expected by the end of 2022. However, many more governments will need to quantify and report their food loss and waste for this milestone to be achieved.
- **ACT:** *Milestone = Countries with 40 percent of the global population are actively working at scale to reduce food loss and waste (red).* The number of national-level initiatives to tackle food loss and waste, with ambition for large-scale impact, continues to grow. In addition to initiatives established in previous years in countries including Denmark, the European Union, Japan, the Netherlands, the United Kingdom, and the United States, new efforts have emerged in Australia and Canada in the 12 months since September 2018. There have also been signs of emerging actions growing across Africa, with a number of countries beginning to implement and finance activities outlined in their national postharvest loss prevention activities. Although the number of countries acting at scale to reduce food loss and waste has risen, efforts are happening in countries that cover only around 15 percent of the world’s population. If this milestone is to be achieved, the pace at which countries adopt and implement programs to reduce food loss and waste needs to be accelerated.
- *Milestone = The first country halves its rate of food loss and waste (red).* No country has yet announced a halving of food loss and waste, with a lack of quantification at the national level hindering tracking of this milestone. As more countries conduct base-year assessment of food loss and waste and are required to publicly report progress against targets, as is the case in the European Union, progress will be easier to track.

## Companies

- **TARGET:** *Milestone = >95 percent of the world’s 50 largest food companies, by revenue, have set specific food loss and waste reduction targets aligned with Target 12.3 (yellow).* Two-thirds of the world’s 50 largest food companies (by revenue) have independently set a food loss and waste reduction target consistent with SDG 12.3 or participate in programs that have a target in line with SDG 12.3.
- *Milestone = Among those setting targets, all are working with suppliers to set their own targets (red).* The past 12 months have seen a slight increase in companies working with their suppliers to set targets, but the number of companies that have set targets that are also working with their suppliers remains low at 18 percent. The number of companies working with suppliers should increase following the launch of the 10x20x30 initiative. Nevertheless, engaging with suppliers should remain a priority for companies over the next year.
- **MEASURE:** *Milestone = 40 percent of the world’s 50 largest food companies have quantified base-year food loss and waste and have started measuring and reporting on food loss and waste (yellow).* Forty-four percent of the world’s largest food companies have quantified base-year food loss and waste and have started measuring and reporting on food loss and waste within their own operations. However, only 30 percent of companies that are measuring are publicly reporting their food loss and waste inventories. Going forward, more companies need to publicly report their food loss and waste inventories.
- *Milestone = Among those measuring and reporting, half are working with their suppliers to quantify the latter’s food loss and waste (yellow).* Among those companies measuring and reporting, only a handful of these companies are working with their suppliers. If this milestone is to be achieved, companies need to work with their suppliers to quantify and publish their food loss and waste inventories.
- **ACT:** *Milestone = Twenty percent of the world’s 50 largest food companies have active food loss and waste reduction programs (green).* One-third of the world’s 50 largest food companies have established food loss and waste reduction programs, meaning that the milestone has already been exceeded.

- *Milestone = Among those taking action, half are working with their suppliers to reduce the latter's food loss and waste (yellow).* Among the companies taking action, just over one-third are engaged with their suppliers to reduce the latter's food loss and waste. Business partnerships and initiatives like 10x20x30, The Consumer Goods Forum, The International Food Waste Coalition (a network for food service providers), and the UK Food Waste Reduction Roadmap provide a good foundation for companies to set ambition, share good practices, and collaborate. The large number of companies that have signed up to these initiatives mean that the number of companies engaging with suppliers should increase over the next 12 months, but a concerted effort needs to be made by companies to engage suppliers on food loss and waste.
- *Milestone = The first global company halves food loss and waste in its own operations and its supply chain (yellow).* No company has yet announced that it has halved food loss and waste in its own operations. However, some companies have halved food waste at specific sites, and there are several companies reporting impressive reductions across their whole operations.

## A Call to Action

**SDG 12.3 is a historic opportunity for the world to curtail food loss and waste.** Reducing food loss and waste is an important strategy to help meet the UN SDGs by 2030, contribute to the Paris Agreement on climate change, and sustainably feed the planet by 2050.

**There is evidence that momentum toward achieving this target is growing, particularly among companies.** Businesses still need to do more, however, especially with regard to working with suppliers and publicly reporting their food loss and waste inventories. Nonetheless, business cannot achieve SDG 12.3 alone.

**It is imperative that national governments dramatically accelerate their efforts to reduce food loss and waste.** Too few governments are setting targets, establishing base-year estimates of food loss and waste, and taking bold action at scale to reduce food loss and waste. There are notable exceptions, but they remain exceptions.

**National action on food loss and waste can help countries meet their commitments to the Paris Agreement on climate change.** Therefore, countries should include food loss and waste reduction in their updated NDCs, which are due in December 2020.

**National action on food loss and waste can help countries meet their food security goals.** Therefore, countries should include food loss and waste reduction in their national food and agriculture policies, programs, and incentives.

**There are only 11 years remaining before the SDGs are due to be met.** It is therefore essential that all governments, companies, farmers, and individuals deepen their commitment to reducing food loss and waste and accelerate their efforts.

**Set targets, measure the problem, and take action.** If the world does this, it will take a big step forward in reducing food loss and waste, and securing a more sustainable future for people and planet.

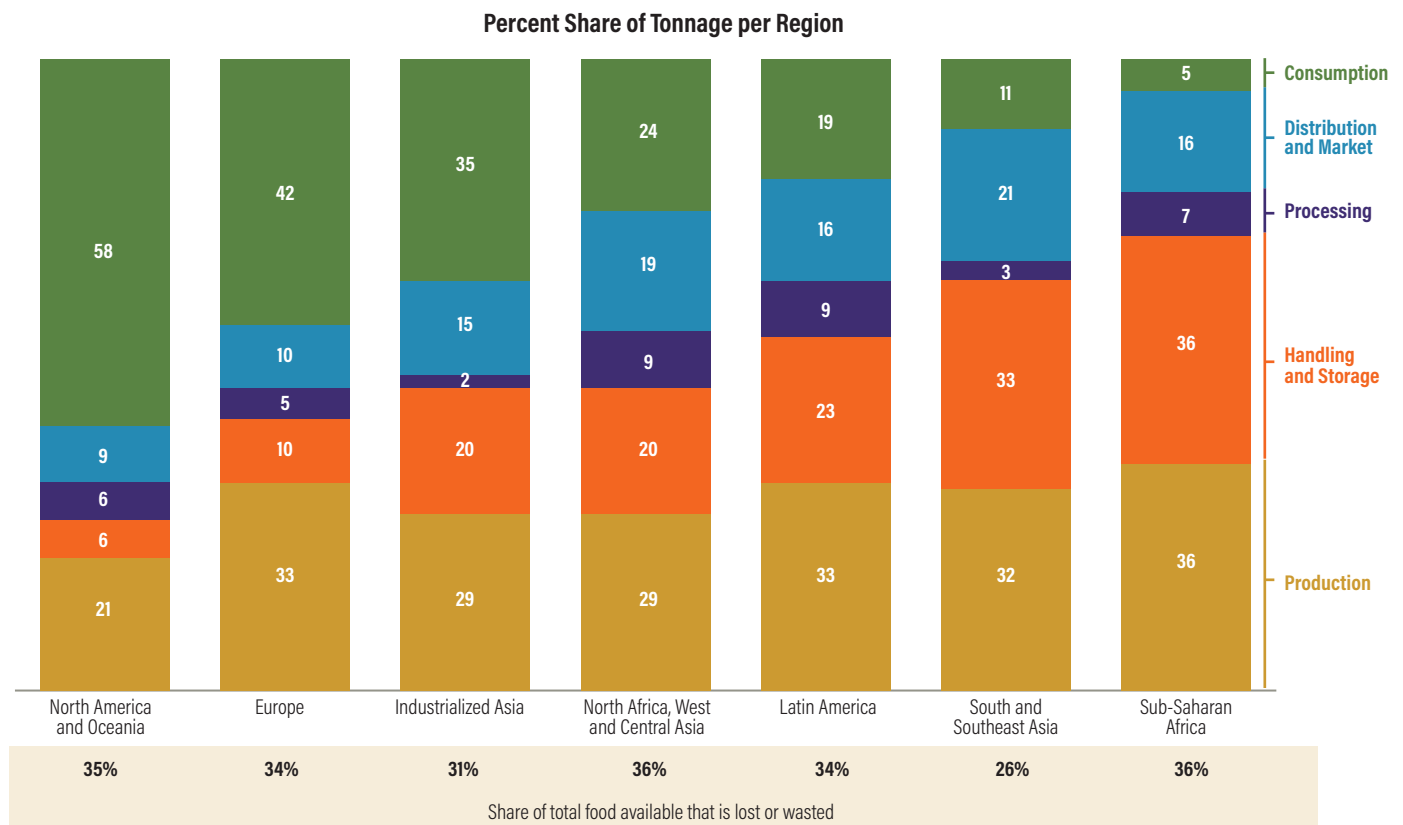
## THE CHALLENGE

According to the Food and Agriculture Organization of the United Nations (FAO), approximately one-third of all food produced in the world is lost or wasted (FAO 2011).<sup>1</sup> This huge level of inefficiency has significant impacts.

Consider food security. In some areas, food losses near the farm are predominant (Figure 1) and can affect the ability of farmers to make a good living and, at times, feed their families. In other places, including Europe and North America, food wasted near the end of the supply chain can affect household nutrition and spending. Regardless of where the food loss and waste occurs, in a world where one in nine people are undernourished, the fact that more than 1 billion tons of food never gets consumed is a travesty (FAO et al. 2018). And as the demand for food production rises to meet a growing population, the world needs now more than ever to make the most of what is already grown.

Consider the economic costs. Food loss and waste results in roughly US\$940 billion in economic losses globally per year (FAO 2015). In sub-Saharan Africa, postharvest losses total up to \$4 billion per year (World Bank 2011). Food waste in households and restaurants costs an average of \$1,800 per year for a family of four in the United States and about \$1,100 per year for the average household with children in the United Kingdom (Gunders and Bloom 2017; WRAP 2015). Investing in food loss and waste reduction efforts can therefore reap significant economic benefits. For example, one study found that food providers such as canteens, hotels, and restaurants can experience up to a 14-fold return on their investment in food waste reduction programs (Hanson and Mitchell 2017).

FIGURE 1. Distribution of Food Loss and Waste by Region and Stage in the Food Supply Chain, 2007



Notes: Values displayed are of food loss and waste as a percentage of food supply, defined here as the sum of the "Food" and "Processing" columns of the FAO Food Balance Sheet. Numbers may not sum to 100 due to rounding.

Source: WRI analysis, based on FAO 2011.

Consider the environment. Food that is harvested but ultimately lost or wasted consumes about one-quarter of all water used by agriculture each year (Kummu et al. 2012). Food loss and waste requires land area greater than the size of China to be grown (FAO 2013). And it generates about 8 percent of global GHG emissions annually (FAO 2015). To put this in perspective, if food loss and waste were a country, it would be the third largest GHG emitter on the planet—surpassed only by China and the United States (Figure 2). One recent study found that reducing food loss and waste by half would avoid 1.5 gigatons of carbon dioxide equivalent per year by 2050, an amount more than the current energy- and industry-related emissions of Japan (Searchinger et al. 2018).

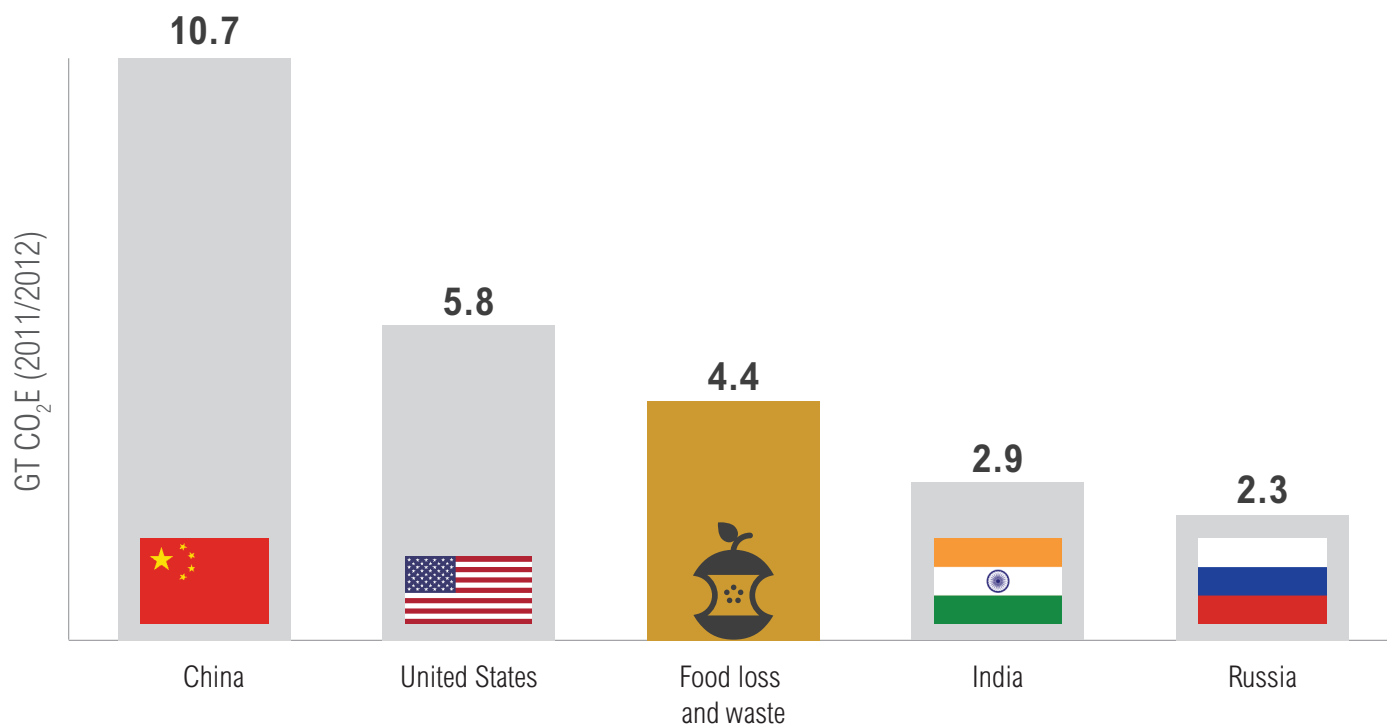
## A HISTORIC OPPORTUNITY

In light of these impacts, reducing food loss and waste can be a triple win. It can help feed more people. It can save money for farmers, companies, and households while creating new business opportunities.

