The Global FoodBanking Network®

WASTE NOT
WANT NOT

TOWARD ZERO HUNGER

Food Banks as a Green Solution to Hunger

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FOOD BANKING AROUND THE WORLD BOXES

There is more than enough food produced in the world to feed everyone, yet an estimated 821 million people—one in nine—go hungry,[1] all while 1.3 billion tons of edible food is wasted.[2] For the third year in a row, there has been a rise in global hunger, reversing an almost decade-long trend of decline. The hunger situation in some regions has worsened—as in East, South, and South East Asia—or has only marginally improved.

At its core, food banking is a community-based solution to hunger and food loss and waste that many of us are familiar with at the local level. However, to date there has been only limited investigation into the global scale of these vital local efforts. This report, *Waste Not, Want Not*, is one of the first that attempts to quantify the social and environmental impact of the world's three largest food banking entities—The Global FoodBanking Network (GFN), European Food Banks Federation (FEBA), and Feeding America. The report is framed through the lens of the Sustainable Development Goals (SDGs), with a strong focus on SDG 2, which aims to zero out hunger by 2030, and SDG Target 12.3, which aspires to halve food loss and waste within the same time frame. It is our hope that through this report, the global community can begin to see the vital, macroimpact on human and environmental conditions that food banks are making in thousands of communities across the world.

I would like to thank the food banking organizations served by GFN for providing the information presented in this report. Their work inspires all of us at GFN daily. I am grateful to the European Food Banks Federation and to Feeding America for participating in this study so that global figures could be calculated. We are fortunate as a global community to be learning from their incredible work as the food banking model spreads to new communities each year. I am deeply grateful for the generous support of the Bank of America Charitable Foundation and Cargill for making this report possible.

Significant thanks is owed to the research team for this report. Doug O'Brien, GFN's vice president of programs, oversaw the research process, and Halley Aldeen, director of impact assessment and research, framed the study's agenda and wrote the analysis and findings. The World Resources Institute generously lent its methodology for calculating greenhouse gas emissions and aided the research team. Monica Dykas and David Millar provided support. Chicago Creative Group provided exceptional editing and design services.

Most importantly, GFN is grateful for the ongoing support of food banks, partners, donors, and volunteers whose commitment, creativity, and energy make the food bank movement successful.

LISA MOON
PRESIDENT & CEO
THE GLOBAL FOODBANKING NETWORK

Hunger is a solvable problem. More than enough food is produced in the world to feed everyone, yet an estimated 821 million people—one in nine—still go hungry.[3] For the third consecutive year, after decades of progress, hunger is once again on the rise.

While millions of vulnerable people around the globe go without adequate food to meet their basic needs, approximately one-third of all food produced for human consumption (1.3 billion tons) is lost or wasted.[4] The amount of food wasted is enough to feed more than a billion hungry people.

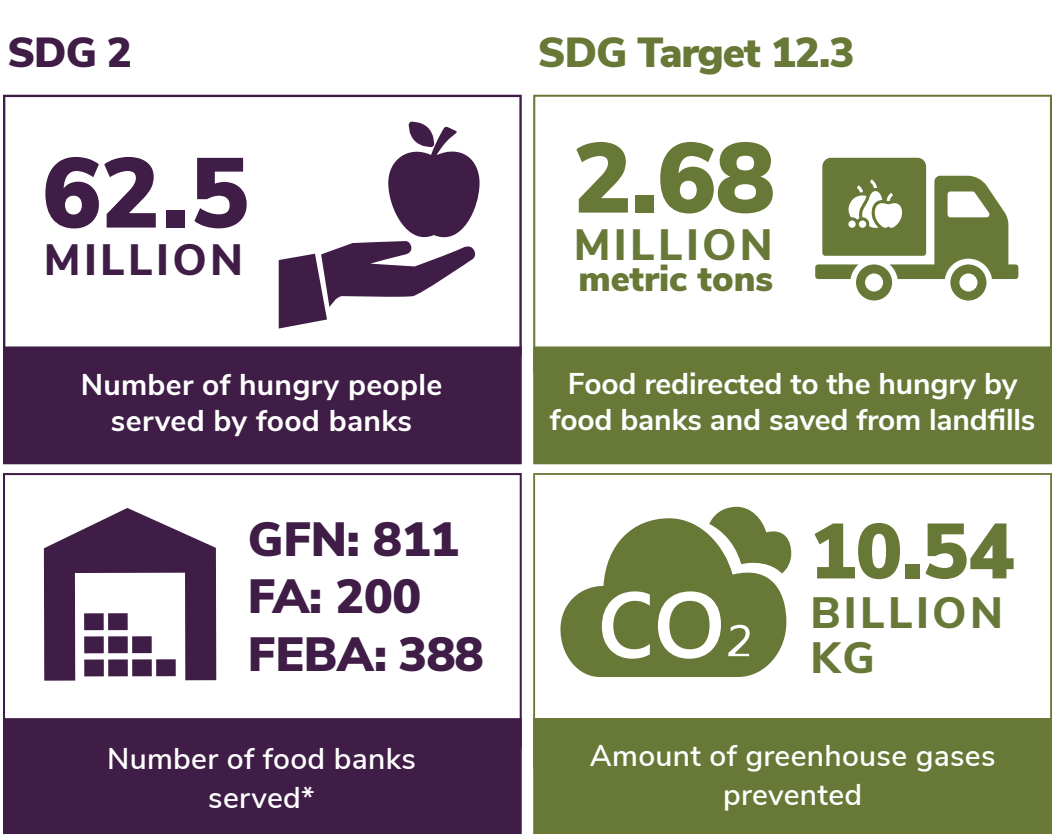
The international community has responded to these and other global trends and challenges by establishing the United Nations 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs). SDG 2 (Zero Hunger) calls for the eradication of hunger and all forms of malnutrition as a fundamental condition for sustainable development. This includes ensuring access by all people, particularly the poor and people in vulnerable situations, to safe, nutritious, and sufficient food all year round. SDG 12 (Responsible Consumption and Production)

calls for sustainable consumption and production patterns and includes the SDG Target 12.3 to 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, by 2030.

The food bank model is uniquely positioned to address the paradox of global hunger and food loss and waste. Food banks are truly the "green" hunger relief solution, engaged in a sophisticated, environmentally beneficial surplus recovery and redistribution system. Food banks are community-based, nonprofit organizations that procure surplus, wholesome food that might otherwise be lost or wasted in the food system and redirect these surpluses to feed the hungry through networks of local charities and grassroots organizations. Food banks represent a "triple win" in the communities where they operate, reducing food wastage and protecting the environment, providing food assistance to hungry and vulnerable people, and strengthening civil society through support of local humanitarian charities.

