

EXECUTIVE SUMMARY REDUCING FOOD LOSS AND WASTE

Setting a Global Action Agenda

With support from



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FOREWORD

How is the world going to feed nearly 10 billion people while also advancing economic development and meeting the challenge of climate change? This has become one of the paramount questions of our time. Reducing food loss and waste is part of the answer.

Tackling the issue of food loss and waste can generate a "triple win." Reductions can save money for farmers, companies, and households. Wasting less food means we can feed more people. And reductions can alleviate pressure on climate, as well as on water and land.

Fortunately, a modern movement around food loss and waste reduction is emerging. In 2015, nations of the world adopted the Sustainable Development Goals (SDGs)-including "Target 12.3," which calls for halving the rate of food loss and waste by 2030. In 2016, a group of leaders came together to form the Champions 12.3 coalition to help inspire ambition and motivate action toward this SDG target. Numerous organizations, including those we lead, have launched initiatives to address this important issue. And recent landmark studies such as the World Resources Report Creating a Sustainable Food Future and the EAT-Lancet Commission's Healthy Diets from Sustainable Food Systems make the case that halving the rate of food loss and waste is necessary if the world is to sustainably feed the planet over coming decades.

Andrew Steer President World Resources Institute Rajiv J. Shah President The Rockefeller Foundation The issue is now on the minds of public and private sector leaders. Ambitions have been raised. Steps are being taken. What we need now, though, is a shared vision of what needs to happen to get the world on track to halving food loss and waste. We need a Global Action Agenda.

In this report, we offer that agenda. First, we encourage countries and companies to adopt the global SDG 12.3 target as their own, measure their food loss and waste (since what gets measured gets managed), and take action on the hotspots identified. Although simple, this "Target-Measure-Act" approach is proving effective. Second, we identify a short-list of "to do's" for each type of actor in the food supply chain. If you don't know which actions to take, start with this list and go from there. Third, to scale up the impact and pace of these actor-specific interventions, we recommend 10 interventions that tackle food loss and waste across the entire supply chain, target a handful of food loss and waste hotspots, and help set the enabling policy and financial conditions that are necessary for success.

We hope this report will inspire you to play a role in helping create a sustainable food future. The need is urgent—because food is a terrible thing to waste.

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EXECUTIVE SUMMARY

Reducing food loss and waste can help meet the UN Sustainable Development Goals (SDGs) by 2030, contribute to the Paris Agreement on climate change, and sustainably feed the planet by 2050. This report lays out a **Global Action Agenda** that will help reduce food loss and waste and achieve SDG 12.3. This action agenda includes a Target-Measure-Act approach, an actor-specific "to-do" list, and 10 "scaling interventions" designed to take the approach and to-do list to scale.

HIGHLIGHTS

- Numerous studies find that the world experiences significant levels of food loss and waste, with losses "near the farm" predominant in lower-income regions and waste "near the plate" predominant in higher-income regions.
- Halving the rate of food loss and waste is an important "no regrets" strategy that would contribute to achieving the UN Sustainable Development Goals, meeting the goals of the Paris Agreement on climate change, and sustainably feeding the planet.
- This report, based on extensive desk-based research and input from partner organizations, proposes a Global Action Agenda to reduce food loss and waste. It involves three main components.
- Governments and companies should follow the "Target-Measure-Act" approach: Adopt a target to halve food loss and waste by 2030, measure how much and where food is being lost and wasted, and take action on the hotspots.
- All actors in the food supply chain should kick-start their actions by pursuing a "to-do" list tailored to their specific roles.
- Governments and business leaders should pursue 10 "scaling interventions" that have the potential to rapidly scale, accelerate, and broaden deployment of the Target-Measure-Act approach and the actor-specific interventions.

Background

Reducing food loss and waste is an important strategy to help meet the UN Sustainable Development Goals (SDGs) by 2030, contribute to the Paris Agreement on climate change, and sustainably feed the planet by 2050. SDG 12 aims to ensure "sustainable consumption and production patterns," and one of its targets (SDG 12.3) calls for halving rates of food loss and waste. This in turn would contribute to meeting a number of other SDGs, such as those on hunger, poverty, and health. Recent modeling efforts indicate that halving food loss and waste rates would yield significant reductions in greenhouse gas (GHG) emissions because more efficient use of food would reduce the need for land conversion for additional food production and slow the rate of increase in fertilizer applications and methane emissions from food in landfills (Searchinger et al. 2018; Willett et al. 2019). Moreover, a recent World Resources Report (Searchinger et al. 2018) and a just-released report from the

EAT-Lancet Commission (Willett et al. 2019) both identify halving food loss and waste as a critical element in achieving a sustainable food future. The private sector is also making changes to tackle food loss and waste, with over 30 of the world's largest global companies having set targets in line with SDG 12.3 (Flanagan et al. 2018). In short, reducing food loss and waste is rapidly rising on public and private sector agendas as a strategy to help fix an inefficient food system for the sake of people and the planet.