In September 2015, a historic window of opportunity opened to elevate the issue of food loss and waste reduction on the global agenda. At the United Nations General Assembly, countries of the world formally adopted a set of 17 SDGs as part of the 2030 Agenda for Sustainable Development: global goals to end poverty and hunger, protect the planet, and ensure prosperity for all populations and generations (UN 2017). These SDGs and their associated targets came into effect on January 1, 2016.

SDG 12 seeks to “ensure sustainable consumption and production patterns.” The third target under this goal (Target 12.3) calls for halving per capita global food waste at the retail and consumer levels and reducing food losses along production and supply chains (including postharvest losses) by 2030 (Box 1). This ambitious yet achievable target has the potential to embed the reduction of food loss and waste firmly in public- and private-sector strategies around the world for the first time. It is truly a global target. Although solutions may differ between developed and developing nations, every country, company, and individual has a role to play.

FIGURE 2. **If Food Loss and Waste Were Its Own Country, It Would Be the Third Largest GHG Emitter**



*Note:* Figures reflect all six anthropogenic GHG emissions, including those from land-use change and forestry (LULUCF). Country data are for 2012 while the food loss and waste data is for 2011 (the most recent data available). To avoid double counting, the food loss and waste emissions figure should not be added to the country figures.  
*Source:* CAIT 2015; FAO 2015.

This target contributes to achieving other SDGs and international aspirations such as the Zero Hunger Challenge, the United Nations Framework Convention on Climate Change, and more. For instance, the Paris Agreement on climate change calls for nations to take action on climate mitigation and adaptation; reducing food loss and waste is a strategy that can address both (but that is too often overlooked). The achievement of SDG 12.3 also will aid in the realization of the African

Union’s Malabo Declaration, which was adopted in 2014 with several commitments, one of which is to reduce postharvest losses by 50 percent by 2025. Moreover, the second United Nations Environment Assembly in 2016 adopted a resolution on prevention, reduction, and reuse of food waste, which calls for increased awareness and action to reduce food waste by governments and the UN Environment Programme (UNEP).

## BOX 1. About Food Loss and Waste

The difference between food loss and food waste is not always sharply defined. However, a distinction is sometimes made to reflect different underlying causes. Under the SAVE FOOD initiative, FAO and UNEP (2016), and a number of other stakeholders use the following definitions:

- “Food loss” in the production and distribution segments of the food supply chain is mainly caused by the functioning of the food production and supply system or its institutional and legal framework.<sup>a</sup>
- “Food waste” refers to the removal of food that is fit for human consumption from the food supply chain, by choice, or because it has spoiled or expired, and is mainly caused by economic or social behavior, poor stock management, or neglect.

Figure B1 provides examples of food loss and waste during various stages of the food supply chain.

FIGURE B1. Examples of Food Loss and Waste along the Food Supply Chain

FOOD LOSS			FOOD WASTE	
PRODUCTION	HANDLING & STORAGE	PROCESSING & PACKAGING	DISTRIBUTION & MARKET	CONSUMPTION
<i>During or immediately after harvesting on the farm</i>	<i>After leaving the farm for handling, storage, and transportation</i>	<i>During industrial or domestic processing and/or packaging</i>	<i>During distribution to markets, including at wholesale and retail markets</i>	<i>In the home or business of the consumer, including restaurants and caterers</i>
<ul style="list-style-type: none"> <li>• Fruits discarded due to bruising during picking</li> <li>• Crops sorted out postharvest for not meeting cosmetic standards</li> <li>• Crops left behind in fields due to poor mechanical harvesting or drops in prices</li> <li>• Fish discarded during fishing operations</li> </ul>	<ul style="list-style-type: none"> <li>• Harvested food eaten by pests</li> <li>• Harvested food degraded by fungus or disease</li> <li>• Fish that are spilled or degraded after landing</li> </ul>	<ul style="list-style-type: none"> <li>• Milk spilled during pasteurization and processing</li> <li>• Food sorted out as not suitable for processing</li> <li>• Livestock trimming during slaughtering and industrial processing</li> <li>• Fish spilled or damaged during canning or smoking</li> </ul>	<ul style="list-style-type: none"> <li>• Food sorted out due to quality</li> <li>• Safe food disposed of because of going past sell-by date before being purchased</li> <li>• Food spilled or damaged in market</li> </ul>	<ul style="list-style-type: none"> <li>• Food sorted out due to quality</li> <li>• Food purchased but not eaten</li> <li>• Food cooked but not eaten</li> </ul>

*Note:* <sup>a</sup> The definition outlined in this paper, following the recommendations of the Food Loss and Waste Standard and the Champions 12.3 Guidance on Interpreting Sustainable Development Goal Target 12.3, does not include preharvest losses, which are those losses that occur before the crop has been harvested or the animal slaughtered. Some definitions of food loss do include preharvest losses.

*Source:* WRI analysis, based on FAO 2011.

## PROGRESS SINCE SEPTEMBER 2018

Over the past 12 months, essentially the fourth year since the announcement of the SDGs, to what degree has the world continued to make progress toward achieving SDG 12.3? This publication addresses this question by evaluating progress relative to a three-step approach advocated by Champions 12.3 for reducing food loss and waste: Target-Measure-Act (Box 2). The authors collected data through a literature review and consultation with experts (Box 3). For progress against SDG 12.3 during 2016, 2017, and 2018, see the previous installments of this Progress Report.<sup>2</sup>

*“By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.”*

—SDG Target 12.3

### BOX 3. Data Sources for this Chapter

Examples of progress to date were found through a literature review and Internet searches in the English language. The search was limited to actions occurring from September 2018 through September 2019. Examples of progress were also gathered by requesting information from a group of over 100 associates that represent the individuals who are members of the Champions 12.3 coalition. Restricting searches to the English language may have affected the geographic spread of examples, so specific effort was made to gather input from experts working in non-English-speaking countries. Likewise, special effort was made to gather input from low- and middle-income countries, as these regions tend to be underrepresented in data uncovered by the literature review. Despite all these efforts, the examples highlighted in this paper are not exhaustive.

### BOX 2. Why Target-Measure-Act?

The Target-Measure-Act approach to reducing food loss and waste is based on the simple steps wherein a country or company (1) sets a food loss and waste reduction target, (2) measures its current levels of food loss and waste (and periodically remeasures to assess progress), and (3) takes action to reduce the hotspots of food loss and waste. Target-Measure-Act is used widely and successfully by governments and companies that are working to reduce food loss and waste. Examples include the United Kingdom (the nation that has made the most known progress in reducing food loss and waste since the mid-2000s, with a reduction of 19 percent in total avoidable food waste from 2007 to 2015 (WRAP 2018a) and a number of major food businesses (e.g., IKEA, Kellogg Company, Nestlé, Olam, Sodexo, Tesco and its 27 own-brand suppliers, and Walmart). Moreover, Target-Measure-Act is now the approach being pursued by additional countries and political blocs (e.g., the European Union's strategy for fulfilling SDG 12.3 essentially follows this approach) and by members of The Consumer Goods Forum and The Global Agribusiness Alliance.

FIGURE B2. A Strategy for Tackling Food Loss and Waste





# 1. TARGET

Targets set ambition, and ambition motivates action. Therefore, as a first step toward reducing food loss and waste, governments and companies should set reduction targets aligned with SDG 12.3.

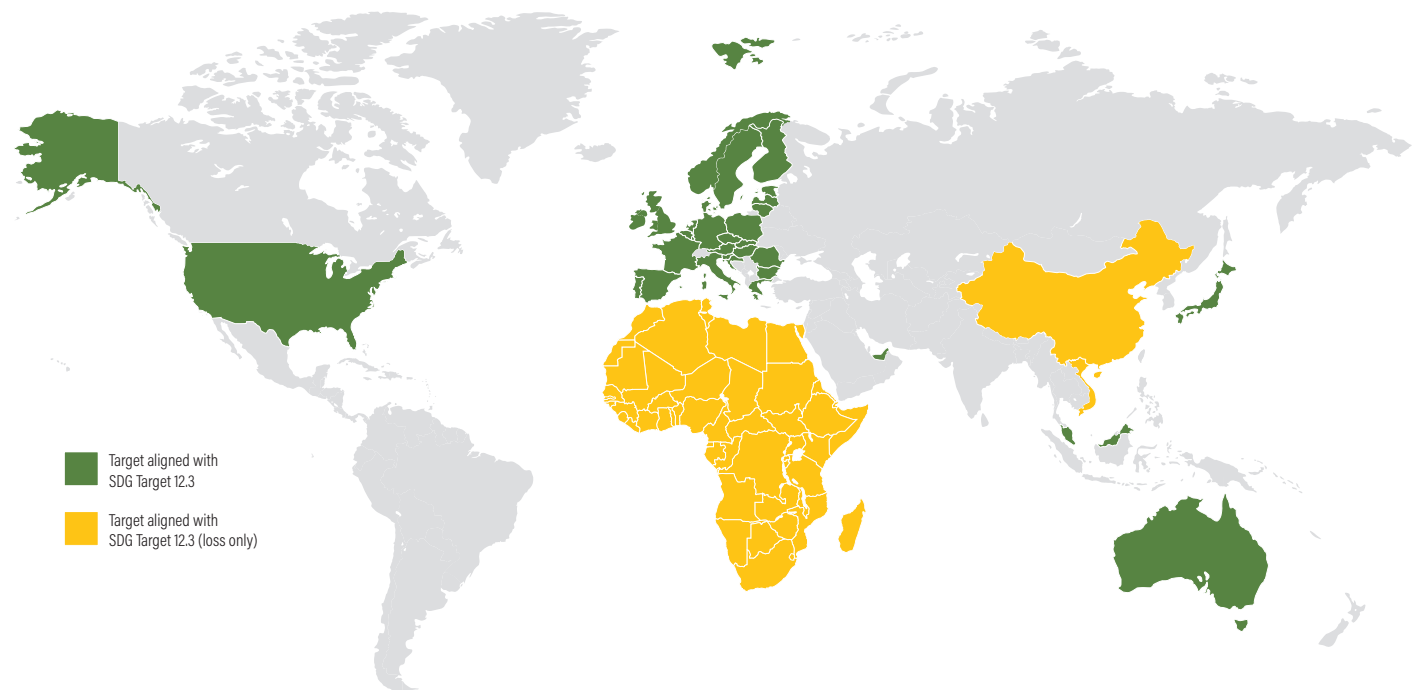
## Governments

With the adoption of the SDGs in 2015, all nations implicitly agreed to SDG 12.3. But because the SDGs have a total of 169 targets, adoption of the SDGs *en masse* does not necessarily mean that food loss and waste reduction will garner sufficient government attention and focus. Explicitly articulated national or subnational food loss and waste reduction targets made by governments, aligned with SDG 12.3, would indicate such attention and focus. Figure 3 shows countries or regional blocs with such targets (either voluntary or mandatory) in place that the authors could identify, including those that set specific targets before the advent of the SDGs in September 2015.

Progress in governments setting targets over the past 12 months includes:

- In November 2018, the United Arab Emirates committed to halving food loss and waste in the country by 2030, in line with SDG 12.3 (Government of the United Arab Emirates 2019).
- Vietnam has a target to reduce postharvest losses of agricultural and fishery products by 50 percent by 2020 and has a number of policies in place that provide economic incentives for farmers to adopt postharvest loss reducing technologies.<sup>3</sup>
- Malaysia has a target to reduce food waste by 50 percent by 2030, in line with SDG 12.3.<sup>4</sup>
- China has a national strategy for how to achieve each of the 169 SDG targets and, in its current five-year plan, has set a quantitative target of reducing food losses by about 37 percent by 2020 (a rate consistent with achieving a 50 percent reduction in losses by 2030).<sup>5</sup>

FIGURE 3. National and Regional Governments with Food Loss and/or Waste Reduction Targets Aligned with SDG Target 12.3 (as of September 2019)



Source: WRI analysis.

Subnational governments, including cities, are also setting goals in line with SDG 12.3:

- In September 2018, the Pacific Coast Collaborative—a consortium of U.S. and Canadian governments consisting of British Columbia, California, Oregon, and Washington, as well as the cities of Oakland, Portland, San Francisco, Seattle, and Vancouver (British Columbia)—committed to halving food waste by 2030 (Pacific Coast Collaborative 2018).
- In late 2018, 23 cities and regions representing 150 million citizens—including Auckland, Catalonia, Paris, Philadelphia, San Jose (California), Sydney, Tel Aviv, and Vancouver (British Columbia)—signed the “Advancing towards Zero Waste Declaration,” through which they commit to reducing the amount of waste sent to landfills and incineration by at least 50 percent by 2030 (C40 2018).

## Companies

The private sector continues to adopt targets aligned with SDG 12.3. Initiatives like The Consumer Goods Forum’s Food Waste Resolution and the UK Food Waste Reduction Roadmap, profiled in the 2017 and 2018 *Progress Reports*, demonstrate that already many of the world’s leading food companies across the food supply chain have an explicit food loss and/or food waste target. Although the importance of going beyond setting targets to conducting measurement and taking action cannot be understated, the number of companies setting targets is an indication of growing momentum within the private sector.

One recent development was made in September 2019 when the Sustainable Rice Platform, a multi-stakeholder collaboration that represents some of the largest rice producers in the world, announced that it has committed to implementing the Target-Measure-Act approach and to halving on-farm and near-farm rice losses by 2030.