FIGURE 1

FOOD BANKS' COLLECTIVE IMPACT



*Not inclusive of food banks that are independent or not affiliated with GFN, FA, or FEBA
Source: GFN, FEBA, and Feeding America

While hunger relief is at the heart of what food banks do, food banks also address the environmental impact of food waste. By diverting food from landfills, food banks reduce land occupation and carbon emissions as well as ensure the environmental and economic costs that go into the production, processing, and retail stages are not in vain. Global climate change is a key driver of the recent rise in global hunger. Ultimately drought, excessive rainfall, and extreme temperatures pose a profound threat to agricultural productivity, yield, and sustainability.[5] In fact, there is evidence of a correlation between countries that experience high levels of climate shocks and high levels of food insecurity.[6]

Today, food banks prevent billions of kilos of safe, wholesome food from ending up in landfills and contributing to greenhouse gas emissions, which then contribute to climate change and variability. Formal partner food bank networks of GFN, including Feeding America (United States) and the European Food Banks Federation (members in 24 European countries and four projects), provided data and useful insights on the scope of their respective networks. Numerous independent food banks and other regional networks, which GFN has only limited information or access to, have not been included in this report, though these food bank organizations similarly have a significant impact in their communities, reducing hunger and mitigating food wastage.

Globally, food banks redirect what would have become 2,956,484 cubic yards of food waste in landfills and put it to good use to feed hungry people. According to Waste360, just 1 million cubic yards of debris could fill a US football stadium and would extend 500 feet high.[7] If the edible, nutritious food that food banks distribute to needy people were sent to a landfill, the impact would be tremendous—equivalent to almost 300,000 large dump trucks or 896 Olympic swimming pools filled with food.

Food banks in the GFN, FEBA, and Feeding America networks cumulatively mitigate an estimated 10.54 billion kilograms of carbon dioxide equivalent (CO_2e) annually. That means that food banks provide an environmental impact equal to nearly 2.2 million passenger vehicles driven or 1.8 million homes' energy in the United States per year.

Hunger is a complex problem, requiring numerous interventions to address, from efficient agriculture and commercial systems, development aid, equitable economic growth, and government action. The food bank model is a critical intervention that represents an important part of the solution: local action for global change. The unimaginable amount of food directed to landfills presents two opportunities: to drastically reduce both loss and waste overall, ultimately creating a healthier and more sustainable planet, and to divert otherwise healthy, edible food to food banks for distribution to the vulnerable people around the world who need it most.

Agenda for global action

Ending hunger and undernutrition (SDG 2) is the foundational SDG that catalyzes improvements across other SDGs, including environmental sustainability, economic development, community health, equity and inclusion, education, and peace.[8] Food banks are a "green" hunger intervention, providing food assistance to the hungry, building up civil society, supporting sustainable food systems, and protecting the environment through community-based, multisector collaborations. With its tremendous collective impact on reducing hunger, food waste, and greenhouse gas emissions that contribute to a changing climate, food banking can play a vital role in creating a more environmentally sustainable, just, and equitable society.

RECOMMENDED ACTIONS FOR GOVERNMENTS

- Quantify food loss and waste—support food recycling and redistribution
- Establish public policies to encourage surplus food donation
- Partner with food banks to expand the informal social safety net
- Direct Official Development Assistance funding to support food banking expansion
- Measure food insecurity using the Food Insecurity Experience Scale

RECOMMENDED ACTIONS FOR BUSINESS

- Measure and manage food loss and waste
- Develop and implement a global donation policy
- Standardize date coding
- Increase support and resources for local food banks

RECOMMENDED ACTIONS FOR INTERNATIONAL AGENCIES AND MULTILATERAL INSTITUTIONS

- Gather better data
- Utilize food banks for logistics and storage to support in-kind emergency relief

HUNGER IS A SOLVABLE PROBLEM

Ending hunger, undernourishment, and food insecurity—and all of the maladies associated with them—is one of the greatest challenges of our time. Even after decades of progress, an estimated 821 million people—one in nine—still go hungry, and this number is again on the rise.[9] Hunger rips at the social fabric of families, communities, and nations, creating a cycle of poverty and despair. It also undermines social and economic development, costing the world trillions in lost human potential.[10]

Paradoxically, while millions of vulnerable people around the globe go without adequate food to meet their basic needs, more than enough food is produced in the world to feed everyone. Approximately one-third of all food produced for human consumption (1.3 billion tons) is lost or wasted.[11] The amount of food wasted is enough to feed more than a billion hungry people.[12] Food wastage is also a drain on precious natural resources, including land, water, and energy, and is responsible for significant greenhouse gases that contribute to climate change.

The link between hunger and food wastage is a challenge that poses significant societal and environmental risks now and into the future. Over the next three decades, projections show that demand for food is expected to rise by an estimated 60 percent as the global population increases.[13] Recovering wholesome, edible surplus to help feed the hungry, preserve resources, and strengthen food systems can help improve global food security in the coming decades. Food banks are critical to that effort.

Food banks are community-based, nonprofit organizations that procure surplus, wholesome food that might otherwise be lost or wasted and redirect it to feed the hungry through networks of local charities and grassroots organizations. Food banks represent a "triple win" in the communities where they operate—reducing food wastage and protecting the environment, providing food assistance to hungry and vulnerable people, and strengthening civil society through support of local humanitarian organizations.

Source: United Nations

The international community has committed itself to ending hunger and reducing food waste as part of the United Nations 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs). SDG 2 (Zero Hunger) calls for the eradication of hunger and all forms of malnutrition as a fundamental condition for sustainable development. This includes ensuring access by all people, particularly the poor and people in vulnerable situations, to safe, nutritious, and sufficient food all year round. SDG 12 (Responsible Consumption and Production) calls for sustainable consumption and production patterns and includes the SDG Target 12.3 to 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, by 2030.

Waste Not, Want Not is the second report by The Global FoodBanking Network (GFN) to highlight the impact of local food bank organizations, operating in more than 60 countries around the world, on addressing the food security needs in their communities. The first in the series, *The State of Global Food Banking 2018: Nourishing the World*, provided a snapshot of the GFN member food banks, the scale of their operations, and the socioeconomic conditions of the nations in which they operate. This 2019 report looks at how the collective work of food banks around the world aligns to the SDGs 2 and 12.3.

Throughout the world, food banks operate at the nexus between SDGs 2 and 12.3, mobilizing vast local networks of voluntary, grassroots organizations and initiatives, helping transform lives and communities, and creating global impact as a green intervention toward zero hunger. Formal partner networks of GFN, including Feeding America (United States) and the European Food Banks Federation (with members and associate members in 28 European countries), provided data and useful insights on the scope of their respective networks. Numerous independent food banks and other regional networks for which GFN has only limited information or access have not been included in this summary report, though these food bank organizations similarly have a significant impact in their communities, reducing hunger and mitigating food wastage.