About this report

This report lays out a **Global Action Agenda** for reducing the rate of food loss and waste and thereby achieving SDG 12.3. The action agenda includes a Target-Measure-Act approach, an actor-specific "to-do" list, and 10 "scaling interventions" designed to take the approach and to-do list to scale.

The Global Action Agenda is designed to guide businesses, governments, civil society, and other actors in the food supply chain who can play a role in tackling food loss and waste, individually and collectively.

This report was jointly prepared by WRI with support from The Rockefeller Foundation, and in collaboration with food loss and waste experts from the Consortium for Innovation in Postharvest Loss and Food Waste Reduction, Iowa State University, the University of Maryland, the Natural Resources Defense Council (NRDC), United Nations Environment Programme (UNEP), Wageningen University & Research, the Waste & Resources Action Programme (WRAP), and the World Bank.

What is the food loss and waste challenge?

A significant amount of food intended for human consumption is never eaten. In 2011, the Food and Agriculture Organization of the United Nations (FAO) launched a landmark publication, *Global Food Losses and Food Waste: Extent, Causes and Prevention* (FAO 2011), with the headline finding that one-third of all food is lost or wasted between the farm and the plate. Despite its uncertainties, this figure remains the only global estimate currently available. Our assessment of more subcontinental and commodity-specific studies conducted since then suggests that the FAO data are broadly correct.



Figure ES-1 | Distribution of Food Loss and Waste by Region and Stage in the Food Supply Chain, 2007

Share of Total Food Available That Is Lost or Wasted

Notes: Values displayed are of food loss and waste as a percent 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).

The distribution of food loss and waste across the food supply chain varies by region of the world. Food loss and waste at the point of consumption in homes and restaurants appears to be a hotspot of food loss and waste in high-income regions, whereas losses during handling and storage are a hotspot in low-income regions. On-farm production losses (i.e., during and just after harvest) are an issue in all regions (FAO 2011) (Figure ES-1).

The world is calling for halving the rate of food loss and waste. In September 2015, nations of the world formally adopted a set of 17 Sustainable Development Goals (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. 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 reduc[ing] food losses along production and supply chains, including post-harvest losses," by 2030 (UN 2017).

Why does it matter?

Food loss and waste matters in terms of the environment, economy, food security, jobs, and ethics. The environment: The food that is lost and wasted each year accounts for an estimated 8 percent of annual GHG emissions, consumes a quarter of all water used by agriculture, and requires an agricultural area the size of China. *The economy:* The annual market value of lost and wasted food is estimated at an astounding \$940 billion globally (FAO 2015a). Food security: More than 1 billion metric tons of food per year is never consumed in a world where one in nine people are still undernourished (FAO et al. 2018). Jobs: Reducing food loss and waste could play a modest role in job creation across the supply chain, ranging from smallholder processing facilities close to the farm to technology start-up companies that help redistribute food that would otherwise be wasted. Ethics: Reducing food loss and waste is considered by many people as simply "the right thing to do."

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The benefits of reducing food loss and waste can be significant. For instance, reducing the current rate of food loss and waste by 50 percent by 2050 would have the following results:

- It would close the gap between food needed in 2050 and food available in 2010 by more than 20 percent (Searchinger et al. 2018).
- It would avoid the need to convert an area of natural ecosystems roughly the size of Argentina into agricultural land between 2010 and 2050 (Searchinger et al. 2018).
- It would lower GHG emissions by 1.5 gigatons of carbon dioxide equivalent (Gt CO₂e) per year by 2050, an amount more than the current energy- and industry-related emissions of Japan (Searchinger et al. 2018).

What is causing food loss and waste?