Other companies are setting targets that build upon or are independent of these collective efforts:

- In January 2019, eight food manufacturers and retailers committed to reduce food waste in their Canadian operations by 50 percent by 2025. The companies include Kraft Heinz Canada, Loblaw Companies Ltd., Maple Leaf Foods, Metro Inc., Save-on-Foods, Sobeys Inc., Unilever Canada, and Walmart Canada (National Zero Waste Council 2019).
- In May 2019, the UK Department for Food, Environment and Rural Affairs (Defra) launched the Step Up to the Plate

pledge in which signatories commit to helping halve UK food waste by 2030. Signatories adopt the UK Food Waste Reduction Roadmap (developed by WRAP and the Institute of Grocery Distribution), which requires companies to adopt the Target-Measure-Act approach to reduce food waste. More than 170 signatories adopted the Roadmap, including all of the main grocery retailers and 130 other large food businesses, collectively representing over half of UK food businesses (by turnover).

- In September 2018, Tesco announced that 10 of the world’s largest food brands have set targets to halve their food waste by 2030 and also committed to publish the food waste data for their operations by September 2019. They will also take concrete steps to reduce food waste in the supply chain and in customers’ homes. The 10 branded companies that have made this commitment include Mars, PepsiCo, and Unilever (Tesco 2019a).
- In late 2018, food service giant Sysco announced a target to divert 90 percent of food waste from landfill by 2025 from the current level of 65 percent. To help meet this goal, Sysco is working on repurposing and donating excess food and redirecting food waste through agricultural feed (Sysco 2018).

## 2. MEASURE

The old adage, what gets measured gets managed, holds true for food loss and waste, as well. Quantifying food loss and waste within borders, operations, or supply chains can help decision-makers better understand how much, where, and why food is being lost or wasted. This information is the foundation for developing and prioritizing reduction strategies. In addition, measurement is necessary if entities are to know whether they are on track to meet SDG 12.3; they need to quantify a base-year amount of food loss and waste and monitor change over time.<sup>6</sup>

### Governments

FAO conducted the first global food loss and waste quantification exercise, and in 2011 published the results in the report *Global Food Losses and Food Waste*. It estimated the amount of food (by weight) that was lost and wasted throughout the food supply chain, dividing the world into seven near-continental regions (FAO 2011). Although the results were based on existing data and literature and no new measurements were conducted, this landmark study was a catalyst for the current movement to tackle food loss and waste.



using this agreed methodology, with the first results expected by mid-2022 (European Commission 2019). A number of EU member states are already taking steps to fulfill these new obligations. For example, the Netherlands is currently developing a new food waste monitoring system through which companies can provide data on a voluntary and confidential basis, with initial findings from the primary sector, retail, and out-of-home consumption to be published by the end of 2019. A similar system is being developed in Finland.

Some additional progress on measurement during the past 12 months includes the following announcements:

- In 2018, The Statistical Office of the Republic of Slovenia released data on food waste using a new methodology. The results show that 132,000 tons of food waste were generated at the processing, distribution and market, and consumption stages of the food supply chain in the country in 2017, equivalent to 64 kg of food per person. Of the 132,000 tons, approximately 38 percent was the edible parts of food (The Statistical Office of the Republic of Slovenia 2018).
- In late 2018, New Zealand published estimates of household food waste. Between February and July 2018, 600 bin audits of domestic waste were collected around New Zealand. The results of this audit found that, on average, each New Zealand household throws away 3.15 kg of food waste per week, of which around 50 percent was food that could have been eaten. This equates to more than 150,000 tons of food disposed to landfill each year (WasteMINZ 2018).
- In 2019, the Israeli food rescue organization Leket released an estimate of the amount of food lost and wasted in the country. The study estimated that over 2 million tons of food was wasted in the country per year, which is equivalent to 35 percent of overall domestic food production (Leket 2019).
- In March 2019, Australia released its first nationwide base-year assessment of food loss and waste. The assessment found that an estimated 7.3 million tons of food were lost or wasted across the food supply chain in 2016–17 (including both food and the associated inedible parts). Both ends of the food supply chain, primary production and household consumption, were found to be responsible for the greatest proportion of waste, with production accounting for 31 percent of the total, and consumption for 34 percent (Arcadis 2019).
- In 2019, the Saudi Grains Organization and the Saudi Ministry of Environment, Water, and Agriculture conducted an initial base-year assessment of food loss and waste in the

country. The assessment found food loss and waste levels of approximately 33 percent throughout the food supply chain. Approximately 21 percent of this total food loss and waste occurs during the production stage, and 57 percent during the consumption stage (SAGO forthcoming).

- In 2019, a comprehensive estimate of food loss and waste in Canada was published, covering each stage of the food supply chain. The study is the first in the country to measure the weight of food lost and wasted using a standardized system across the food supply chain. The study calculated annual food loss and waste as 35.5 million tons, representing nearly 60 percent of commodities entering the Canadian food system (Gooch et al. 2019).
- In 2019, Italy published a base-year estimate of household food waste in the country. The results, based on food diaries, questionnaires, and waste sorting, found that 1.6 million tons of food intended for human consumption are wasted in Italian homes each year, equivalent to around 28 kg of edible food per person per year (Spreco Zero 2019).
- In 2019, the Spanish Household Food Waste Quantification Panel of the Ministry of Agriculture, Fisheries and Food published figures for household food waste in Spain. The results found that 1.3 million tons of food waste were generated at the household level in the country in 2018. This represents an increase of almost 9 percent compared with 2017 levels (Menos Desperdicio 2019).
- A new report from WRAP published in 2019 estimates for the first time the extent of losses that occur during primary production in the country. The study, based on an extensive literature review and studies previously conducted by WRAP, found that approximately 1.6 million tons of food waste, or around 3 percent of annual production, are generated during primary production in the United Kingdom (WRAP 2019a). In 2018, WRAP estimated the scale of milk wastes across the entire food chain, from dairy to home, and found that approximately 330,000 tons of milk, around 7 percent of total UK milk production and worth more than £150 million, are lost each year between processing and the home (WRAP 2018b).
- In 2019, a base-year estimate for food loss and waste for Mexico was published. In Mexico, at least 20 million tons of food per year are lost or wasted from the farm gate to the retail stage, representing more than 35 percent of total food produced in the country. An additional 11 million tons of waste per year are generated by households and small businesses (The World Bank 2019a).

- The Malabo Declaration commits members of the African Union to measuring and taking action on food loss. In 2019, the AU established a continental baseline, which will be used to monitor and report on progress against the target of reducing postharvest losses by 50 percent. Countries will report against this target in the next biennial review of the declaration which is due to be released in January 2020. To support ongoing measurement efforts across the country the African Union Commission’s Department of Rural Economy and Agriculture has been conducting workshops to train the trainers on updated indicators for the biennial report (African Union 2019).

## Companies

Companies continue to lead on measurement of food loss and waste. Members of The Consumer Goods Forum are conducting measurement as part of the Food Waste Resolution (see CGF 2018 for an overview of progress). Members of the Global Agri-business Alliance are starting to measure food loss and waste as part of the Food and Agricultural Loss Resolution, which was announced in September 2017. Companies participating in voluntary agreements, such as Courtauld 2025, the International Food Waste Coalition, the UK Food Waste Roadmap, and U.S. Food Loss and Waste 2030 Champions, are also measuring their food loss and waste to track reductions over time.

Developments over the past year mean that more companies are starting to publish their food loss and waste inventories. In September 2018, for instance, Tesco announced that 27 of its largest suppliers, which are responsible for over half of the retailer’s own-label fresh food sales in the United Kingdom, have now published data on their food loss and waste. Tesco’s wholesale business has also published its data for the first time (Tesco 2019a). However, in most cases, companies are not yet publicly reporting their food loss and waste data on an individual basis, making progress difficult to independently track and meaning that opportunities to share learning and good practices are lost.

Measurement-related developments from the private sector over the past 12 months include (but are not limited to) the following examples:

- A number of companies have reported progress in reducing food loss and waste within their own operations. For example, in April 2019 Google announced that it had prevented more than 2,700 tons of food waste since 2014. This reduction was achieved by implementing LeanPath technology across 189 cafes and using the information to

alter menus and purchasing, repurposing trims of food that would otherwise be wasted into other products, and donating any surplus food to those in need (Seltzer 2019). Kellogg Company announced a reduction of 12 percent in organic waste (food waste plus animal feed and biomaterial/processing) across its global manufacturing plants since 2016, and have reduced total waste by almost 7 percent overall compared with a 2015 baseline (Kellogg Company 2019). Morrisons, the UK’s fourth largest food retailer, reported a 13 percent reduction in its food waste compared with a 2016 baseline (Morrisons 2019), while the Co-Op, the UK’s sixth largest retailer, reduced food waste by 29 percent relative to a 2015 baseline (Co-Op 2019).<sup>9</sup>

- Between 2017–18 and 2018–19, Tesco UK achieved a 63 percent increase in the amount of surplus food redistributed to charities, community groups, colleagues, and animal feed. This resulted in a 51 percent decrease in the amount of food safe for human consumption going to waste (energy recovery) and a 17 percent reduction in total food waste in tonnage (Tesco 2019b). Between 2016–17 and 2018–19, Tesco Central Europe reduced its total food waste by 47 percent (Tesco 2019c) through reducing surplus and increasing the amount of surplus food redistributed to charity partners (Figure 5).
- In 2018, Olam, one of the world’s largest agri-businesses, in partnership with Wageningen University and Research and the Sustainable Food Lab, began to measure how much rice is lost in its commercial rice farm and integrated mill supply chains in Nigeria as part of the Rockefeller YieldWise Food Loss Initiative. Following field observations, farmer surveys, and direct value chain measurements, postharvest losses were found to be 35 percent, equivalent to a loss of \$520 per hectare for the farmer and 97 million servings of rice per year (Olam International 2018).
- Nestlé publicly reported losses along its entire value chain—including upstream losses of the raw materials it purchases and the losses in manufacturing, distribution, and at the consumption stage—for the first time in 2018, estimating losses at 12 percent (Nestlé 2019). Nestlé also published food loss data from its dairy operations in more than 30 countries. The data show that between 2017 and 2018, Nestlé reduced milk losses during transportation from the farms to factory by nearly 40 percent (Food Loss and Waste Protocol 2019).
- In June 2019, Sodexo, which serves more than 100 million meals a day and is one of the world’s largest food

service providers, announced that it will be stepping up its food waste reduction activities with a data-driven waste management program called “WasteWatch powered by LeanPath,” to be deployed across 3,000 sites worldwide within the next 12 months. These data will allow Sodexo to identify what is being wasted in kitchens and why, allowing them to implement more targeted interventions that will help avoid food waste. The company also announced that it will make its global food waste data public (Sodexo 2019).

- Kroger, the second largest food retailer in the United States (Forbes 2018), published its base-year estimate for food loss and waste in its 2018 sustainability report, estimating that in 2017, 27 percent of retail store food waste was diverted from landfill. In 2018, Kroger improved food waste diversion from landfill to 40 percent, a 13 percent increase. Kroger stores also reduced the total amount of food waste generated by 9 percent, year over year. This improvement is largely due to updated, clear communications in back rooms about the company’s Zero Hunger | Zero Waste Food Rescue Program and food waste recycling programs, leading to improved store engagement and execution (Kroger 2019).

### 3. ACT

Setting targets and measuring food loss and waste are important. But what ultimately matters is action. Therefore, governments and companies need to follow through on implementation. Flanagan et al. (2019) provide recommendations on a number of actions that actors in the food supply chain, from farmers to consumers, can take to reduce food loss and waste.

Efforts to address food loss and waste are not new, and activity in many places has been ongoing for some time. Since the

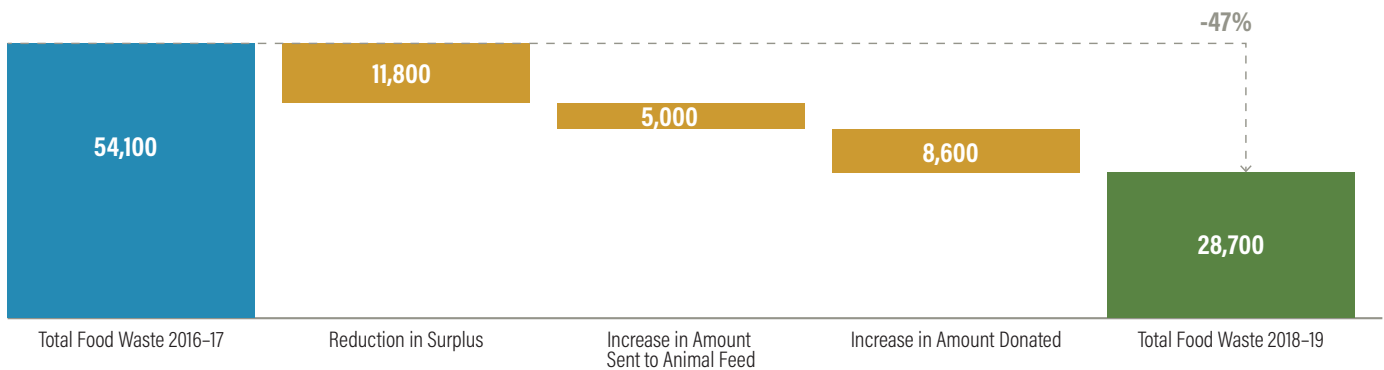
launch of the SDGs in 2015, we have observed a number of emerging trends in actions per stage of the food supply chain (Figure 6). The following are examples of these trends over the past 12 months, listed according to the stage in the supply chain where food loss and waste otherwise would have occurred.<sup>10</sup> They are not exhaustive.