SUSTAINABLE DEVELOPMENT GOAL 2: ZERO HUNGER

Hunger is on the rise after decades of progress

Since 2014 the number of undernourished people globally has increased, reversing an almost decade-long trend of decline. Today there are 821 million people who are chronically hungry, or not receiving the daily calories they need to function for a healthy life.[14] About 770 million people are "severely food insecure," which means that they run out of food and/or have to involuntarily go without food for an entire day and, in many instances, for an extended period.[15] The prevalence of severe food insecurity is on the rise and is higher than it was in 2014 in every region of the globe except North America and Europe.[16]

Even more people—over 2 billion worldwide—suffer from serious micronutrient deficiencies as a result of poor and unvaried diets,[17] or what is sometimes referred to as "hidden hunger."[18] Hidden hunger can be hard to detect yet can devastate families and communities, especially in vulnerable populations like children and women who have greater reliance on micronutrients for health, maternity, and child development.[19]

Micronutrient deficiency is measured by a lack of regular access to the diet-based vitamin and mineral building blocks of the human body that promote health, growth, and well-being. In the global public health sphere, iron, iodine, and vitamin A are the most critical micronutrients, and deficiencies represent a threat to the development of populations in low-income countries. Severe deficiencies in these micronutrients can result in blindness, low IQ, anemia, stillbirth, birth defects, and death. Approximately one-third of children under five in the developing world are vitamin A deficient.[20]

Stunting, or impaired growth and development due to lack of nutrition, affects 151 million children under five, or 22 percent globally.[21] The effects of stunting are devastating and long term: once a child is stunted, the effects cannot be reversed, and lifelong consequences can include impaired cognition and poor educational performance.

The global cost of malnutrition annually is US$19 billion in lost adult work performance and related health expenditures.[22]

"Food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life."

—1996 United Nations World Food Summit

2 ZERO HUNGER

SDG Target 2.1

By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious, and sufficient food all year round.

Loss of productivity due to undernutrition has been estimated at 3 to 16 percent (or more) of GDP in low-income countries.[23] Poor diet is the number one risk factor driving the world's disease burden.[24]

The estimated impact of all forms of malnutrition—including stunting, wasting and micronutrient deficiencies, and overweight—on the global economy is as high as US$3.5 trillion per year, an average of US$500 per individual.[25]

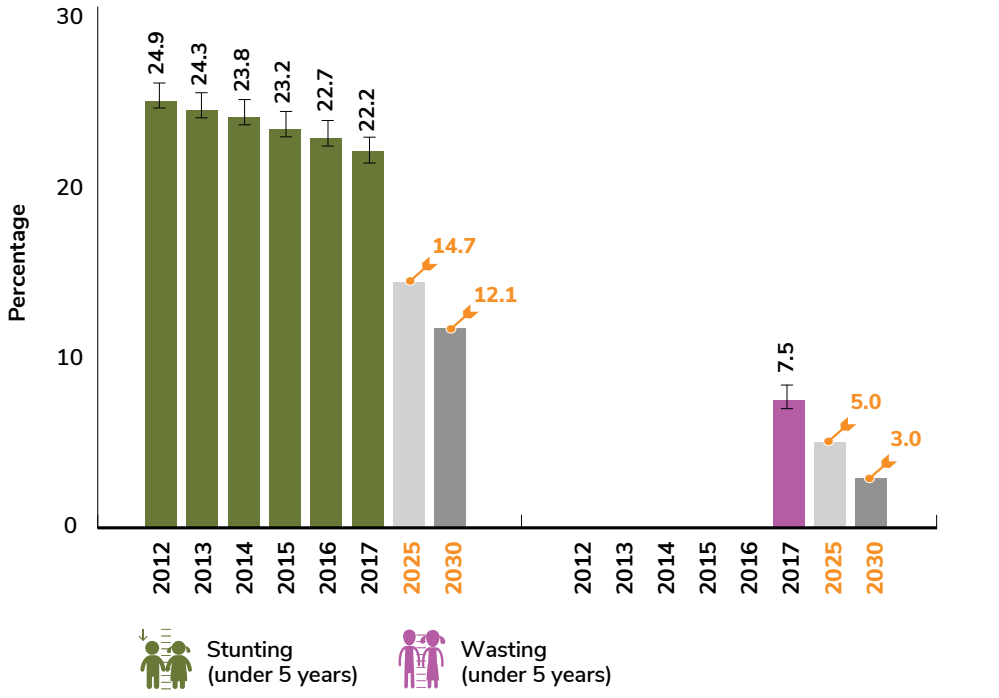
Hunger undermines the future of the world's children

Hunger in households with children is pervasive around the globe. In more than 147 countries, 41 percent (605 million) of children under the age of 15 live in a moderately or severely food-insecure household, with 19 percent (260 million) in a severely food-insecure household. Forty-five percent (688 million) live with an adult who reported not having enough money to buy food in the previous 12 months.[26, 27] Only 51 percent of babies aged 6 to 23 months get the recommended minimum number of meals in a day.[28]

Because children are still developing, they are particularly vulnerable to food insecurity and poor nutrition. Shorter-term health effects of hunger include impaired cognition, decreased concentration, and poor academic performance.[29] Longer-term health effects include vitamin deficiencies, weakness, growth delays, susceptibility to disease, and death.[30] Hunger impacts children's mental health as well: food-insecure, school-aged children had parent-reported anxiety scores that were more than double the scores for children with no hunger.[31] Child hunger can cause an estimated 10 percent reduction in lifetime earnings.[32]

FIGURE 2

PERCENT OF CHILDREN UNDER 5 SUFFERING FROM VARIOUS FORMS OF HUNGER AND CHRONIC UNDERNUTRITION



Source: Data for stunting and wasting is based on UNICEF, WHO, and International Bank for Reconstruction and Development/World Bank.

Box 1: Understanding food insecurity and hunger

FOOD SECURITY IS HAVING, AT ALL TIMES, both physical and economic access to sufficient food to meet dietary needs for a productive and healthy life.[33] Most people around the world are food secure, especially those in high- and middle-income countries, as they are able to afford and obtain enough nutritious food for their needs and do not live in hunger or fear of hunger. Food insecurity, by contrast, is experienced in various forms worldwide in countries of varying degrees of development.

There are four main dimensions to food security:

- **Availability—**the physical existence of food, determined by the level of food production, food security stocks, and trade
- **Access—**having enough resources to obtain food in sufficient quantity, quality, and diversity for a nutritious diet; includes economic and physical resources at the household, community, and national levels
- **Utilization—**how individuals make use of available and accessible food for sufficient energy and nutrients; includes decisions to purchase, prepare, consume, and allocate food for the household
- **Stability—**the availability, access, and utilization of food over time

To be considered food secure, all four dimensions must be fulfilled simultaneously. Even if your food intake is adequate today, you are still considered to be food insecure if you have inadequate access to food on a periodic basis, risking a deterioration of your nutritional status.

Food insecurity is divided into two general types: (1) chronic food insecurity and (2) transitory food insecurity. It is measured at the household level, whether it has one individual or multiple members. These measures take into account the fact that food insecurity and hunger could be associated with various forms of malnutrition, including undernutrition and overweight. Experience-based food insecurity scales were initially developed and validated in the United States, and similar tools followed in various countries in different regions of the world.