Understanding why food loss and waste occurs (whether intentionally or not) is important to successfully reducing it. The most immediate reasons food leaves the human food supply chain (the "direct causes") tie back to concern about a food's safety or suitability for consumption, or there being no perceived use or market for it. This may be due to deterioration or suboptimal quality, or issues such as the food's appearance, excess supply, and seasonal production fluctuations. Leading to these direct causes are a number of "underlying drivers." These can be technological, managerial, behavioral, or structural in nature. The technological drivers are poor infrastructure, inadequate equipment, and suboptimal packaging. The managerial drivers are inadequate food management practices, skills, or knowledge; inflexible procurement practices; poor supply and demand forecasting and planning; and marketing strategies. The behavioral drivers are norms and attitudes, lack of awareness, and concerns about possible risks. The structural drivers are conditions in demographics, climate, policies and regulations, economics, and financing that lead to food loss and waste. These 15 underlying drivers need to be addressed if food loss and waste is to be reduced.

The underlying drivers of food loss and waste are closely interrelated. An instance of food loss or waste is often driven by more than one driver (e.g., rice losses may occur due to inadequate storage bags, which, in turn, may be caused by a grower's lack of access to credit to purchase better bags). Moreover, while an underlying driver may affect one stage of the food supply chain, the generation of loss and waste might actually occur at a different stage. For instance, orders modified last-minute by food retailers at the distribution and market stage of the food supply chain can result in fruits and vegetables being left in the farm field, leading to losses during production.

Among the various underlying drivers, some are more relevant in certain regions. For example, lack of infrastructure is typically a more significant driver in low-income countries, whereas social norms and attitudes such as the acceptability of not eating all the food on one's plate are often a driver in high-income countries.



Reducing food losses close to the farm (during production as well as handling and storage) can be a result of "good economic development." As economies develop and underlying drivers shift, food loss may give way to food waste closer to the plate.

What should be done about it?

Governments and companies should pursue a simple but effective "Target-Measure-Act" approach to reducing food loss and waste:



Set targets. Targets set ambition, and ambition motivates action. Governments and companies should therefore adopt an explicit food loss and waste reduction goal aligned with SDG 12.3—a 50 percent reduction by 2030.

Measure your food loss and waste. The



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 provides an evidence-based foundation for prioritizing interventions to reduce food loss and waste, and helps entities monitor whether they are on track to realizing their target. Governments and companies should therefore start to measure their food loss and waste and monitor progress over time. 28

ACT

Take action. What ultimately matters is action. However, there is no proverbial "silver bullet" action for reducing food loss and waste. Rather, reducing it at scale will require numerous actors in the food supply chain to implement a variety of contextspecific interventions. Figure ES-2 provides a priority to-do list for each type of actor to get started reducing food loss and waste. Governments, companies, farmers, citizens, and others should immediately get moving on implementing their respective to-do lists.

Experiences from reduction initiatives that are making progress provide a number of insights on taking action:

- Awareness is a start (but only a start).
- Make the "business case" to motivate actors (so they see reducing food loss and waste as in their self-interest).
- Recognize that there is no silver bullet (a number of interventions are typically required).
- Which interventions are relevant vary between and within countries (especially depending on the level of economic development).
- Beware of knock-on effects across the supply chain (reductions at one stage might merely trigger loss and waste elsewhere).
- Collaboration between actors is crucial (especially when pursuing a "whole supply chain" approach).







Source: Canali et al. (2014); CEC (2017, 2018, 2019); Clowes et al. (2018a, 2018b, 2019); Food Loss and Waste Protocol (2016); Global Knowledge Initiative (2017); Gunders and Bloom (2017); Hegnsholt et al. (2018); HLPE (2014); ReFED (2016); Gooch et al. (2019); WWF-US (2018).

PRODUCTION	HANDLING PROCESSING DISTRIBUTION AND STORAGE AND PACKAGING AND MARKET CONSUMPTION
Primary producers	 Crop farmers: Improve training in best practices (e.g., handling to reduce damage, drying, fumigation treatments, and on-farm processing). Establish aggregation centers that provide adequate storage and preservation options, such as cooling chambers. Fishers: Improve temperature management, handling, and preservation techniques (e.g., fenced-off landing beaches or drying racks to improve the quality of fish and to minimize losses). Ranchers and animal farmers: Improve handling and preservation options (e.g., establish milk collection centers with cooling tanks). Improve conditions during transportation of food-producing animals from farm to markets.
Packinghouses	 Adopt best practices to provide the clean, cool, and/or dry conditions required to reduce postharvest losses. Reexamine handling and storage practices to reduce damage (e.g., use liners in wood and basket containers, reduce the size of sacks or crates to minimize product damage). Build near-farm facilities to convert unmarketable crops and by-products into value-added products.
Storage providers	 Use storage containers that protect against temperature variations, humidity and precipitation, and insect and rodent infestation. Adopt low-cost storage and handling technologies (e.g., hermetic grain storage bags, plastic or metal silos, plastic crates) that prevent spoilage and increase shelf life. Work with intended users and community experts to design and produce locally relevant storage solutions.
Transportation and logistics providers	 Improve handling practices during loading and unloading. Use technology innovations to improve the flow of information (e.g., about road and traffic conditions, as well as timing of pickup and delivery) to optimize movement of food. Introduce (or expand) energy-efficient, clean, low-carbon cold chains from farm to wholesalers. Work upstream with customers to provide planning tools and handling and storage technologies that help them reduce losses. Create access to alternative markets for products that cannot be marketed.