More examples can be found at the ReFED innovator database, the REFRESH Community of Experts, FurtherwithFood.org, and The Community of Practice on Food Loss Reduction.<sup>11</sup>

### Production

- **Sale of imperfect produce continues to grow.** Retailers, particularly larger retailers that typically stock higher-grade produce, are increasingly selling produce as “wonky” or “imperfect” food. Previously, this produce would have failed to meet retailer cosmetic standards and would have been discarded by farmers. Over the past year, retailer Lidl launched an imperfect produce range in the United Kingdom (Retail Gazette 2019), and the Dutch food retail chain JUMBO placed a dedicated shelf in stores that features several products that use imperfect produce (REFRESH Community of Experts 2019b). Over the course of 2018, more than 75 tons of imperfect fruits and vegetables were sold in Denmark (Barrett 2018).
- **ICT platforms are being used to connect farmers with markets to respond more quickly to changes in supply and demand.** Twiga Foods, based in Kenya, provides a mobile platform that links smallholder farmers to informal food vendors in urban areas. The company operates a central pack house with cold storage facilities and a fleet of vans that allow for quick collection of produce, resulting

FIGURE 5. How Tesco Reduced Food Waste in Its Central European Operations by 47 Percent between 2016-17 and 2018-19



Note: Figures are rounded to the nearest 100.  
Source: WRI analysis, based on Tesco 2019c and Tesco 2019d.

in postharvest losses of only 5 percent, compared to around 30 percent in informal markets. In 2018, the International Finance Corporation, TLcom, and the Global Agriculture and Food Security Program announced a \$10 million investment in Twiga Foods (Twiga Foods 2018).

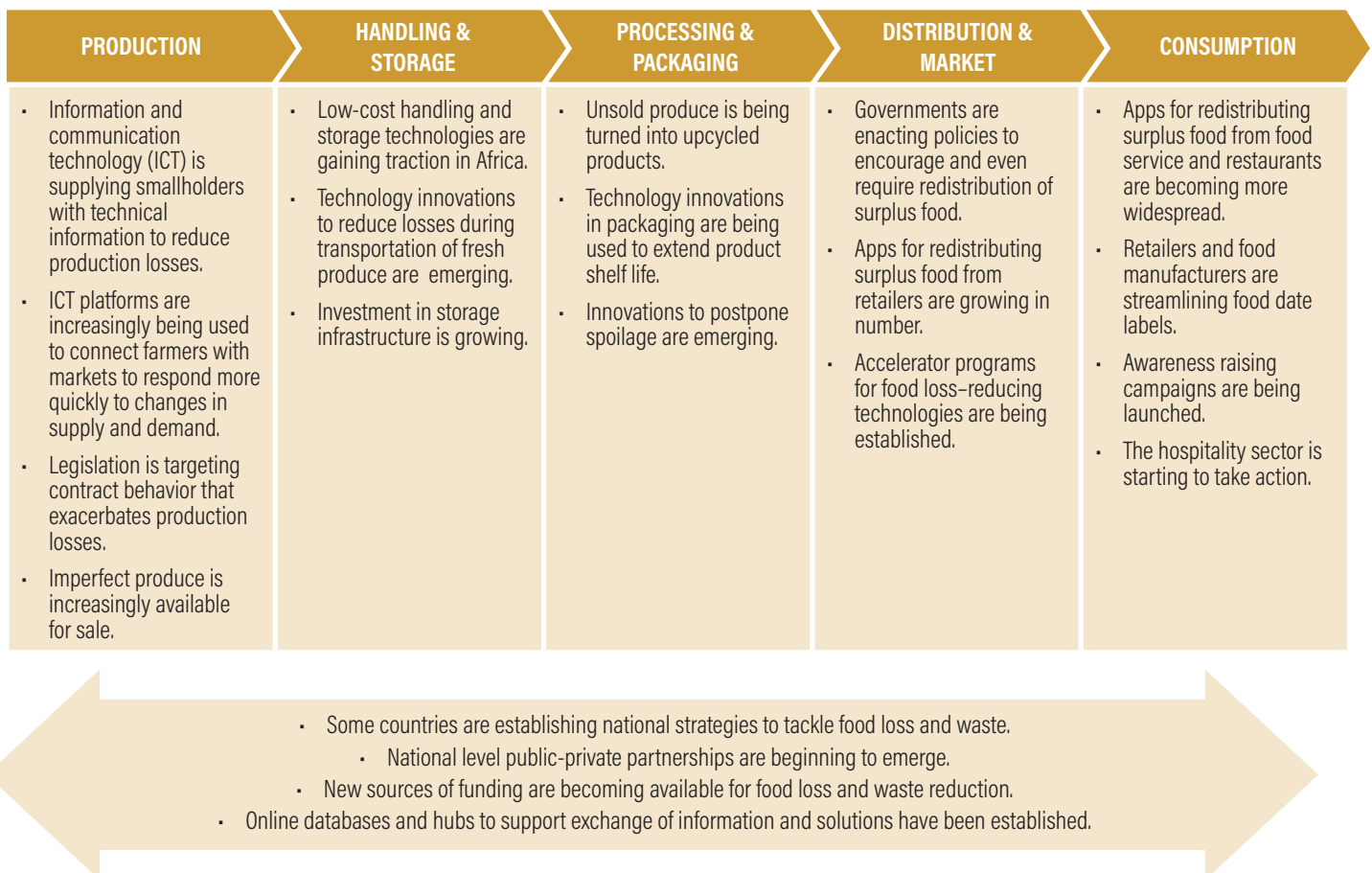
## Handling and Storage

- **Investment in storage infrastructure continues to grow in Africa.** Throughout 2019, the construction of warehouses began in Ghana as part of the One District, One Warehouse project which aims to build 50 units of 1,000-metric-ton warehouses in selected districts that will provide storage for farmers and their produce (GhanaWeb 2019). In Kenya, a new smallholder aggregation and processing center for mangoes has been established. The facility is equipped with low-cost storage technologies that enable farmers to aggregate their produce and negotiate better prices, as well as juice processing and drying facilities that allow farmers to transform fresh mangoes into value-added products such as pulp, juices, and dried chips, which fetch a better price

at market (Ambuko 2019). In 2019, Rabo Foundation launched a pilot project in Kenya that aims to provide proof of concept for pay-as-you-use cold storage facilities for smallholder farmers.

- **Innovation and design competitions are identifying promising postharvest loss reducing technologies.** In October 2018, Rabobank launched the inaugural Food Loss Challenge Asia, an open innovation challenge that was launched to highlight agri-tech solutions to food loss that occurs from farm to market. The winner of the challenge, India’s Ecozen Solutions, reduces food losses by providing solar-based cold rooms at the farm level (Food Loss Challenge 2019). In 2019, the American Society of Agricultural and Biological Engineers named a solar drying device, DEHYTRAY, the winner of its 2019 AE50 Product Design Award. The device dries products faster than sun-drying, requires minimal setup and maintenance, and protects crops from damage from pests and rain (Purdue University 2018).

FIGURE 6. Emerging Developments to Reduce Food Loss and Waste across the Supply Chain



Source: Flanagan et al. 2019.

## Processing and Packaging

- **Unsold produce is being turned into upcycled products.** In 2019, Kellogg UK and Ireland created a new range of beers made from grains discarded during the production of Corn Flakes®, Rice Krispies®, and Coco Pops® (Hill 2019). ReFED estimates that, as of 2019, there are now around 70 companies in the United States alone that use food that would otherwise have been wasted and turn it into value-added products (Peters 2019).
- **Technology innovations in packaging are emerging to reduce waste.** For example, Royal DSM has created Pack-Age, a product for the cheese industry that allows cheese to mature without developing a rind that has to be thrown away, meaning the whole cheese can be used (DSM 2018). In 2019 Imperial College London announced that it had developed a prototype for paper-based electrical gas sensors that can detect gases like ammonia that are associated with food spoilage in meat and fish products. The sensors cost \$0.02 each to produce and are made by printing carbon electrodes onto cellulose paper. It is hoped that these sensors could replace use-by dates found on food packaging and reduce instances of retailers and households disposing of food that has not spoiled (Brogan 2019).
- **Financing for processing facilities is on the rise.** In 2019, the government of Ghana announced that it would be constructing 56 small-scale agro-processing facilities, financed by the African Development Bank, under the One District, One Factory program (Arku 2019). Around 60 percent of the factories being built under this program will be agro- and meat-processing factories (Arku 2019).

## Distribution and Market

- **Redistribution of food surplus continues to grow.** In the United Kingdom, redistribution of surplus food doubled between 2015 and 2018, with almost 56,000 tons of food being prevented from becoming waste, saving the equivalent of 133 million meals a year (WRAP 2019b). In Mexico, Kellogg partnered with the Mexico Food Bank Network to rescue fruits and vegetables from agricultural lands to provide people with more than 35 million servings of fresh fruits and vegetables that were at risk of being lost but able to be consumed (Kellogg Company 2019).
- **Apps are helping food retailers and food service providers to redistribute surplus.** In 2018, Sodexo Australia purchased more than 16 tons of quality surplus

food, equivalent to 42,232 meals, thanks to its partnership with the online surplus food wholesale marketplace Yume (Yume Food n.d.). In Singapore, the app Treatsure allows members of the public to purchase food from buffet restaurants up to an hour before closing time. In late 2018, a number of hotels started signing up to the app, with six hotel chains now offering surplus food at a discount to help prevent food waste (Ah Yoke 2019). In 2019, Bancos de Alimentos de México transitioned its Al Rescate program, which redistributes food waste from the hospitality and food service sector, to an online platform that has become the first food rescue app in Mexico (Global Food Banking Network 2019).

- **Retailers are changing date labels to help prevent waste.** In 2019, Japanese food companies Nippon Fisheries and House Foods announced changes to date labels for canned products to make it clearer when the food is unsafe to eat and thereby reduce consumer confusion (Koe 2019). In 2019, the U.S. Food and Drug Administration sent out a letter to the food industry in the United States stating that the agency strongly supports voluntary industry efforts to use the “best if used by” phrase on food packaging (Sharpless 2019). In Germany, retailer ALDI SÜD changed labels on milk products that encourage customers to “Smell Me! Try Me!” before disposing of milk. (REFRESH Community of Experts 2019c).

## Consumption

- **Awareness-raising campaigns continue to be launched.** In 2019, World Wildlife Fund launched the Save One Third campaign to educate consumers on the impacts on nature of wasting food. The campaign has already reached millions of people in China, Vietnam, South Korea, Malaysia, Hong Kong, and Thailand (Save One Third 2018). In the UK, advocacy organization Feedback launched Milking It, a campaign calling on retailers to extend use-by dates on milk to address the millions of pints a year that are wasted because they exceed their date label before being consumed, despite the fact they may still be safe to drink (Feedback 2019).
- **A number of countries also have launched awareness-raising campaigns.** The Netherlands announced a campaign in March 2019 that aims to motivate 30 percent of the Dutch population to reduce food waste by providing helpful tips, and a campaign was launched in 2019 in Sweden to encourage good food management practices (Voeddingscentrum 2019). In Brazil, the Ministry of



Environment promoted National Loss and Waste Awareness Week, which aims to raise awareness of food loss and waste. In China, reducing food waste was one of the main themes of the 2019 Green Sustainable Consumption Promotion Week (Weixin 2019). In 2019, the Malaysian government launched a campaign, Ramadan without Waste, to help reduce food waste during Ramadan, a period when food waste can increase by 15 to 20 percent across the country (Bernama 2019).

- **Hospitality and the food service sector are taking steps to reduce food waste.** WRAP and IGD launched the Hospitality and Food Service Action Plan in April 2019. This industry plan outlines key steps and milestones the sector must meet to help deliver the United Kingdom's Food Waste Reduction Roadmap (Flanagan et al. 2018), and ultimately help the UK achieve SDG 12.3 (WRAP and IGD 2019). This was complemented in May 2019 by the launch of the WRAP Guardians of Grub campaign, aimed at empowering professionals from across the hospitality and food service sector to reduce the amount of food thrown away in their establishments (WRAP 2019c). In Austria, 2019 was declared the year against canteen food waste, with the Ministry of Sustainability and Tourism launching a national campaign to reduce food waste in canteen kitchens, with preliminary results showing an average reduction of 14 percent. In the United Kingdom, Tesco launched a new training program with celebrity chef Jamie Oliver that will teach more than 1,000 community cooks how to use surplus food donations to help stop good food from going to waste, such as how to use unusual or unexpected ingredients and large quantities of seasonal produce (Tesco 2019e). In the Netherlands, Rabobank launched the Food Waste Challenge for the hospitality industry in September 2019. The initiative aims to recruit more than 300 restaurants to sign up for this challenge and agree to measure and take action to reduce their food waste (Rabobank 2019).

## Crosscutting

- **More companies are working with their suppliers to tackle food loss and waste across the supply chain.** In September 2019, the 10x20x30 initiative launched. Ten major international food retailers and food providers, including AEON, Ahold Delhaize, IKEA Food, Kroger, Metro Group, Pick n Pay, The Savola Group, Sodexo, Tesco, and Walmart committed to each getting 20 of their respective priority suppliers to commit to the Target-Measure-Act approach and reduce food loss and waste within their own operations by 2030, in line with SDG 12.3.

- **The world's first food loss and waste bond is launched.** In 2019, the World Bank launched the world's first bond dedicated to supporting countries in efforts to reduce food loss and waste. The bond was first launched in March 2019 with Swedish insurance and pensions group Folksam investing \$300 million in the three-year bond (World Bank 2019b). In September 2019, the bank announced that the amount in the bond had reached \$1 billion.
- **Countries are establishing national strategies and plans to target food loss and waste.** Between late 2018 and 2019, Croatia, Germany, Portugal, and the United Kingdom all announced national strategies to tackle food loss and waste.<sup>12</sup> Other countries are also developing national strategies. For example, in December 2018, the FAO launched a project to help Albania, Armenia, the Republic of North Macedonia, and the Republic of Moldova develop strategies for food loss and waste reduction. The project will also develop a regional awareness-raising campaign, establish and coordinate a partnership network, and conduct training programs in postharvest handling practices and food and waste reduction (FAO 2018). In April 2019, the governments of the Netherlands and Vietnam met to evaluate opportunities for collaboration, where representatives from both countries agreed to develop a postharvest loss road map for Vietnam (Vietnam Plus 2019). Uganda also has begun developing a national strategy to tackle postharvest losses in grains. The strategy will aim to increase general awareness, enhance postharvest management skills, and increase the availability of postharvest loss reducing technologies (FAO 2019). Countries that have launched national strategies in recent years are also moving on to implementation. For example, Ethiopia has started implementing its national postharvest management strategy for grains. The strategy was initially launched in early 2018.