Food insecurity of one type or another is experienced in nearly every country, wherever poor, vulnerable, or deprived persons lack sufficient access to food for economic or other reasons. Even in high-income countries, a condition of poverty or financial hardship can bring food insecurity to families and communities. War and civil strife; shifts in the global economy, including rises in global food and oil prices; and climate variability or change all can affect food security throughout the world, with especially severe effects for people in developing nations and emerging market economies.

"HUNGER" IS A PROXY FOR FOOD INSECURITY AND IS USED IN THAT CONTEXT IN THIS REPORT

The term "hunger" is often used interchangeably with food insecurity,[34] though the measure for hunger compiled by FAO is defined more specifically as "prevalence of undernourishment."[35] For the purposes of this report, "hunger" is used broadly to indicate a prevalence of food insecurity, characterized by various forms of severity, including chronic hunger, undernourishment, and nutrient deficiency. With that understanding, wherever poor, vulnerable, or deprived persons lack sufficient access to food for economic or other reasons, hunger may be present.

The impact on children starts with their mothers

The health of children is inextricably linked to the health of their mothers. A woman's nutritional status before and during pregnancy and while breastfeeding determines the nutritional status of her baby and young child. In fact, the first two years of a child's life have profound consequences for his or her health, brain development, cognition, and overall well-being. Poor nutrition can result in stunting, the effects of which are irreversible.[36] Undernourished girls have an increased likelihood of becoming undernourished mothers with low-birthweight babies.[37]

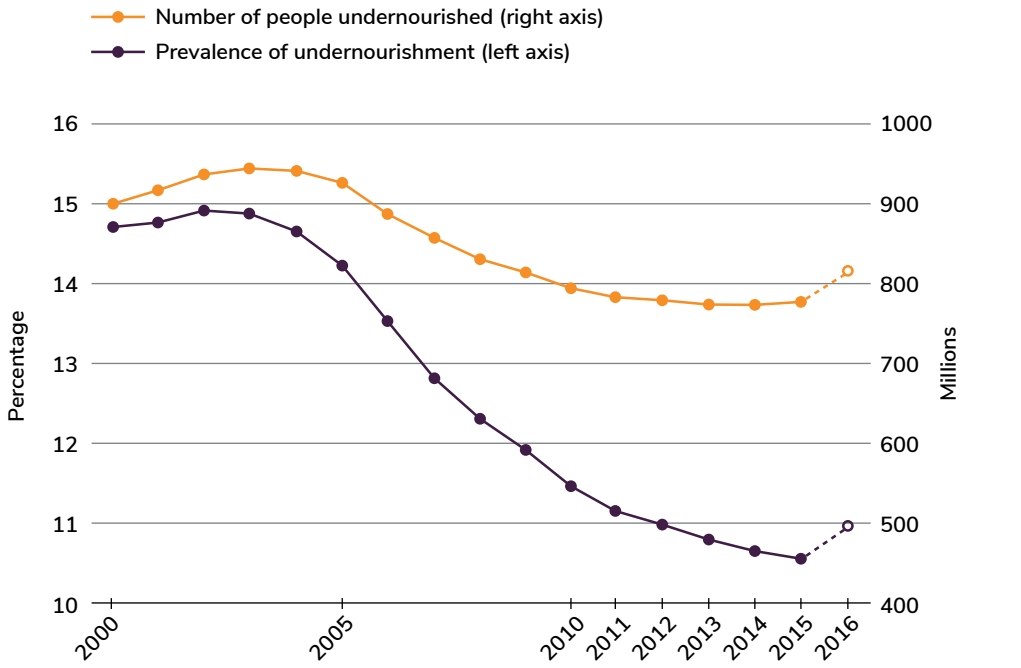
Maternal and child undernutrition is responsible for an estimated 3.5 million deaths annually among children under age five.[38] Nearly 22.5 percent of the world's children under age five suffer from stunting, or reduced growth, and 7.5 percent suffer from wasting, or underweight.[39] Four-fifths of undernourished children live in 20 countries across four regions—Africa, Asia, the western Pacific, and the Middle East.[40]

The costs of hunger are high

Hunger has a high cost to individuals, families, and society. Countries with very high levels of poverty and chronic malnutrition face long-term reductions in the human capital necessary for social

FIGURE 3

THE NUMBER OF UNDERNOURISHED PEOPLE HAS BEEN ON THE RISE SINCE 2014, REACHING AN ESTIMATED 821 MILLION IN 2017



Source: Food and Agriculture Organization of the United Nations

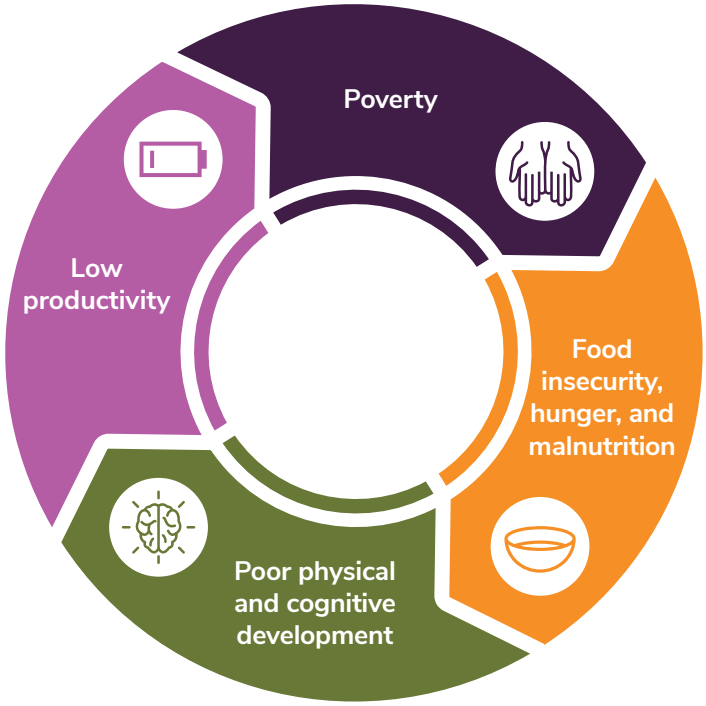
and economic growth. If not effectively addressed, hunger may be multigenerational and a hindrance to future socioeconomic development. The incidence of hunger rips at the social fabric of families, communities, health systems, businesses, and governments while creating a cycle of poverty and despair.

No country is completely safe from the challenge of hunger. However, in higher-income countries, policies, programs, institutions, and infrastructure can mitigate these challenges. In emerging economies and developing nations lacking these advantages, the poor disproportionately suffer and widespread chronic hunger or undernourishment can occur. In the most food-insecure nations and regions of the world, chronic hunger or chronic food insecurity and undernourishment may reach crisis levels, especially in those nations suffering severe economic distress, civil strife, war or other hostilities, or natural disasters. Simply stated, the magnitude and human toll of food insecurity in developing nations is profoundly different and much more severe than in higher-income countries.