PRODUCTION	HANDLING PROCESSING DISTRIBUTION CONSUMPTION				
Households	 Buy only what you expect to eat: check refrigerator and cupboards before shopping, use a shopping list, and plan meals in advance. Know the difference between "use by" (which is about food safety) and "best before" (which is about quality and still safe to eat after this date). Freeze or preserve food before it spoils, and find out how to best store different foods so they stay fresh and safe longer. Find creative ways to use leftover ingredients and products past their peak quality (e.g., in soups, sauces, smoothies), as well as to cook the parts you may not normally eat (e.g., stems, cores). Organize the kitchen and refrigerator so that items do not get lost and spoil. 				
Restaurants	 Engage staff on food waste reduction (e.g., explain why reduction is important, give tips on waste reduction, reward staff who deliver against targets). Shift away from preparation methods such as batch cooking, casserole trays, and buffets to reduce over-production and repurpose excess food (e.g., offer customers "doggy bags," safely incorporate unused items into other dishes, sell excess food at a discount, donate unsold food). Revisit inventory management and purchasing practices (as well as menus) to better fit needs based on historical trends and waste data. Use scales in the kitchen to weigh food and track items most commonly wasted (and estimate the financial cost of food disposed, thus creating a financial signal to waste less). Consider whether portions served exceed what can be eaten, and rethink promotions that encourage over-purchasing by customers. 				
Hotels	 Engage staff on food waste reduction (e.g., explain why reduction is important, give tips on waste reduction, and reward staff who deliver against targets). Rethink the buffet (e.g., shift certain items to à la carte near end of mealtimes, reduce the size of dishes used in buffets). Reduce overproduction by producing smaller quantities of items consistently left on the plate. Repurpose excess food (e.g., by safely incorporating unused items into other dishes, or by donating it). Communicate to guests about food waste and encourage them to take only as much as they need. 				
Catering/food service	 Engage staff on food waste reduction (e.g., explain why reduction is important, give tips on waste reduction, and reward staff who deliver against targets). Reduce the amount overproduced (e.g., by producing smaller quantities of items that are consistently underconsumed). Repurpose excess food (e.g., by safely incorporating unused items into other dishes, or by donating it). Use scales in the kitchen to weigh food and track items most commonly wasted (and estimate the financial cost of food disposed, thus creating a financial signal to waste less). Evaluate contractual obligations between clients and suppliers that generate waste and overproduction (e.g., contracts that stipulate that all hot dishes must be available for the full-service period). 				
Public and private institutions (e.g., schools, hospitals, government canteens)	 Engage staff on food waste reduction (e.g., explain why reduction is important, give tips on waste reduction, and reward staff who deliver against targets). Reduce the amount overproduced (e.g., by producing smaller quantities of items that are consistently underconsumed), and repurpose excess food (e.g., by safely incorporating unused items into other dishes, or by donating it). Introduce techniques to minimize people taking overly large portions (e.g., trayless dining, flexible portion sizes, pay-by-weight pricing system, smaller plates). Revisit inventory management and procurement practices (as well as menus) to better fit needs based on historical trends and waste data. Use scales in the kitchen to weigh food and track items most commonly wasted (and estimate the financial cost of food disposed, thus creating a financial signal to waste less). 				