- **Governments are enacting legislation to reduce food loss and waste.** In April 2019, Argentina's National Plan for the Reduction of Food Losses and Waste became law. The plan includes a provision through which businesses that redistribute surplus food are protected from prosecution if someone who eats the food becomes ill, provided they respect relevant laws regarding food safety and expiration dates. The new law also encourages businesses to donate food products that are near to their expiration date (Michail 2019). In May 2019, Japan enacted legislation to reduce

food waste, following a national movement to reduce food waste in the country that was spurred by a viral photograph of discarded sushi rolls (The Mainichi 2019). Under the new legislation the central government will formulate a basic policy to cut back food waste, as well as requiring that municipalities devise their own action plans. In July 2019, the Food Safety and Standards Authority of India passed a series of regulations to encourage individuals and organizations to donate food. The new regulations, which come into force in 2020, would protect those who donate food in good faith (Packaging South Asia 2019). In 2019, the Council of the European Union adopted the Directive on Unfair Trading Practices (highlighted in the *2018 Progress Report* as a draft policy), which prohibits unfair trading practices that can lead to food waste, such as late payments for perishable products and last-minute order cancellations (European Parliament 2019).

- **More public-private partnerships to tackle food loss and waste emerge.** Public-private partnerships are an effective means through which multiple actors from across the supply chain can act collaboratively to reduce food loss and waste. A number of public-private partnerships targeting food loss and waste have emerged over the past year. In 2018, three EU REFRESH pilot countries—Germany, Hungary, and Spain (Catalunya region)—launched voluntary partnerships that aim to reduce food loss and waste (REFRESH and WRAP Global 2019). In Ecuador, a pilot public-private partnership to reduce food loss and waste has been launched in the capital city, Quito. Actors involved in this pilot include Hilton Hotels, a supermarket, two of the country’s largest catering companies, and representatives from universities. One of the first tasks of this partnership will be to conduct an initial base-year assessment of the amount of food waste generated across a number of food retailers and food service providers in Quito. In March 2019, the China Chain Store and Franchise Association (CCFA)<sup>13</sup> proposed the formation of the Voluntary Action Plan of CCFA Chain Catering Enterprises on Food Waste Reduction Initiative (REFRESH 2019). In September 2019, Mexico announced a public-private partnership that involves the Mexican government, WRAP, Walmart Mexico, the World Business Council for Sustainable Development, and other companies along the food supply chain (Circular Online 2019). The first such partnership in Africa is being developed by the South African Government, led by the Department of Trade and Industry in partnership with the Consumer Goods Council of South Africa, co-funded by the European Union through the SA-EU

Dialogue Facility, with the aim of helping put the country on the trajectory to deliver SDG 12.3. This initiative has secured significant support from food retailers and manufacturers and plans to launch early next year (CGSA 2019).

- **New sources of funding are becoming available.** In October 2018, the UK government announced £15 million of additional funding to reduce food waste, with particular focus on increasing redistribution (Government of the United Kingdom 2019). In 2018, the Dutch Ministry of Agriculture, Nature and Food Quality announced that it had reserved €7 million for projects combatting food waste between 2018 and 2021. In 2019, the Foundation for Food and Agriculture Research, a grant-making body established by the U.S. government, funded the Consortium for Innovation in Postharvest Loss and Food Waste Reduction, which aims to advance a common research agenda for gaining efficiencies within the global food system (FFAR 2019). For example, the Consortium will work to provide farmers with cost-effective strategies and technologies that link their crop supply to the market demand. Also in 2019, The Kroger Co. Zero Hunger | Zero Waste Foundation awarded a total of \$1 million to seven innovators focused on reducing food waste through its Zero Hunger | Zero Waste Innovation Fund (Zero Hunger Zero Waste Foundation 2019).
- **Regional initiatives are starting to emerge.** In October 2018, The Inter-American Development Bank alongside partners that include Coca-Cola, Nestlé and The Consumer Goods Forum, the FAO, and the World Resources Institute (WRI), launched #SinDesperdicio, a program that aims to reduce food loss and waste in Latin America and the Caribbean. The program aims to promote four areas of activity: innovative projects, national and local public policies, knowledge generation, and responsible consumer habits (Sin Desperdicio 2019).
- **Knowledge exchange on the solutions to food loss and waste is growing.** In March 2019, Denmark established a new think tank with the aim of reducing food loss and waste across the supply chain in Denmark and beyond, especially those countries which have not yet achieved progress in this area. Called the Think Tank on the Prevention of Food Loss and Waste, this body seeks to improve data collection, collect and disseminate specialist knowledge, and collaborate with national and international stakeholders and provide knowledge to international platforms such as the United Nations and the

EU Platform on Food Losses and Food Waste (Gardiner 2019).<sup>14</sup> In 2018, the IVL Swedish Environmental Research Institute established a platform, Reducing Food Waste, the compiles news and information with the aim of encouraging stakeholders in China to reduce food waste. In June 2019, a free digital book was published by The Postharvest Education Foundation. The book details 100 tools for reducing postharvest losses, all of which cost less than \$100 (Teutsch and Kitinoja 2019).

## GOING FORWARD: A ROAD MAP AND ASSESSMENT

It has been four years since the launch of the SDGs. So how is progress going in relation to SDG 12.3? Is the world on track, or is the world behind?

### A Road Map

To reduce the amount of subjectivity involved in answering these questions, we developed a road map that describes a possible pathway for achieving SDG 12.3 (Table 1). Based on expert input, the road map provides milestones for a series of metrics per each three-year period from 2016 to 2030—from the first full year of the SDGs to their stated completion date. There are milestones for setting targets, for measuring food loss and waste, and for taking action, aligning with our Champions 12.3 Target-Measure-Act approach. The milestones are split between two sectors: governments (which includes the citizens they represent) and companies.

The pacing of these milestones reflects the fact that change does not occur immediately but rolls out over time, often in a nonlinear fashion. We start by generically assuming that 10 percent of a metric is met at the end of the first three-year period (2016–2018), 20 percent by the end of the second period (2019–2021), 40 percent at the end of the third period (2022–2024), 60 percent by the end of the fourth period (2025–2027), and 100 percent at the end of the fifth period (2028–2030). We then modify these percentages to reflect the fact that some activities need to be completed early in order for there to be sufficient time for full implementation to occur. For example, governments and companies need to set targets by 2021; otherwise, they are unlikely to have enough time to measure and take actions that enable achievement of SDG 12.3 by 2030.




Finally, the road map is a balancing act. It needs to meet the scale of the challenge yet conceivably be attainable, all within

the remaining years. Of course, this road map presents just one potential pathway; other combinations of milestones are possible. Nonetheless, this road map is intended to provide a basis for monitoring progress and for prompting discussion about what next steps are needed.

### 2018 and 2019 Assessment

Table 1 shows our assessment of where the world is in relation to achieving SDG 12.3. The year 2018 was a milestone in the road map, but the analysis in *2018 Progress Report* was published just three-quarters of the way through the year, so a full assessment could not be made. Table 1 therefore gives a final assessment of the 2015–2018 milestones. The milestones for this period are marked green if they were achieved and red if they were not achieved.

Table 1 also shows our first assessment of progress toward the 2019–2021 road map milestones. We use the following color-coded indicators:


-  **Green.** There is sufficient progress to suggest that the sector is on track to meet or exceed the milestone within the time period.
-  **Yellow.** There is some progress toward meeting the milestone, but it is below the pace needed to meet the milestone within the time period.
-  **Red.** There is little progress toward meeting the milestone, or previous progress is backsliding.


These indicators should be taken solely as an assessment of progress to date. A green indicator does not necessarily mean that the milestone has been already met (except in a milestone year), but, rather, that the progress to date is on track for the milestone to be met within its three-year time period. We will indicate in future progress reports when a milestone has been achieved.


Moreover, our assessment is based on publicly available information. To assess progress of companies, the most recent sustainability reports for each of the world's 50 largest food companies (by revenue) were reviewed to assess progress against the Target-Measure-Act framework. Assessment of progress of governments was limited to Internet searches and direct outreach to representatives of countries that the authors are aware of that are pursuing food loss and waste programs or considering setting targets in line with SDG 12.3. Considering these limitations, there may be developments toward meeting SDG 12.3 of which we are unaware.

TABLE 1. Road Map to Achieving SDG Target 12.3 (2019 Assessment)

		2016–2018	2019–2021
TARGET	GOVERNMENTS	 Countries with <b>40%</b> of the global population have set specific FLW <sup>a</sup> reduction targets aligned with Target 12.3.	 Countries with <b>&gt;95%</b> of the global population have set specific FLW reduction targets aligned with Target 12.3.
	COMPANIES	 <b>60%</b> of the world's 50 largest food companies <sup>b</sup> by revenue (spanning manufacturing, production, processing, retail, and food service sectors) have set specific FLW reduction targets aligned with Target 12.3.  Among those setting targets, <b>half</b> are working with their suppliers to set their own targets.	 <b>&gt;95%</b> of the world's 50 largest food companies have set specific FLW reduction targets aligned with Target 12.3.  Among those setting targets, <b>all</b> are working with their suppliers to set their own targets.
MEASURE	GOVERNMENTS	 Countries with <b>20%</b> of the global population have quantified base-year FLW and have started reporting on FLW.	 Countries with <b>40%</b> of the global population have quantified base-year FLW and have started reporting on FLW.
	COMPANIES	 <b>20%</b> of the world's 50 largest food companies have quantified base-year FLW and have started measuring and reporting on FLW.  Among those measuring and reporting, <b>half</b> are engaged with their suppliers to quantify the latter's FLW.	 <b>40%</b> of the world's 50 largest food companies have quantified base-year FLW and have started measuring and reporting on FLW.  Among those measuring and reporting, <b>half</b> are engaged with their suppliers to quantify the latter's FLW.
ACT	GOVERNMENTS	 Countries with <b>20%</b> of the global population are actively working at scale to reduce FLW. <sup>c</sup>	 Countries with <b>40%</b> of the global population are actively working at scale to reduce FLW.  <b>First</b> country halves its rate of FLW.
	COMPANIES	 <b>10%</b> of the world's 50 largest food companies have active FLW reduction programs.  Among those taking action, <b>half</b> are engaged with their suppliers to reduce the latter's FLW.  The <b>first</b> global company halves FLW in its own operations.	 <b>20%</b> of world's 50 largest food companies have active FLW reduction programs.  Among those taking action, <b>half</b> are engaged with their suppliers to reduce the latter's FLW.  The <b>first</b> global company halves FLW in its own operations and its supply chain.
OVERALL PROGRESS <sup>d</sup>	5% reduction in FLW achieved globally		10% reduction in FLW achieved globally

 **Green.** There is sufficient progress to suggest that the sector is on track to meet or exceed the milestone within the time period.

 **Yellow.** There is some progress toward meeting the milestone, but it is below the pace needed to meet the milestone within the time period.

 **Red.** There is little progress toward meeting the milestone, or previous progress is backsliding.

2022–2024

2025–2027

2028–2030

Countries with **60%** of the global population have quantified base-year FLW and have started reporting on FLW.

Countries with **>95%** of the global population have quantified base-year FLW and have started reporting on FLW.

**60%** of the world's 50 largest food companies have quantified base-year FLW and have started measuring and reporting on FLW.

**>95%** of the world's 50 largest food companies have quantified base-year FLW and have started measuring and reporting on FLW.

Among those measuring and reporting, **all** are working with their suppliers to reduce the latter's FLW.

Among those measuring and reporting, **all** are working with their suppliers to reduce the latter's FLW.

Countries with **60%** of the global population are actively working at scale to reduce FLW.

Countries with **>95%** of the global population are actively working at scale to reduce FLW.

**10** countries halve their rate of FLW.

**50** countries halve their rate of FLW.

**40%** of the world's 50 largest food companies have active FLW reduction programs.

**60%** of the world's 50 largest food companies have active FLW reduction programs.

**>95%** of the world's 50 largest food companies have active FLW reduction programs.

Among those taking action, **half** are engaged with their suppliers to reduce the latter's FLW.

Among those taking action, **half** are engaged with their suppliers to reduce the latter's FLW.

Among those taking action, **half** are engaged with their suppliers to reduce the latter's FLW.

**20% reduction**  
in FLW achieved globally

**30% reduction**  
in FLW achieved globally

**50% reduction**  
in FLW achieved globally

*Notes:*

<sup>a</sup> FLW = food loss and waste.

<sup>b</sup> See Food Loss + Waste Protocol. 2017. Home page. <https://flwprotocol.org/>.

<sup>c</sup> Evidence of working at scale could include the presence of nationwide voluntary agreements between government agencies and businesses, passage of public policies aimed at reducing FLW, increased investment in FLW reduction, consumer campaigns, and so on.

<sup>d</sup> Currently, there is no globally agreed-upon base-year FLW quantification. Thus, it is not possible to measure overall progress against SDG Target 12.3 until the base-year FLW levels have been quantified.

## TARGET

### Governments

By the end of calendar year 2018, countries and regional blocs representing 50 percent of the global population had set specific targets in line with SDG 12.3. Those countries and blocs include the African Union, Australia, China, European Union, Japan, Malaysia, the United Arab Emirates, the United States, and Vietnam. This means that the 2015–2018 goal of “Countries with 40 percent of the global population have set a specific food loss and waste reduction target” was achieved.

Over the course of 2019 so far, no additional countries have announced targets in line with SDG 12.3, with the percentage of the world’s population covered by an explicit target aligned with SDG 12.3 remaining at 50 percent. The pace at which countries are setting food loss and waste reduction targets has slowed. However, considering the increasing number of cities with large setting targets and that 50 percent are over half-way to the 2019–2021 milestone goal of “Countries with >95 percent of the global population have set specific food loss and waste reduction targets aligned with Target 12.3,” we give this milestone a **yellow** assessment.