Interventions that successfully help the poor achieve food security are vitally important, both locally and globally. In the poorest communities, where people live on US$2, nearly two-thirds of the household income goes for food.[41] When lacking access to food, either short term or long term, a family's priority is simply averting hunger on a daily basis.

FIGURE 4

FOOD INSECURITY, MALNUTRITION, AND POVERTY



Source: GFN

Box 2: Measuring hunger and food insecurity

THE TERM "HUNGER" IS WIDELY USED, but often outside the context of a scientific definition. Hunger is usually understood as an uncomfortable or painful sensation caused by insufficient consumption of food and ranges from short-term physical discomfort to severe, life-threatening lack of food. Better definitions and understanding of hunger and food insecurity—as well as indicators to measure them—are important to addressing these conditions.

Several current measures look at aspects of food access and nutrition; while complementing each other, they have some limitations. FAO uses hunger to describe the condition of undernourishment. However, the severity and magnitude of hunger in developing countries, conflict zones, and other crisis situations are essentially different than hunger in developed nations. Comparing "hunger" rates between developed and developing countries, therefore, should be done with caution. In addition, the number of countries with insufficient or no trend data for the key nutrition indicators is high. Measurement is complicated since food insecurity and nutrition insecurity are interconnected, and both conditions are rooted in poverty and affected by cultural, social, economic, and political factors that differ by context.[42]

Prevalence of undernourishment: The prevalence of undernourishment is commonly defined as chronic hunger or chronic food deprivation. It represents the proportion of people who face dietary energy consumption (measured in kilocalories) below a set threshold of energy requirement norms. Dietary energy is needed to promote basic health, weight maintenance, and performance. The measurement estimates the percentage of undernourished people in each country over time based on changes in the overall availability of food, access to adequate food, and the sociodemographic characteristics of the population. This measurement is widely used by all government agencies and NGOs in the field, particularly in the developing world.

Food Insecurity Experience Scale (FIES): A project of FAO, FIES is an eight-question survey designed to be administered face to face to gauge a respondent's access to adequate food. In 2014 Gallup World Poll introduced the FIES into its population survey, covering 147 countries and four territories. The FIES questions ask about varying degrees of access, including worry/anxiety about having enough food to reducing portions to ultimately skipping meals/not eating for a whole day. Measurements are comparable across countries and can capture the percentage of children living in food-insecure households.

Micronutrient deficiency: According to the *Global Nutrition Report*, micronutrient deficiency is "suboptimal nutritional status caused by a lack of intake, absorption, or use of one or more vitamins or minerals."[43] Lack of adequate iron, zinc, vitamin A, folate, vitamin B12, and iodine are among the most common issues globally since they are generally only satisfied in diverse diets. One general indicator of micronutrient deficiency is anemia, as it is caused by the deficiency of many micronutrients, and its effects are exacerbated by several diseases.[44]

Stunting: According to the *Global Nutrition Report*, stunting is a form of "growth failure" that develops over time in children under five who have limited access to food, health, and care. Stunting is also referred to as chronic undernutrition, although stunting also has other causes. The height-for-age nutritional index is used to measure stunting in children. Stunting is often associated with cognitive impairments such as delayed motor development, impaired brain function, and poor school performance.[45]

Wasting: According to the *Global Nutrition Report*, wasting, or acute malnutrition, is when children are thin for their height because of acute food shortages or disease. It is characterized by a rapid deterioration in nutritional status over a short period of time in children under five years of age. Wasted children are at higher risk of dying. Wasting can be measured using the weight-for-height nutritional index or mid-upper arm circumference (MUAC). The two levels of severity of acute malnutrition are moderate acute malnutrition (MAM) and severe acute malnutrition (SAM).[46]

SUSTAINABLE DEVELOPMENT GOAL TARGET 12.3: REDUCE FOOD WASTE AND LOSS

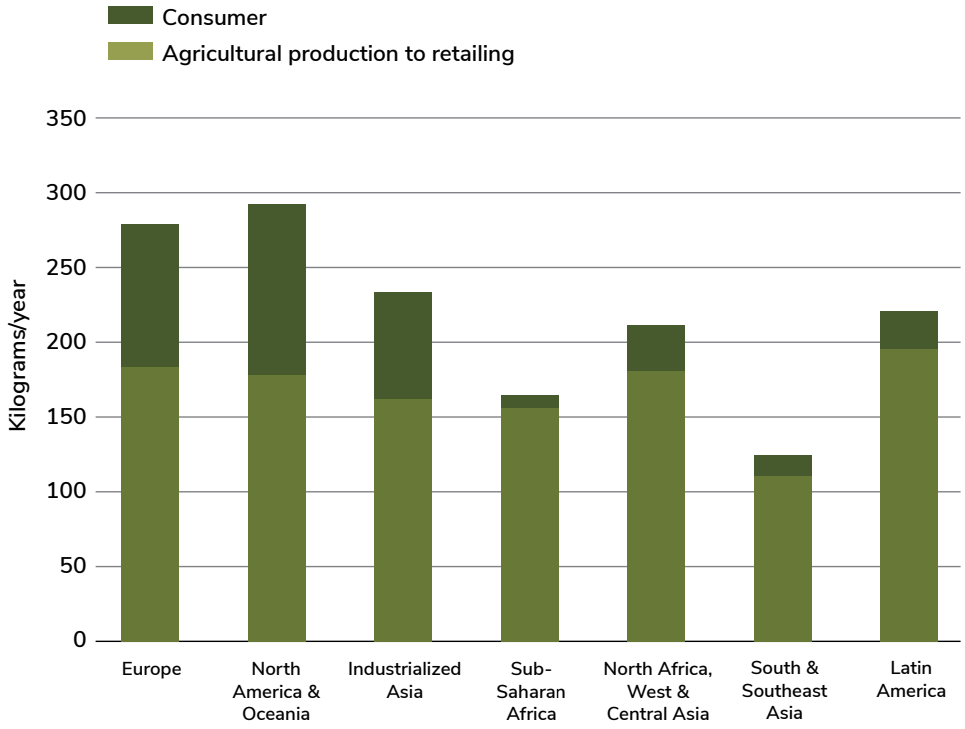
Food loss and waste are a crisis for food security and the environment

In a world with so much hunger, one might be expected to think there is also a shortage of food. Yet the reality could not be more different. Currently, more than enough food is produced in the world to feed everyone. Major strides in agricultural production over the past three decades have enabled global food production to significantly outpace population needs and growth. Crop production alone has increased by an estimated 48 percent between 1985 and 2005.[47] FAO estimates that global food production now produces more than one-and-a-half times enough food to feed every person on the planet.[48]

Despite enormous gains in agricultural productivity and improvements throughout food systems from the farm to the table, 1.3 billion tons of edible food is lost

FIGURE 5

PER-CAPITA FOOD LOSSES AND WASTE (KG/YEAR)



Source: FAO 2011

or wasted,[49] leaving millions hungry. One-third of all food produced for human consumption worldwide is wasted or lost, accounting for more than one-fourth of calories, enough to feed 1.9 billion people an adequate diet for a healthy life.[50]

Rates of food wastage in developed countries are as high as in developing countries, and on a per-capita caloric basis, waste is much higher. Countries that are the most productive on a per-capita basis tend to waste the most: North America, Europe, and Oceania, which boast the highest per-capita food production, also have the highest per-capita waste as measured in calories.[51]

Food loss and waste (FLW or "wastage")[52] occurs at points all along the value chain. Where it is most likely to occur varies depending on the economic level and food system infrastructures of communities, nations, and regions around the world. In the high-income regions of North America, Europe, and Oceania, volumes of wasted food are higher in the later stages of the supply chain during processing, distribution, and consumption. In many emerging market economies, food waste and losses occur mainly in fields at early stages of the food value chain.[53] Globally, an estimated 30 to 40 percent of post-harvest food production is lost. Fruits, vegetables, root crops, and tubers have the highest wastage rates of all food produced.