PRODUCTION	HANDLING AND STORAGE PROCESSING DISTRIBUTION AND MARKET CONSUMPTION				
Policymakers	 Embed into agricultural extension services (and in farmer subsidy programs) food loss reduction awareness, technical assistance, and financial aid. Develop, facilitate, promote, and/or improve climate-smart infrastructure (e.g., roads, electricity, irrigation, community storage) and access to it, especially for smallholder farmers who live far from markets. Increase investment in agricultural research related to postharvest loss and provide incentives for the adoption of postharvest technologies (e.g., zero-rates tax on imported postharvest technologies, incentives for local manufacturers of postharvest technologies, subsidies for postharvest technologies). Implement policies to prevent unfair trading practices (e.g., last-minute order cancellations and unilateral or retroactive changes to contracts). Remove barriers to food redistribution via policies (e.g., liability limitations, tax breaks) that make it easier for food suppliers to donate safe (but unsold) food to charities or to those in need. Support policies to standardize food date labeling practices to reduce confusion about product safety and quality, and improve consumer understanding of the meaning of date labels. Include food waste reduction lessons in school curricula and include food waste reduction training in public procurement programs. Provide municipal support for informal retailers to access clean water, storage areas, equipment that improves food safety, and training in how to reduce food contamination. Make measurement and reporting of food loss and waste by large companies mandatory. 				
Financiers	 Increase the number of philanthropic institutions funding food loss and waste prevention activities. Create financing instruments and product lines (e.g., funds, bonds, loans) dedicated to reducing food loss and waste. Increase start-up financing for new technologies and business models that would reduce food loss and waste, as well as financing to scale up proven technologies and models. Increase development cooperation between high-income and low-income countries targeting food loss and waste. Introduce "pay-as-you-go" programs to make technologies affordable for smaller operations (e.g., for solar-powered refrigeration units and mobile processing). 				
Innovators and intermediaries (e.g., brokers, consolidators, digital solution developers)	 Develop and improve availability of processing and preservation facilities (including aggregation centers and mobile low-carbon options). Develop alternative outlets during peak season through organizing export opportunities to markets with other seasonalities. For unmarketable crops, improve flow of information to find alternative buyers, promote financially viable alternative markets, or develop new outlets (e.g., as processed foods, industrial products, animal feed). Apply innovations to reduce delays for imported products during the point of exit and entry, which extends the shelf life of perishable products. Leverage technology and digital solutions to rethink and better coordinate key processes between suppliers and customers in a more organized and informed way. 				
Researchers	 Research new and innovative technologies to preserve food quality and extend shelf life. Develop innovative products from perishable food commodities, such as fruits and vegetables, to promote whole food utilization. Undertake research to fill data gaps and standardize reporting of food loss and waste data in order to better compare results, create benchmarks, and provide clearer direction for stakeholders. Assess impact of interventions to improve evidence base of what works and the return on investment. Develop sector-specific guidance that provides the motivation and technical information for businesses to take action (e.g., promote industry roadmaps for food loss and waste reduction). 				
Civil society	 Raise awareness and shift social norms so that food loss and waste is considered "unacceptable" for all, including higher-income consumers. Encourage public and private sector leaders to pursue the Target-Measure-Act strategy. Act as a channel for the sharing and reporting of food waste data and progress. 				

What progress has been made so far?

Progress has been made toward implementing some aspects of Target-Massure Act. In terms of setting targets

Measure-Act. In terms of setting targets, 50 percent of the world's population now lives in a country that has set an explicit, public target aligned with SDG 12.3 (Flanagan et al. 2018). In addition, 32 of the world's 50 largest food companies (by revenue) independently have set or participate in programs that have set—a food loss and waste reduction target consistent with SDG 12.3 (Flanagan et al. 2018). In terms of measurement, countries representing 12 percent of the world's population measure food loss and/or waste within their borders, and more than 30 of the world's largest companies are now measuring food loss and waste within their operations. In terms of taking action, over the past few years a number of technologies, policies, and business practices have been designed along the food supply chain to tackle food loss and waste (Figure ES-3).

What needs to happen next?

Despite the progress to date, much more must be done and done much faster if SDG 12.3 is to be met. Most of the specific interventions on the to-do lists are already technically possible. The problem is that too few actors are deploying them. Why? In some cases, it may be lack of awareness, concern, or focus regarding food loss and waste. In others, it may be lack of ability or resources (e.g., technical, financial). And in still others, it may be lack of collaboration across a large number of actors needed to effect change. What is needed next is a series of "scaling interventions" that address these bottlenecks.