To secure this milestone over the next three years, many more governments need to set food loss and waste reduction targets. For example, if the economies that are members of the Asia-Pacific Economic Cooperation coalition that have not already set a target were to set a target in line with SDG 12.3, an additional 13 percent of the world’s population would be covered.

### Companies

By the end of calendar year 2018, two-thirds of the world’s 50 largest food companies (by revenue) had a food loss and waste reduction target. These companies include AEON, Kellogg’s, Nestlé, Walmart, and Woolworth. Therefore, the 2018 milestone “Sixty percent of the world’s 50 largest food companies by revenue have set specific FLW reduction targets aligned with Target 12.3” was exceeded.

Since the beginning of 2019, no additional companies within the top 50 largest in the world have set a target in line with SDG 12.3. However, since the 2019–2021 milestone of “More than 95 percent of the world’s 50 largest food companies have set specific FLW reduction targets aligned with Target 12.3” is two-thirds complete, with 66 percent of the world’s largest companies having a target in place, we give this milestone a **yellow** assessment.

Although some companies are engaging with suppliers, not all companies (among the world’s 50 largest) that have set targets themselves are actively engaging with their suppliers. By the end of calendar year 2018, only a handful of these companies were working with their suppliers; thus the milestone that half of companies setting targets working with their suppliers was not achieved.

Over the course of 2019, more companies have begun working with their suppliers, with the authors finding that just under one-fifth of the world’s largest companies that have set targets are doing so. Following the launch of the 10x20x30 initiative in September 2019, the number of the world’s largest companies working with their suppliers should increase. However, if companies do not increase engagement with their suppliers, this milestone is at risk of not being achieved. Considering this risk and that the milestone is not even halfway to being achieved, we give this milestone a **red** assessment.

## MEASURE

### Governments

As summarized in the *2018 Progress Report*, the majority of countries with explicit food loss and waste reduction targets do not currently measure food loss or waste within their borders. As of the end of 2018, just a handful of countries measured their food loss and/or waste, including Denmark, Israel, Japan, Finland, Mexico, the Netherlands, New Zealand, Norway, Slovenia, Spain, the United Kingdom, and the United States. These countries constitute just 10 percent of the world’s population, meaning that the 2018 milestone goal that “Countries with 20 percent of the global population have quantified base-year FLW and have started reporting on FLW” was not achieved.

Three-quarters of the way through 2019, a number of additional countries have started measuring their food loss and/or waste, including Australia, Canada, Italy, and Saudi Arabia. This means that countries measuring food loss and waste currently represent 12 percent of the global population. This percentage is not halfway toward the 2019–2021 milestone of “Countries with 40 percent of the global population have quantified base-year FLW and have started reporting on FLW,” so we give this milestone a **red** assessment.

The percentage of countries measuring should increase significantly following new obligations introduced by the European Union in May 2018 that require member states to monitor food waste levels at each stage of the food supply chain from 2020

onward. Members of the African Union are also required to report on postharvest losses as part of the continent's commitment to the Malabo Declaration, with member countries expected to report on postharvest losses in the 2020 *Biennial Review Report*, which tracks progress toward achieving the 2025 Malabo goal. However, measurement by the member states of the European Union and African Union will not lead to this milestone being achieved, as the additional EU countries that have not yet begun measuring only account for around 4 percent of the global population, and members of the African Union around 17 percent, which still would not result in the milestone being achieved. For this milestone to be achieved, more countries and regional blocs like the Asia-Pacific Economic Cooperation coalition will need to begin systematic quantification of their food loss and waste and report the results in order for this milestone to achieve a green rating going forward.

## Companies

The number of the world's largest food companies measuring food loss and waste continues to grow. According to our research and interviews, as of the end of 2018, 38 percent of the world's 50 largest food companies were measuring food loss and waste within their operations. This means that the 2018 milestone of 20 percent of companies measuring food loss and waste within their operations was exceeded.

Three-quarters of the way through 2019, the number of companies measuring has risen even further, with 44 percent of the largest food companies measuring food loss and waste within their operations. However, not all companies that measure their food loss and waste publicly report their inventories, with just 30 percent of the largest companies doing so. The 2019–2021 milestone of 40 percent of the world's largest companies measuring *and* reporting has therefore not been met. With Tesco asking 10 of its branded suppliers to publicly report their food waste data by the end of 2019, the number of companies reporting their food waste inventories should increase. Furthermore, the number of companies reporting their food waste data has increased by one-third from what was indicated in the 2018 *Progress Report*. Considering this momentum, we give this milestone a **yellow** assessment.

The 2018 milestone on engagement with suppliers was not achieved. Three-quarters of the way through 2019, the authors found that currently only six companies that are measuring their food loss and waste are engaging with their suppliers. Companies that have committed to the 10x20x30 initiative have committed to work with their suppliers to tackle food loss

and waste, so the number of companies working with their suppliers should increase. Therefore, we give the 2019–2021 milestone “Among those measuring and reporting, half are engaged with their suppliers to quantify the latter's FLW” a **yellow** assessment.

Due to the lack of publicly available data, definitively tracking progress toward this milestone is difficult, leaving tracking reliant on informal interviews and Internet searches. Moreover, lack of these data forgoes the opportunity for companies to showcase success and engage internal and external stakeholders. A priority for the next year should be for more companies to publicly report food loss and waste data.

## ACT

### Governments

There have been a growing number of initiatives on food loss and waste over the past few years in a number of countries and regions, most notably in the European Union, United States, and Japan. Over the past 12 months, a number of additional countries have introduced or scaled up programs addressing food loss and waste. In 2018, Australia launched the AUS \$100 million 10-year Fight Food Waste Cooperative Research Centre, a public-private partnership that involves 46 industry and 10 research partners to investigate methods to increase food donation as well as develop household and business behavior change programs. In Canada, the country's first ever national food policy committed to investing C\$26.3 million to develop innovative solutions to food waste (Government of Canada 2019), a group of 10 food retailers and manufacturers initiatives announced a common goal to cut food waste in line with SDG 12.3, and there is a “Love Food, Hate Waste” campaign operating nationally.

Although efforts have increased in the past year, as of the end of the calendar year 2018, efforts were taking place in countries that represent just 14 percent of the world's population, falling short of 20 percent of the world population needed to achieve the 2018 milestone. The 2018 milestone was therefore not achieved.

Three-quarters of the way through 2019, after taking into account the actions over the past year in Australia and Canada, countries acting at scale to reduce food loss and waste now represent 15 percent of the world's population. This percentage is well below the milestone of “Countries with 40 percent of the global population are actively working at scale to reduce FLW.” Therefore, we give this milestone a **red** assessment.

There is some indication that the number of governments acting at scale to target food loss and waste should increase over the coming years. For example, a number of governments, including Croatia, Portugal, and Germany, have launched national strategies to tackle food loss and waste within their borders in the past 12 months, and a number of low- and middle-income countries have started developing national strategies, including Moldova, Uganda, and Vietnam. There is also increasing momentum growing across Africa, demonstrated by a number of countries, including Ethiopia, Kenya, Tanzania, Zambia, and Zimbabwe, creating national strategies and allocating financial resources to implement these strategies. If these national strategies are adequately financed and implemented, and governments enact other policies such as public-private partnerships and consumer behavior change campaigns, the percentage of countries acting at scale should increase.

A new milestone target for 2019–2021 is that the “first country halves its rate of FLW.” No country has announced that it has halved food loss and waste within its borders. Some countries have reported impressive reductions, with the United Kingdom reducing food waste in the home by 23 percent and total avoidable food waste (from farm gate up to retail) by 19 percent over a period of a decade; Norway reducing food loss and waste across industry, wholesale, retail, and household by 12 percent on a kilogram-per-person basis between 2010 and 2015; and Denmark reducing avoidable household food waste by 8 percent per person, and 5 percent in total, between 2011 and 2017. However, the lack of enough countries measuring at a national level hinders the tracking of reductions of food loss and waste. As more countries conduct base-year assessment of food loss and waste (and are required to publicly report progress against targets, as is the case in the European Union), progress will be easier to track. However, considering that no country has yet to report a reduction of even half that required if SDG 12.3 is to be met, we give this milestone a **red** assessment.

To achieve SDG 12.3, more countries will need to pursue food loss and waste reduction initiatives at scale—initiatives involving activities like creating and implementing national strategies, public-private partnerships that span the food supply chain, public policies that support food loss and waste reduction from farm to plate, increased investments, farmer and consumer education campaigns, and more. One timely

strategy for driving more action is for countries to get food loss and waste included in their NDCs to the Paris Agreement on climate change. A focused period of NDC enhancement is occurring between now and the UNFCCC Climate COP at the end of 2020.

## Companies

At the end of 2018, 28 percent of the world’s largest food companies—including Aramark, Danone, Kellogg Company, Kroger, Nestlé, Sodexo, Tesco, Unilever, and Walmart—had active food loss and waste reduction programs. The 2018 milestone of “Ten percent of the world’s 50 largest food companies have active FLW reduction programs” has therefore been achieved. However, the increase in the number of companies with active food waste reduction programs has not been accompanied by a proportionate rise in companies engaging with their suppliers, with only five companies working with their suppliers as of the end of 2018. The 2018 milestone of “Among those taking action, half are working with their suppliers to reduce the latter’s FLW” therefore was not achieved.

Three-quarters of the way through 2019, 17 of the world’s largest food companies, or 34 percent, have active food waste reduction programs in place, with AEON, Metro, and Woolworth being added to the companies listed above. Other major food companies not among the 50 largest, such as Campbell Soup Company, Costa Cruises, and IKEA, also have programs in place. The 2019–2021 milestone of “Twenty percent of world’s 50 largest food companies have active FLW reduction programs” has already been exceeded. We therefore give this a **green** assessment.

Just over a third of companies with active food waste reduction programs are engaging with their suppliers to reduce the latter’s food loss and waste as of mid-2019. We therefore give the 2019–2021 milestone that “Among those taking action, half are engaged with their suppliers to reduce the latter’s FLW” a **yellow** assessment, as the goal is already more than halfway achieved. Initiatives such as the UK Food Waste Roadmap and 10x20x30 mean that, in the future, more companies will likely be engaging with their suppliers, and this percentage should increase significantly. A priority for the next year is for companies to follow through on their commitments to actively engage with their suppliers to reduce their food loss and waste.

No company within the world’s 50 largest food companies (by revenue) has announced that it has halved food loss and waste in its own operations. However, some companies have



halved food waste at specific sites, and there are a number of companies reporting impressive reductions across their whole operations. For example, IKEA announced in 2019 that, after implementing a food waste reduction program across more than 100 sites, food waste was reduced by an average of 20 percent, with some sites experiencing impressive reductions. For example, IKEA Southampton (in the United Kingdom) has reduced food waste by 75 percent to date since 2016 (Lemos 2018). Compass Group Singapore also reduced food waste by 55 percent after launching a pilot project to measure and monitor food waste (Lemos 2019). Tesco Czech Republic and Tesco Slovakia reduced food waste by 55 and 51 percent, respectively, between 2016/17 and 2018/19.<sup>15</sup> Considering the progress that several companies have made toward reducing waste in certain operations, we give this milestone a **yellow** assessment.

### Overall progress

The overall 2016–2018 milestone was a 5 percent reduction in global food loss and waste, as compared to 2015 base-year levels, and the milestone for the 2019–2021 period is a 10 percent reduction in global food loss and waste. However, we are unable to determine, for either of these milestones, by how much the world has reduced food loss and waste over the past four years because global base-year data (for example, food loss and waste in 2015) have not yet been reported, and no follow-up quantification of global food loss and waste levels has yet been conducted.

Companies are currently outpacing governments when it comes to measuring food loss and waste. In particular, the last 12 months have seen a significant (but still too slow) increase in companies measuring and publicly reporting their food loss and waste inventories.

Although perfect data are not required to start addressing food loss and waste, without adequate measurement it is impossible to determine whether actions are successful in achieving reduction of food loss and waste. As more and more countries conduct national food loss and waste inventories, and national level figures for both food loss and food waste become available via the Food Loss Index and Food Waste Index, a global picture should emerge, and a global indication of the world's progress toward reducing food loss and waste should start to become clearer beginning in 2020 or 2021.

Ultimately, without establishing base-year food loss and waste levels and conducting periodic subsequent measurement, it will be impossible to determine whether the planet is achieving SDG 12.3. Therefore, we give the overall progress milestone an unknown assessment. Developing national and global data on food loss and waste levels and making these data publicly available as soon as possible is a critical gap that needs to be filled.

## IN CLOSING

SDG 12.3 is a historic opportunity for the world to curtail food loss and waste. Reducing food loss and waste is an important strategy to help meet the SDGs by 2030, contribute to the Paris Agreement on climate change, and sustainably feed the planet by 2050.

There is evidence that momentum toward achieving this target is growing, particularly among companies. Businesses still need to do more, especially with regard to working with suppliers and publicly reporting their food loss and waste inventories. However, business cannot achieve SDG 12.3 alone. It is imperative that national governments dramatically accelerate their efforts to reduce food loss and waste. Too few governments are setting targets, establishing base-year estimates of food loss and waste, and taking bold action at scale to reduce food loss and waste. There are notable exceptions, but they remain exceptions.

Making significant reductions in food loss and waste is not just nice to do; it is essential if the world is to achieve the reductions required in GHG emissions and create a sustainable food system for the future. There are only 11 years remaining before the SDGs are due to be met. It is therefore essential that all governments, companies, farmers, and individuals deepen their commitment to reducing food loss and waste and accelerate their efforts.

Set targets, measure the problem, and take action. If the world does this, it will take a big step forward in reducing food loss and waste and securing a more sustainable future for people and the planet.