FOOD LOSS refers to food or commodities lost on the farm and after harvest but before packaging or retail (i.e., in fields, at harvest, in storage, or during transport). Food loss is more prevalent in low-income countries and emerging market economies where infrastructure such as adequate cold chain (refrigeration capacity), food storage, and transportation is often lacking.

FOOD WASTE is food lost at the retail or consumer levels—at grocery stores and restaurants and in consumers' homes, for example. This is due to wasteful food distribution and consumption patterns in high-income countries. Based on global averages, food wastage per capita in high-income countries has more than double the impact on climate change than food wastage in low-income countries.

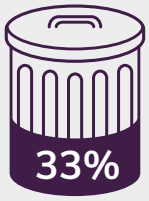
Source: FAO, Food Wastage Footprint & Climate Change (Rome: FAO, 2015).

SDG Target 12.3

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 by 2030.

FIGURE 6

HOW MUCH FOOD IS WASTED EVERY YEAR?



of food produced in the world for human consumption is either lost or wasted

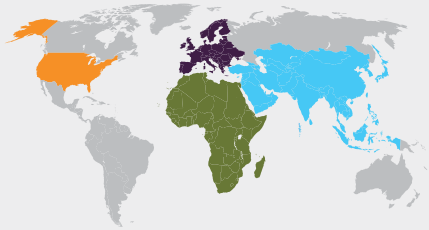
This amounts to approximately

$1 trillion

worth of waste

Fruits and **vegetables** have the highest wastage rates

Average annual waste per consumer



EUROPE & US

95-115 kg

AFRICA & ASIA

6-11 kg

Food banks globally redistribute nearly **2.68 million metric tons of edible surplus food** to hungry people

If **25%** of the food currently lost or wasted globally could be saved, it would be enough to feed **870 million** hungry people in the world

- The food currently wasted in **Latin America** could feed **300 million** people.
- The food currently wasted in **Europe** could feed **200 million** people.
- The food currently wasted in **Africa** could feed **300 million** people.

Sources: FAO and GFN

> The total cropland used **to grow food that is never eaten** is equal to almost all the cropland in Africa.

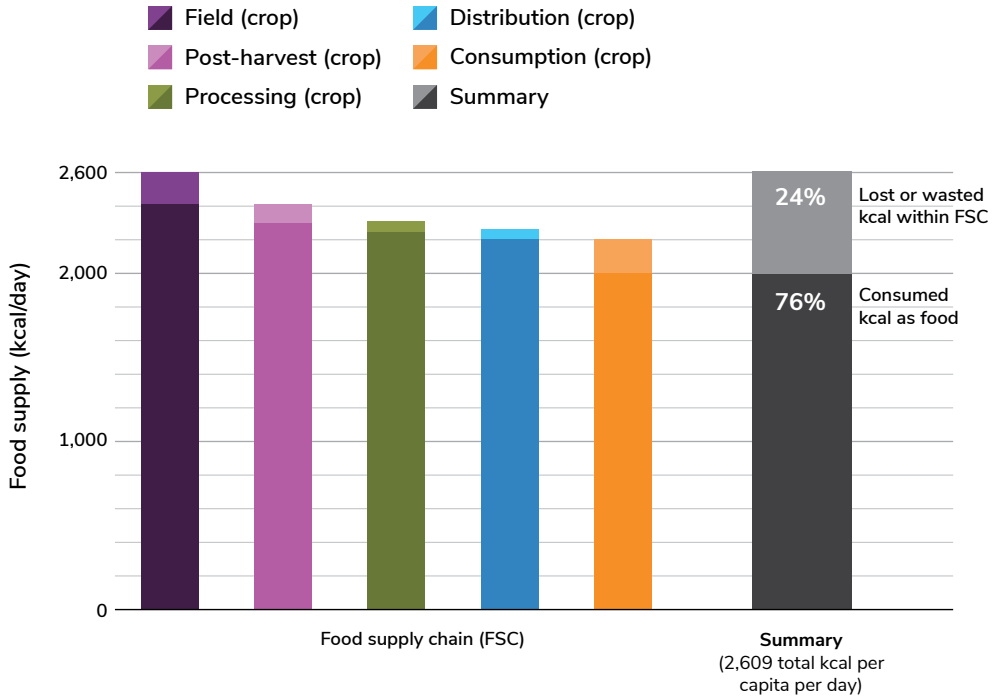
Food security, climate change, and malnutrition can no longer be addressed independently of one another[54]

Wasted food isn't simply calories denied to impoverished people who could be fed, but a massive misuse of natural and labor resources, including land, water, and energy. This adds to the uncertainty of the world's ability to produce adequate food to meet growing demand. Food waste lowers overall global food availability in the present and heightens environmental impacts that, in turn, threaten future food production aims and food security. Upwards of 30 percent of global cropland is dedicated to food that ultimately is wasted, and 20 percent of the fertilizer applied globally each year is used to grow food that ends up as waste.[55] Globally, the total amount of food wastage in 2007 occupied almost 1.4 billion hectares, equal to about 28 percent of the world's total agricultural land area.[56] Land usage for food produced and not consumed is an area equal to almost all cropland in Africa.[57]

Food wastage has a significant environmental impact beyond squandered resources. Food waste that decomposes in landfills releases methane, a greenhouse gas that is 28 times more potent than carbon dioxide. Methane emissions caused by food wastage are equivalent to 87 percent of all global car and truck emissions, according to FAO.[58] It is

FIGURE 7

GLOBAL FOOD SUPPLY CHAIN LOSSES



Source: M. Kummu et al., "Lost Food, Wasted Resources: Global Food Supply Chain Losses and Their Impacts on Freshwater, Cropland, and Fertiliser Use," *Science of The Total Environment* 438, no. November (2012): 477–89.

estimated that food waste produces the equivalent of 4.4 billion tons of greenhouse gases[59]—8 percent of all global greenhouse gases[60]—which thereby contribute to climate change and variability. So pronounced is the problem of food loss and waste on the environment that if the greenhouse gases from food landfills were a country, it would rank third in emissions after the United States and China in terms of impact on global warming.[61]