PRODUCTION	HANDLING AND STORAGE	PROCESSING AND PACKAGING	DISTRIBUTION AND MARKET	CONSUMPTION
 Information and communication technology (ICT) is supplying smallholders with technical information to reduce production losses. ICT platforms are increasingly being used to connect farmers with markets to respond more quickly to changes in supply and demand. Legislation is targeting contract behavior that exacerbates production losses. Imperfect produce is increasingly available for sale. 	 Low-cost handling and storage technologies are gaining traction in Africa. Technology innova- tions to reduce losses during transportation of fresh produce are emerging. Investment in storage infrastructure is growing. 	 Unsold produce is being turned into upcycled products. Technology innova- tions in packaging are being used to extend product shelf life. Innovations to post- pone spoilage are emerging. 	 Governments are enacting policies to encourage and even require redistribution of surplus food. Apps for redistributing surplus food from retailers are growing in number. Accelerator programs for food loss reducing technologies are being established. 	 Apps for redistributing surplus food from food service and restau- rants are becoming more widespread. Retailers and food manufacturers are streamlining food date labels. Awareness-raising campaigns are being launched. The hospitality sector is starting to take action.
	 Some countries are est National-level public-pi New sources of funding Online databases and h been established. 	Cross-Cutting Actio ablishing national strategie rivate partnerships are begi g are becoming available for hubs to support exchange or	ns s to tackle food loss and wast nning to emerge. r reduction of food loss and w f information and solutions ha	te. vaste. ave

Figure ES-3 | Emerging Developments to Reduce Food Loss and Waste across the Supply Chain

To address this, we propose 10 such scaling interventions that have the potential to accelerate and broaden deployment of the Target-Measure-Act approach and of the actor-specific interventions. Three of them take a whole supply chain approach, four of them target specific hotspots of food loss and waste, and three more enhance enabling conditions for reducing food loss and waste. They may not constitute a comprehensive set, but they are a good starting point for making progress.

Whole supply chain approaches

- 1. Develop national strategies for reducing food loss and waste. Increase the number of countries with national strategies, as these can be an important catalyst for Target-Measure-Act at the country level—aligning public policy, private sector action, and farmer-to-consumer behavior toward a shared goal.
- 2. Create national public-private partnerships. Increase the number of country-level publicprivate partnerships dedicated to achieving SDG 12.3.
- 3. *Launch a "10x20x30" supply chain initiative*. Launch a voluntary private sector campaign where at least 10 corporate "power players" commit to Target-Measure-Act themselves and then engage their own 20 largest suppliers to do the same and achieve a 50 percent reduction in food loss and waste by 2030.

Hotspot-specific approaches

- 4. *Invigorate efforts to strengthen value chains and reduce smallholder losses*. Invigorate efforts to help smallholder farmers reduce food losses during production and storage.
- 5. *Launch a "decade of storage solutions."* Kickstart a focused collaboration among storage providers, cold chain alliances, financiers, and governments to get income-sensitive, climatesmart storage technologies into the hands of farmers and distribution networks around the world.

- 6. *Shift consumer social norms*. Leveraging the latest findings of behavioral science, engage grassroots campaigns, social media, religious communities, and others to make "wasting food" as unacceptable as littering now is in many countries.
- 7. *Go after GHG emissions reductions*. Use sectorled programs to tackle food loss and waste from beef, dairy, and rice head on, and get the reduction of food loss and waste into nationally determined contributions to the Paris Agreement on climate change.

Enabling approaches

- 8. *Scale up financing*. Develop funds and financing products dedicated to investing in innovation and scaling up enterprises, technologies, and programs that would reduce food loss and waste.
- 9. *Overcome the data deficit*. Over the next five years, a concentrated push to measure food loss and waste is needed to overcome this data deficit in time to support achievement of SDG 12.3.
- 10. Advance the research agenda. More research is still needed to answer multiple "next generation" questions that would, in turn, help refine food loss and waste reduction strategies and advance implementation of the global agenda.

A call to action

The Target-Measure-Act approach, combined with the actor-specific interventions and the 10 scaling interventions, comprise our proposed Global Action Agenda. Momentum is growing, but the world has much more to do. Only 11 years remain to achieve the targets of the SDGs, and food loss and waste is still pervasive. Actors ranging from governments, businesses, farmers, consumers, and everyone in between can play a role in the Global Action Agenda. With worldwide participation, we just might realize a future where no food fit for consumption goes to waste.

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Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

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We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of governments, businesses, and communities combine to eliminate poverty and sustain the natural environment for all people.

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Established in 2019, the Consortium for Innovation in Postharvest Loss and Food Waste Reduction brings together experts and thought leaders to advance a common research agenda for gaining efficiencies within the global food system. The Consortium represents expertise, knowledge, and innovation in postharvest loss and food waste reduction from institutions in the Americas, Europe, Middle East, and Africa, and across the public, private, and nonprofit sectors.

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