## ENDNOTES

1. As measured by weight.
2. Previous installments can be accessed at [www.champions123.org](http://www.champions123.org)
3. This food loss target was first made in 2014 but has only recently come to light and so is highlighted in this report.
4. This food loss target was announced in 2016 by the MYSaveFood Network Secretariat but has only recently come to light and so is highlighted in this report.
5. This food loss target first appeared in China's 2016–2020 Five-Year Plan but has only recently come to light and so is highlighted in this report.
6. A base year is defined as the time frame (e.g., year) against which an entity's food loss and waste is tracked over time. The amount of food loss and waste generated in the base year can then be compared with the amount generated at the end of the target period to determine whether or not the target was met (Food Loss and Waste Protocol 2016).
7. In late 2019, FAO will be publishing updated global and regional estimates of food loss. However, these numbers will not be directly comparable to the global estimate that FAO released in 2011 (which is the source of the widely cited statistic that roughly one-third of food is lost and wasted globally) for several reasons. Among them is that the scope is different. For example, the new estimates will only cover food lost from the farm gate up to, but not including, the retail level—as opposed to covering the whole supply chain, as the FAO (2011) estimates did. The new estimates will exclude food intended for human consumption going to animal feed and bio-based materials whereas the FAO (2011) estimates included food going to both of these destinations.
8. The EU methodology does not require member states to report pre-harvest and other on-farm food losses and waste.
9. The reduction figures for Kellogg, Morrisons, and the Co-Op are reductions in absolute tonnage.
10. See previous progress reports for actions taken in 2016, 2017, and 2018.
11. For these online hubs, see FAO (n.d.); Further with Food (2019); ReFED (2018); and REFRESH Community of Experts (2019a).
12. See Narodne Novine (2019); BMEL (2019); and Government of the United Kingdom (2018).
13. More specifically, it was the CCFAs Chain Catering Committee and China Sustainable Consumption Roundtable.
14. Champion 12.3 Selina Juul (Founder of Stop Wasting Food movement Denmark) was an originator of the think tank's concept.
15. Reduction in absolute tonnage.

## REFERENCES

- African Union. 2019. "African Union Commission Conducts Malabo Declaration on Agriculture Training of Trainers for Biennial Review Process." February 27. <https://au.int/en/pressreleases/20190227/african-union-commission-conducts-malabo-declaration-agriculture-training>.
- Ah Yoke, W. 2019. "How Treatsure Works." March 16. <https://www.straitstimes.com/lifestyle/food/how-the-treatsure-app-works>.
- Ambuko, J. 2019. "To Put More Money in Mango Farmers' Pockets, We Must Fully Embrace Value Addition." *Daily Nation*. January 26. <https://www.nation.co.ke/business/seedsofgold/fully-embrace-value-addition/2301238-4951438-rtrxvh/index.html>.
- Arcadis. 2019. *National Food Waste Baseline Final Assessment Report*. Executive Summary. <https://www.environment.gov.au/system/files/pages/25e36a8c-3a9c-487c-a9cb-66ec15ba61d0/files/national-food-waste-baseline-executive-summary.pdf>.
- Arku, J. 2019. "181 Factories Enrolled under One District, One Factory Programme." May 7. <https://www.graphic.com.gh/business/business-news/ghana-news-181-factories-under-one-district-one-factory-programme.html>.
- Barrett, M. 2018. "Danish Producer Saves 75 Tonnes of 'Ugly' Tomatoes." September 18. <https://www.thelocal.dk/20180918/danish-producer-saves-75-tonnes-of-ugly-tomatoes>.
- Bernama. 2019. "Ramadan without Waste Campaign Kicks Off." April 29. <https://www.nst.com.my/news/nation/2019/04/484047/ramadan-without-waste-campaign-kicks>.
- BMEL (Federal Ministry of Food and Agriculture). 2019. "National Strategy for Food Waste Reduction." July 31. [https://www.bmel.de/SharedDocs/Downloads/EN/Food/Strategy\\_FoodWasteReduction.html](https://www.bmel.de/SharedDocs/Downloads/EN/Food/Strategy_FoodWasteReduction.html).
- Brogan, C. 2019. "Food Freshness Sensors Could Replace 'Use-By' Dates to Cut Food Waste." June 5. <https://www.imperial.ac.uk/news/191413/food-freshness-sensors-could-replace-use-by/>.

- C40. 2018. "C40: 23 Global Cities and Regions Advance towards Zero Waste." [https://www.c40.org/press\\_releases/global-cities-and-regions-advance-towards-zero-waste](https://www.c40.org/press_releases/global-cities-and-regions-advance-towards-zero-waste).
- CGF (The Consumer Goods Forum). 2018. *FOOD WASTE Commitments and Achievements of CGF Members*. Paris, France: Consumer Goods Forum. <https://www.theconsumergoodsforum.com/wp-content/uploads/2017/10/Environmental-Sustainability-Food-Waste-Booklet-2018.pdf>.
- CGSA (Consumer Goods Council of South Africa). 2019 "South African Companies Close to Signing Voluntary Agreement to Reduce Food Loss and Waste." April 19. <https://www.cgcsa.co.za/south-african-companies-close-signing-voluntary-agreement-reduce-food-loss-waste/>.
- Circular Online. 2019. "Wrap Global Awarded Further Funding to Cut Food Waste in Mexico." August 6. <https://www.circularonline.co.uk/news/wrap-global-awarded-further-funding-to-cut-food-waste-in-mexico/>.
- Co-Op. 2019. *Co-op Way Report 2018*. Manchester, UK: Co-Op. [https://assets.ctfassets.net/5ywmq66472jr/2c1boNfqhy8Wh0aief9Hlo/f55d7caecb1bb116433e7477dcd34309/Co-op\\_Way\\_Report\\_2018\\_Final.pdf](https://assets.ctfassets.net/5ywmq66472jr/2c1boNfqhy8Wh0aief9Hlo/f55d7caecb1bb116433e7477dcd34309/Co-op_Way_Report_2018_Final.pdf).
- DSM. 2018. "Pack-Age." December 4. <https://www.dsm.com/markets/food-specialties/en/products/dairy/PackAge.html>.
- European Commission. 2019. "Press Release—Preventing Food Waste, Promoting Circular Economy: Commission Adopts Common Methodology to Measure Food Waste across the EU." May 6. [http://europa.eu/rapid/press-release\\_IP-19-2391\\_en.htm](http://europa.eu/rapid/press-release_IP-19-2391_en.htm).
- European Parliament. 2019. "From Farms to Supermarkets: MEPS Approve New EU Rules against Unfair Trading." March 3. <http://www.europarl.europa.eu/news/en/press-room/20190307IPR30742/from-farms-to-supermarkets-meps-approve-new-eu-rules-against-unfair-trading>.
- The European Parliament and Council. 2018. "Directive of the European Parliament and of the Council of 30 May 2018 Amending Directive 2008/98/EC on Waste," May 30. <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32018L0851>. Accessed August 5.
- FAO (Food and Agriculture Organization of the United Nations). 2011. *Global Food Losses and Food Waste—Extent, Causes and Prevention*. Rome: FAO.
- FAO. 2013. *Food Wastage Footprint: Impacts on Natural Resources*. Rome: FAO.
- FAO. 2015. *Food Wastage Footprint and Climate Change*. Rome: FAO.
- FAO. 2018. "FAO Supports the Reduction of Food Loss and Waste in Southeastern Europe." December 5. <http://www.fao.org/europe/news/detail-news/en/c/1173577/>.
- FAO. 2019. "Government of Uganda, FAO, WFP, IFAD for the Development of a Comprehensive Strategy to Reduce PHL in Grains." June 3. <http://www.fao.org/food-loss-reduction/news/detail/en/c/1196297/>.
- FAO. n.d. "Community of Practice on Food Loss Reduction Forum." <http://www.fao.org/food-loss-reduction/forum/en/>. Accessed May 23, 2019.
- FAO and UNEP (United Nations Environment Programme). 2016. *Definitional Framework for Food Loss*. Rome: FAO.
- FAO, IFAD (International Fund for Agricultural Development), UNICEF (United Nations Children's Fund), WFP (World Food Program), and WHO (World Health Organization). 2018. *The State of Food Security and Nutrition in the World 2018: Building Climate Resilience for Food Security and Nutrition*. Rome: FAO.
- Feedback. 2019. "Milking It." <https://feedbackglobal.org/campaigns/past-it/>.
- FFAR (Foundation for Food and Agriculture Research). 2019. "Innovative Consortium Reduces Post-harvest Loss and Food Waste." April 17. <https://foundationfar.org/2019/04/17/innovative-consortium-reduces-post-harvest-loss-and-food-waste/>.
- Flanagan, K., A. Clowes, B. Lipinski, L. Goodwin, and R. Swannell. 2018. *SDG Target 12.3 on Food Loss and Waste: 2018 Progress Report*. Washington, DC: World Resources Institute.
- Flanagan, K., K. Robertson, and C. Hanson. 2019. *Reducing Food Loss and Waste: Setting a Global Action Agenda*. Washington, DC: World Resources Institute. [https://wriorg.s3.amazonaws.com/s3fs-public/reducing-food-loss-waste-global-action-agenda\\_0.pdf](https://wriorg.s3.amazonaws.com/s3fs-public/reducing-food-loss-waste-global-action-agenda_0.pdf).

- Food Loss and Waste Protocol. 2019. "Nestlé's Milk Losses from Farm Gate to Factory in 30 Countries." July 19. <https://flwprotocol.org/case-studies/nestles-milk-losses-from-farm-gate-to-factory-in-30-countries/>.
- Food Loss Challenge. 2019. "India's Ecozen Wins Inaugural Rabobank Food Loss Challenge Asia." November 15. <https://www.foodlosschallenge.asia/finale>.
- Further with Food. 2019. "Further with Food: Center for Food Loss and Waste Solutions." <https://furtherwithfood.org/>.
- Gardiner, E. 2019. "New Think Tank against Food Waste in Denmark." February 6. <http://www.refreshcoe.eu/resources/new-think-tank-against-food-waste-in-denmark/>.
- GhanaWeb. 2019. "Work on 'One District, One Warehouse' Initiative on Course—Hawa Koomson." March 22. <https://www.ghanaweb.com/GhanaHomePage/NewsArchive/Work-on-One-district-One-warehouse-initiative-on-course-Hawa-Koomson-732406#>.
- Global Food Banking Network. 2019. "Food Bank Organizations in Jordan and Mexico Receive GFN Certification." May 1. <https://www.foodbanking.org/food-bank-organizations-in-jordan-and-mexico-receive-gfn-certification/>.
- Gooch, M., D. Bucknell, D. LaPlain, B. Dent, P. Whitehead, A. Felfel, L. Nikkel, and M. Maguire. 2019. *The Avoidable Crisis of Food Waste: Technical Report*. Oakville, Ontario, Canada: Value Chain Management International and Second Harvest.
- Government of Canada. 2019. "'Everyone at the Table!' Minister Bibeau Highlights Actions on Food Waste through the Food Policy for Canada." July 4. <https://www.canada.ca/en/agriculture-agri-food/news/2019/07/everyone-at-the-table-minister-bibeau-highlights-actions-on-food-waste-through-the-food-policy-for-canada.html>.
- Government of the United Arab Emirates. 2019. "National Food Security Strategy 2051." May 30. <https://government.ae/en/about-the-uae/strategies-initiatives-and-awards/federal-governments-strategies-and-plans/national-food-security-strategy-2051>.
- Government of the United Kingdom. 2018. "Gove Launches Landmark Blueprint for Resources and Waste." December 18. <https://www.gov.uk/government/news/gove-launches-landmark-blueprint-for-resources-and-waste>.
- Government of the United Kingdom. 2019. "Food Waste Fund: £4 Million Awarded to Cut Food Waste." May 8. <https://www.gov.uk/government/news/food-waste-fund-4-million-awarded-to-cut-food-waste>.
- Gunders, D., and J. Bloom. 2017. *Wasted: How America Is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill*. New York: Natural Resources Defense Council. <https://www.nrdc.org/resources/wasted-how-america-losing-40-percent-its-food-farm-fork-landfill>.
- Hanson, C., and P. Mitchell. 2017. *The Business Case for Reducing Food Loss and Waste*. Washington, DC: Champions 12.3.
- Hill, T. 2019. "Sip, Sparkle and Drink: Kellogg's Turns Cereal Waste into Beer." June 13. <https://www.businessgreen.com/bg/news/3077291/sip-sparkle-and-drunk-kelloggs-turns-waste-into-beer>.
- Kellogg Company. 2019. "Reducing Food Waste." [https://www.kelloggs.co.uk/en\\_GB/our-story/nurturing-our-planet/reducing-food-waste.html](https://www.kelloggs.co.uk/en_GB/our-story/nurturing-our-planet/reducing-food-waste.html).
- Koe, T. 2019. "Environmental and Efficiency Goals: Japanese Food Firms Revise Expiry Date Labelling to Cut Food Waste." July 4. <https://www.foodnavigator-asia.com/Article/2019/07/04/Environmental-and-efficiency-goals-Japanese-food-firms-revise-expiry-date-labelling-to-cut-food-waste>.
- Kroger. 2019. *The Kroger Family of Companies 2018 Sustainability Report: Setting the Table for a Sustainable Future*. [http://sustainability.kroger.com/Kroger\\_CSR2018.pdf](http://sustainability.kroger.com/Kroger_CSR2018.pdf).
- Kummu, M., H. de Moel, M. Porkka, S. Siebert, O. Varis, and P.J. Ward. 2012. "Lost Food, Wasted Resources: Global Food Supply Chain Losses and Their Impacts on Freshwater, Cropland, and Fertiliser Use." *Science of the Total Environment* 438: 477–89.
- Ladd, Brittain. 2018. "Killing Kroger: How Can Retailer Fend Off Threat from Amazon, Walmart and Aldi?" *Forbes*. June 25. <https://www.forbes.com/sites/brittainladd/2018/06/25/killing-kroger/#3d07121c4120>.
- Leket. 2019. *Food Waste and Rescue in Israel*. <https://foodwastereport.leket.org/en/media-kit/>.