Recent analysis suggests the problem will only worsen. By 2030 food wastage is expected to grow at a rate of 1.9 percent annually to 2.1 billion tons[62] of food, valued at US$1.5 trillion.[63] The 2050 carbon footprint from food waste could triple that of 2010.[64] If current trends continue, urban food wastage alone, which ends up in landfills, is predicted to increase world methane (CH_4) emissions from 34 to 48 gross kilograms (Gkg).[65]

Exacerbating the direct environmental cost of food wastage are the commensurate economic costs. Economic losses from global FLW are valued at about US$680 billion in industrialized countries and US$310 billion in developing countries.[66] The United States alone spends over US$218 billion growing, packaging, and moving food that is never eaten.[67] In the European Union an estimated 88 million tons of food is wasted with an economic cost of €143 billion. Estimates suggest that the economic impact of reducing food waste by 50 percent between 2012 and 2020 in the European Union alone could lead to a savings of €94.4 billion (US$130 billion).[68] The overall environmental cost of FLW is estimated at US$700 billion globally and the social cost at more than US$900 billion.[69]

The negative impacts of food wastage increase the further along the supply

Box 3: You need to measure it to manage it

ONLY A FEW COUNTRIES—accounting for just 7 percent of the world's population—currently measure and publicly report on how much food is lost or wasted within their borders. While most countries do not track waste at the national level, food loss can be measured through the Global Food Loss Indicator (GFLI), which focuses on food loss changes over time by country, from production until (but not including) the retail level for 10 main commodities. The index is based on a food loss percentage, which measures the levels of country-by-country food losses. FAO is assisting countries with measuring their harvest and post-harvest losses to effectively track progress toward this SDG.

> **Food security, climate change, and malnutrition** can no longer be addressed independently of one another.

chain a product flows from the farm or field. While all food lost and wasted has an impact, losses further along the supply chain, including processing, distribution, retail, and household, are more labor- and input-intensive and expensive and therefore more damaging to the environment. Imagine not just the land, water, and labor used to produce the food, but the harvesting, processing, packaging, transporting, and storing—all lost in a landfill.

Reducing food waste either through source reduction or food assistance for the hungry provides substantial social good. For businesses reducing excess food production, the financial impact can be significant. For example, a study conducted by Champions 12.3—a coalition of executives from governments, businesses, international organizations, research institutions, farmer groups, and civil society dedicated to mobilizing action and progress toward achieving SDG Target 12.3 by 2030—found a 99 percent return on investment by companies that deployed food wastage strategies. The Champions 12.3 study determined that for every US$1 invested at facilities for food waste reduction, the median company site realized a $14 return through innovations and efficiencies adopted to reduce food waste.[70]

Reducing food losses and waste remains one of the most effective means to improve food security now and in the coming decades. If food wastage were reduced by half, the target of SDG 12.3, we would need to produce 1,314 trillion kilocalories less food globally than is currently produced—enough calories to feed approximately 1 billion people, or the projected global population growth between 2015 and 2028.[71] This is essential to helping reach the SDG 2 goal of zero hunger.

In addition, if food wastage were reduced by half over the next decade, approximately 26.2 gigatons of carbon dioxide could be prevented. Further, avoiding deforestation for additional farmland and food production would prevent an additional 44.4 gigatons of emissions.[72] The European Union already has the goal of cutting food wastage by 50 percent by 2025.


2500Kg

> **Climate change is an acute threat** to global development and efforts to end poverty. Without urgent action, climate change impacts could push an **additional 100 million people** into poverty by 2030. —*World Bank 2018*

HUNGER CAN BE ENDED BY 2030

The commitment to ending hunger and reducing food waste must remain strong

History and experience show the challenge of hunger is solvable. Our world has enough food to feed everyone, with surplus, and reaching zero hunger is more possible today than at any other time in human history.

Despite the large numbers of people who are hungry and undernourished, the amount of people hungry today is far fewer than just four decades ago. From more than one-third of the global population hungry in the 1970s,[73] the percentage has fallen to 11 percent. Numerous factors have propelled these gains, including global economic growth, development, and increased agricultural productivity, with the past two decades alone witnessing the number of undernourished people drop by almost half.

In just two generations, substantial progress has been made against hunger. Many developing countries that used to suffer from famine and widespread hunger now largely meet the nutritional needs of their most vulnerable populations. The occurrence of major famines and mortality due to food shortages has diminished significantly, compared to any other period of human history, with the notable exceptions of armed conflict, natural disaster, and tyranny.[74]

When famines or food crises do occur, the UN World Food Programme and associated aid agencies have established a 50-year track record of working effectively to address the problem through direct aid and fostering food and agricultural development programs that build resilience against future chronic and acute food insecurity. Together with FAO, multilateral and multisector efforts work with governments and other partners to promote and monitor food security, nutrition, and sustainable agricultural practices for millions of people around the world.

Ongoing progress to reduce hunger in the most affected regions has been aided by the increased availability of food per person, achieved through increasing agricultural yields spurred by the "Green Revolution." Access to more food by more people has further been aided by rapid economic growth throughout the world and increased trade, combined

with reductions in the number of people living in extreme poverty and the establishment of domestic food assistance programs deployed by governments as part of social welfare agendas.

These achievements were also made possible by the extraordinary commitment of the international community to work actively to support the principle of freedom from hunger as a basic human right and as the foundation of a more peaceful, prosperous, and just world. This commitment was affirmed in 2000 in the UN Millennium Declaration and again in 2015 in the 2030 Agenda for Sustainable Development. Governments, leaders, and a broad coalition of stakeholder institutions came together to build upon the spirit of cooperation and momentum to tackle global challenges through multilateralism and international policy shaping.[75] Both agendas were adopted by all UN member countries at the time and have provided a shared blueprint for peace and prosperity for people and the planet, now and into the future.

At the heart of the Agenda for Sustainable Development are the 17 SDGs, which are an urgent call for action by all countries—developed and developing—in a global partnership to pick up where the Millennium Development Goals

> Ending hunger has a large payoff for individuals, societies, and the world. Estimates show that eliminating global hunger could **boost global GDP by US$276 billion in 2030.**

(MDGs) left off. They recognize that ending hunger, poverty, and other deprivations must go hand in hand with strategies that improve health and education, reduce inequality, and spur economic growth—all while tackling climate change and working to preserve and protect the planet.

Ending hunger and undernutrition by 2030 (SDG 2) is the foundational SDG, which follows the effort to halve the number of people worldwide who suffer from extreme poverty and hunger in the first 15 years of this century under the MDGs. Progress toward SDG 2 is essential to meeting numerous other SDGs such as health and well-being, quality education and gender equality, good jobs and economic growth, and tackling climate change and sustainable production and consumption.