- Lemos, L. 2018. "See How IKEA Southampton Reduced Food Waste by 75%." June 27. <https://blog.winnowsolutions.com/see-how-ikea-southampton-reduce-food-waste-by-75-qa-with-christina-prince-wright>.
- Lemos, L. 2019. "See How Compass Singapore Is Leading the City-State's Food Waste Revolution." February 8. <https://blog.winnowsolutions.com/see-how-compass-singapore-is-leading-the-city-states-food-waste-revolution>.
- Mainichi. 2019. "Japan Enacts Law to Push Food Waste Reduction." May 24. <https://mainichi.jp/english/articles/20190524/p2g/00m/0dm/049000c>.
- Menos Desperdicio. 2019. "Quantification Panel of Food Waste in Spanish Households." <http://www.menosdesperdicio.es/definiciones-cifras/panel-de-cuantificaci%C3%B3n-del-desperdicio-alimentario-en-los-hogares-esp%C3%B1oles>.
- Michail, N. 2019. "Argentina's Food Waste Law Incentivizes Industry to Donate Surplus." April 17. <https://www.foodnavigator-latam.com/Article/2019/04/17/Argentina-s-food-waste-law-incentivizes-industry-to-donate-surplus>.
- Morrison's. 2019. *Listening and Responding: Corporate Responsibility Report 2018/19*. Bradford, UK: Wm Morrison Supermarkets PLC.
- Narodne Novine. 2019. "Decision on Adoption of the Plan for the Prevention and Reduction of the Production of Waste from Food of the Republic of Croatia 2019–2022." June 21. [https://narodne-novine.nn.hr/clanci/sluzbeni/2019\\_06\\_61\\_1169.html](https://narodne-novine.nn.hr/clanci/sluzbeni/2019_06_61_1169.html).
- National Zero Waste Council (Canada). 2019. "Food Industry Leaders Commit to Tackle Food Waste in Canada." January 17. <http://www.nzwc.ca/additional-info/media/Documents/20190117-NZWCPCMediaRelease-IndustryFoodWasteCo>.
- Nestlé. 2019. *Creating Shared Value and Meeting Our Commitments 2018*. [https://www.nestle.com/asset-library/documents/library/documents/corporate\\_social\\_responsibility/creating-shared-value-report-2018-en.pdf](https://www.nestle.com/asset-library/documents/library/documents/corporate_social_responsibility/creating-shared-value-report-2018-en.pdf).
- Olam International. 2018. *Olam International Limited Annual Report 2018*. [https://www.olamgroup.com/content/dam/olamgroup/investor-relations/ir-library/annual-reports/annual-reports-pdfs/olam-annual-report-fy18\\_strategy\\_report.pdf](https://www.olamgroup.com/content/dam/olamgroup/investor-relations/ir-library/annual-reports/annual-reports-pdfs/olam-annual-report-fy18_strategy_report.pdf).
- Packaging South Asia. 2019. "FSSAI Notifies Food Recovery and Distribution of Surplus Food Regulations, 2019." August 16. <https://packagingsouthasia.com/industry-news/fssai-notifies-food-recovery-and-distribution-of-surplus-food-regulations-2019/>.
- Pacific Coast Collaborative. 2018. "PCC West Cost Reduction Commitment." <https://pacificcoastcollaborative.org/wp-content/uploads/2018/09/PCC-West-Coast-Food-Waste-Reduction-Commitment-FINAL-FINAL-formatted-1.pdf>.
- Peters, A. 2019. "Everything You Need to Know about the Booming Business of Fighting Food Waste." June 19. <https://tinyurl.com/y5h39tpy>.
- Purdue University. 2018. "Purdue Solar Device to Dry Grains Other Food Products and Fight Waste Wins National Product Design Award." December 6. <https://www.purdue.edu/newsroom/releases/2018/Q4/purdue-solar-device-to-dry-grains-other-food-products-and-fight-waste-wins-national-product-design-award.html>.
- Rabobank. 2019. "Food Waste Challenge." <https://www.horecafoodwastechallenge.nl/>.
- ReFED. 2018. "The Food Waste Innovator Database." <https://www.refed.com/tools/innovator-database/>. Accessed December 19, 2018.
- REFRESH. 2019. "Voluntary Action Plan and Food Waste Reduction: Initiative Proposed by CCFa Chain Catering Enterprises." March 13. <https://eu-refresh.org/voluntary-action-plan-and-food-waste-reduction-initiative-proposed-ccfa-chain-catering-enterprises>.
- REFRESH Community of Experts. 2019a. Homepage. <http://www.refreshcoe.eu/>.
- REFRESH Community of Experts. 2019b. "Wonky Veggies and Customer Preference at JUMBO Supermarket." August 20. <http://www.refreshcoe.eu/resources/wonky-veggies-jumbo-supermarket/>.
- REFRESH Community of Experts. 2019c. "ALDI SÜD Consumer Information Campaign on Consumability of Milk beyond the 'Best Before Date.'" May 29. <http://www.refreshcoe.eu/resources/aldi-sud-consumer-information-campaign-on-consumability-of-milk-beyond-the-best-before-date/>.
- REFRESH and WRAP Global (Waste and Resources Action Programme). 2019. *Building Partnerships, Driving Change: A Voluntary Approach to Cutting Food Waste*. <http://tinyurl.com/va2019fw>.

- Retail Gazette. 2019. "Lidl to Roll Out £1.50 Wonky Fruit & Veg Boxes." March 28. <https://www.retailgazette.co.uk/blog/2019/03/lidl-launch-1-50-fruit-veg-box-successful-trial/>.
- SAGO (Saudi Grains Organization). Forthcoming. *Baseline for Food Loss and Waste in the Kingdom of Saudi Arabia: Preliminary Results*. Riyadh, Saudi Arabia: Saudi Grains Organization.
- Save One Third. 2018. "Save 1/3." <https://www.saveonethird.org/>.
- Searchinger, T., R. Waite, C. Hanson, and J. Ranganathan. 2018. *Creating a Sustainable Food Future: A Menu of Solutions to Feed Nearly 10 Billion People by 2050—Synthesis Report*. Washington, DC: World Resources Institute.
- Seltzer, M. 2019. "From Food Waste to Tasty Treats in Google's Kitchens." April 24. <https://www.blog.google/outreach-initiatives/sustainability/google-kitchens-preventing-food-waste/>.
- Sharpless, N. 2019. "Working with the Food Industry to Reduce Confusion over Date Labels." May 23. <https://www.fda.gov/news-events/fda-voices-perspectives-fda-leadership-and-experts/working-food-industry-reduce-confusion-over-date-labels>.
- Sin Desperdicio. 2019. "#SinDesperdicio." <http://sindesperdicio.net/en/>.
- Sodexo. 2019. "Press Release: Sodexo Steps Up Fight against Food Waste, Aims to Deploy Data-Driven Program at 3,000 Sites within Year." May 15. [https://www.sodexo.com/files/live/sites/com-www/files/02%20PDF/Press%20Releases/15052019\\_PR-Sodexo-WasteWatch.pdf](https://www.sodexo.com/files/live/sites/com-www/files/02%20PDF/Press%20Releases/15052019_PR-Sodexo-WasteWatch.pdf).
- Spreco Zero. 2019. "Food Waste in Italy: The Results of the REDUCE Project." July 16. <http://www.sprecozero.it/2019/07/16/lo-spreco-alimentare-in-italia-i-risultati-del-progetto-reduce/>.
- The Statistical Office of the Republic of Slovenia. 2018. "A Resident of Slovenia Discarded on Average 64 Kg of Food in 2017." November 12. <https://www.stat.si/StatWeb/en/News/Index/7826>.
- Sysco. 2018. *Delivering a Better Tomorrow*. Corporate Social Responsibility Report. [https://csr2018report.sysco.com/Sysco\\_2018\\_CSR.pdf](https://csr2018report.sysco.com/Sysco_2018_CSR.pdf).
- Tesco. 2019a. "Working with Suppliers." <https://sustainability.tescopl.com/sustainability/food-waste/topics/suppliers/>.
- Tesco. 2019b. "Tesco Calls for More Businesses to Publish Food Waste Data as Amount of Food Wasted in Tesco Is Down 17%." May 14. <https://www.tescopl.com/news/news-releases/2019/tesco-calls-for-businesses-to-publish-food-waste-data-food-wasted-in-tesco-down-17>.
- Tesco. 2019c. "How We Calculate Our Food Waste Figure (Central Europe)." <https://www.tescopl.com/sustainability/downloads/how-we-calculate-our-food-waste-figure-central-europe/>.
- Tesco. 2019d. "Central European Food Waste Data 2016/17." <https://www.tescopl.com/sustainability/downloads/food-waste-data-201617-central-europe/>.
- Tesco. 2019e. "Surplus Food Put to Good Use with Tesco Community Cookery School Programme, Supported by Jamie Oliver." January 24. <https://www.tescopl.com/news/news-releases/2019/surplus-food-put-to-good-use-with-tesco-community-cookery-school-programme-supported-by-jamie-oliver/>.
- Teutsch, B., and L. Kitinoja. 2019. *100 under \$100: Tools for Reducing Postharvest Losses*. La Pine, OR: The Postharvest Education Foundation. [http://postharvest.org/100\\_under\\_100.aspx](http://postharvest.org/100_under_100.aspx).
- Twiga Foods. 2018. "IFC and TLcom Invest \$10M in Twiga Foods, an m-Commerce Start-Up Supporting Kenyan Farmers." Press release, November 15. <https://twiga.ke/2018/11/15/press-release-ifc-and-tlcom-invest-10m-in-twiga-foods-an-m-commerce-start-up-supporting-kenyan-farmers/>.
- UN (United Nations). 2017. Sustainable Development Goals. <http://www.un.org/sustainabledevelopment/sustainable-developmentgoals>.
- UN Environment. n.d. "SDG 12.3 Food Waste Index." <https://www.unenvironment.org/thinkeatsave/about/sdg-123-food-waste-index>.
- Vietnam Plus. 2019. "Vietnam, Netherlands Agree to Enhance Agricultural Partnership." April 9. <https://en.vietnamplus.vn/vietnam-netherlands-agree-to-enhance-agricultural-partnership/149739.vnp>.

Voedingscentrum. 2019. "Hoe #Verspillingsvrij Ben Jij?: Strijd mee tegen Voedselverspilling." March 4. <https://www.voedingscentrum.nl/nl/nieuws/ho-verspillingsvrij-ben-jij-strijd-mee-tegen-voedselverspilling.aspx>.

WasteMINZ. 2018. *Love Food Hate Waste Campaign Evaluation*. Auckland, New Zealand: WasteMINZ. <https://lovefoodhatewaste.co.nz/wp-content/uploads/2019/02/FINAL-WasteMINZ-National-Food-Waste-Prevention-Study-2018.pdf>.

Weixin. 2019. "2019 Green Sustainable Consumption Promotion Week Starts in Beijing." August 2. [https://mp.weixin.qq.com/s/SFclqsqhBwIQlyk\\_QgQ9qA](https://mp.weixin.qq.com/s/SFclqsqhBwIQlyk_QgQ9qA).

World Bank. 2011. *Missing Food: The Case of Postharvest Grain Losses in Sub-Saharan Africa*. Washington, DC: World Bank.

World Bank. 2019a. *Conceptual Framework for a National Strategy for Food Loss and Waste for Mexico*. Washington, DC: World Bank. [http://www.wrap.org.uk/sites/files/wrap/Conceptual\\_Framework\\_for\\_a\\_National\\_Strategy\\_on\\_Food\\_Loss\\_and\\_Waste\\_for\\_Mexico.pdf](http://www.wrap.org.uk/sites/files/wrap/Conceptual_Framework_for_a_National_Strategy_on_Food_Loss_and_Waste_for_Mexico.pdf).

World Bank. 2019b. "World Bank and Folksam Group Join Global Call to Action on Food Loss and Waste." March 20. <https://www.worldbank.org/en/news/press-release/2019/03/20/world-bank-andfolksam-group-join-global-call-to-action-on-food-loss-and-waste>.

WRAP (Waste and Resources Action Programme). 2015. *Estimates of Food and Packaging Waste in the UK Grocery Retail and Hospitality Supply Chains*. Banbury, UK: WRAP.

WRAP. 2018a. "WRAP Restates UK Food Waste Figures to Support United Global Action," May 22. <http://www.wrap.org.uk/content/wrap-restates-uk-food-waste-figures-support-united-global-action>.

WRAP. 2018b. *Opportunities to Reduce Waste along the Journey of Milk, from Dairy to Home*. <http://www.wrap.org.uk/content/opportunities-reduce-waste-along-journey-milk-dairy-home>.

WRAP. 2018c. "Food Waste Measurement Principles and Resources Guide," January 30. <http://www.wrap.org.uk/content/food-waste-measurement-principles-and-resources-guide>.

WRAP. 2019a. *Food Waste in Primary Production in the UK*. Banbury, UK: WRAP. <http://www.wrap.org.uk/content/food-waste-primary-production-uk>.

WRAP. 2019b. "UK Food Redistribution Continues to Increase." May 19. <http://www.wrap.org.uk/content/uk-food-redistribution-continues-increase>.

WRAP. 2019c. "Guardians of Grub." May 13. <http://www.wrap.org.uk/content/guardians-grub>.

WRAP and IGD (Institute of Grocery Distribution). 2019. *Hospitality and Food Service Action Plan*. [http://www.wrap.org.uk/sites/files/wrap/WRAP\\_hospitality\\_and\\_food\\_service\\_roadmap.pdf](http://www.wrap.org.uk/sites/files/wrap/WRAP_hospitality_and_food_service_roadmap.pdf).

Yume Food. n.d. "Yume partners with Sodexo for a Better Tomorrow." <https://yumefood.com.au/partnerships/sodexo>. Accessed July 16, 2019.

Zero Hunger Zero Waste Foundation. 2019. "Meet the Innovators." <https://thekrogercozerohungerzerowastefoundation.com/portfolio.html>.

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