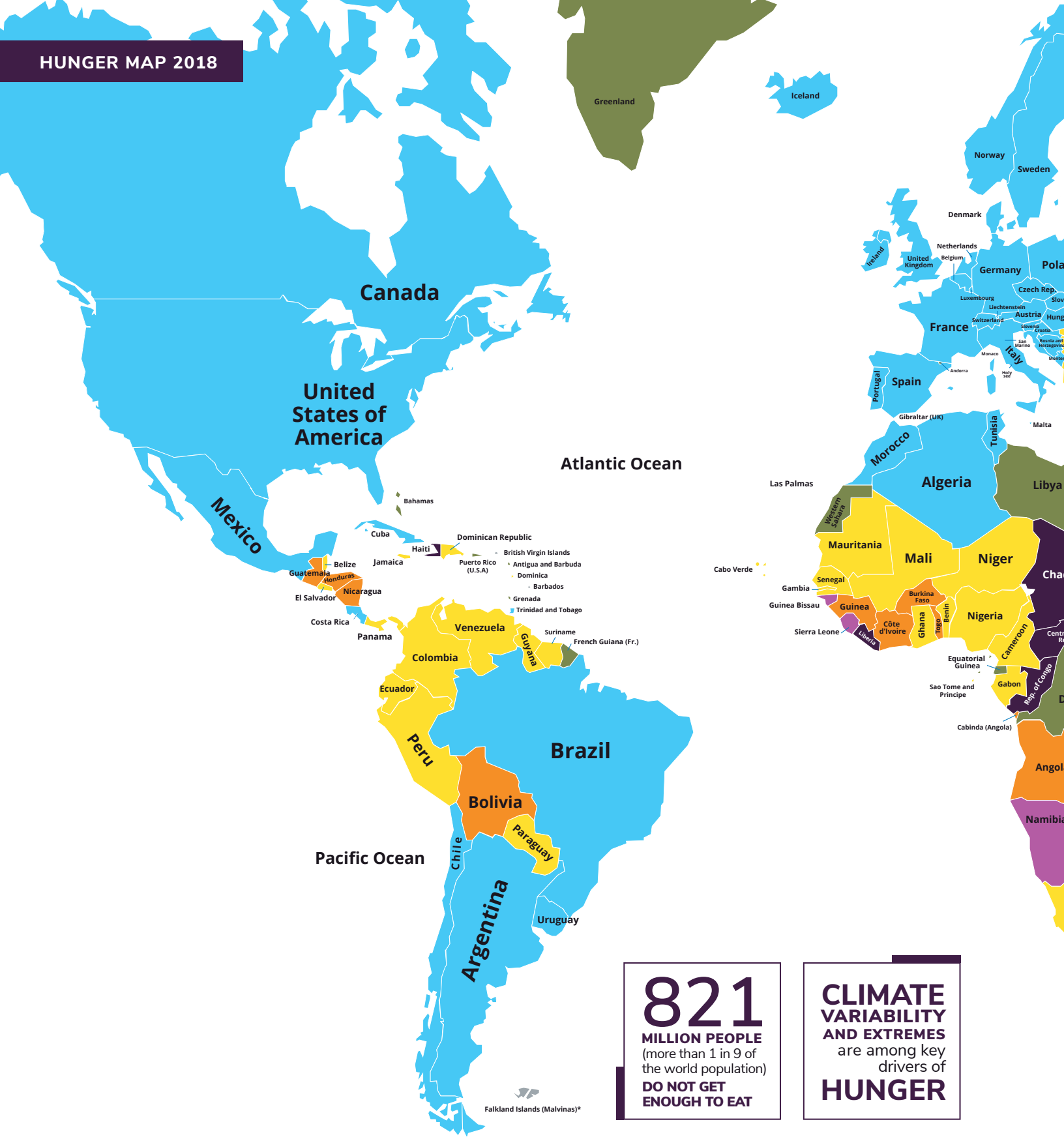
Unfortunately, the reversal in previous trends and the rise of hunger since 2014 has stalled progress toward SDG 2.[76] In 2018 the hunger situation in many regions of the globe worsened, as in Latin America and Africa, or has only marginally improved, as in much of Asia. Even in high- and middle-income countries in North America, Europe, Asia, and Oceania, uneven economic growth and persistent levels of poverty have not completely eliminated food insecurity. More must be done—and urgently—to secure the gains already made in previous decades and to reach the goal of zero hunger.

The international community recognizes that progress toward this goal is complex and multifaceted and requires the combined, collaborative efforts of multiple stakeholders from the public and private spheres. A strategy of economic development alone isn't enough to prevent food insecurity or malnutrition. According to research published in *The Lancet*, a 10 percent increase in economic growth reduced chronic malnutrition by only 6 percent.[77] This asymmetry suggests economic growth is hampered without addressing the problem of hunger.

Ending hunger has a large payoff for individuals, societies, and the world. Estimates show that eliminating global hunger could boost global GDP by US$276 billion in 2030.[78] Investing in nutrition will also have a tremendous impact. For example, for every 10 percent increase in income per capita, the prevalence of stunting declines by an estimated 3.2 percent.[79]

"For the first time in human history, the end of hunger is well within our reach. While courageous and passionate individuals have been working to end this scourge for decades, a recent confluence of political will, public-private partnerships and funding has made this ambition possible. . . . Increasing food security not only lifts the shadow of hunger from hundreds of millions of our fellow human beings, it also builds up economies and trade and minimizes the risk of political instability."

—Kofi Annan, former Secretary General of the United Nations, from "4 Ways to End Hunger in Africa" (2016)


HUNGER MAP 2018
Greenland
Iceland
Norway
Sweden
Denmark
Ireland
United Kingdom
Netherlands
Belgium
Germany
Pola
Czech Rep.
Luxembourg
Liechtenstein
Austria
Switzerland
France
Slovenia
Croatia
San Marino
Monaco
Italy
Andorra
Holy see
Portugal
Spain
Gibraltar (UK)
Malta
Tunisia
Morocco
Algeria
Libya
Las Palmas
Western Sahara
Mauritania
Mali
Niger
Cabo Verde
Senegal
Gambia
Guinea Bissau
Guinea
Burkina Faso
Nigeria
Sierra Leone
Liberia
Côte d'Ivoire
Ghana
Togo
Benin
Cameroon
Equatorial Guinea
Gabon
Rep. of Congo
Sao Tome and Principe
Cabinda (Angola)
Angol
Namibia
Canada
United States of America
Mexico
Atlantic Ocean
Bahamas
Cuba
Haiti
Dominican Republic
Puerto Rico (U.S.A)
British Virgin Islands
Antigua and Barbuda
Dominica
Barbados
Grenada
Trinidad and Tobago
Jamaica
Belize
Guatemala
Honduras
El Salvador
Nicaragua
Costa Rica
Panama
Venezuela
Suriname
French Guiana (Fr.)
Guyana
Colombia
Ecuador
Peru
Brazil
Bolivia
Paraguay
Chile
Argentina
Uruguay
Pacific Ocean
Falkland Islands (Malvinas)*
821
MILLION PEOPLE
(more than 1 in 9 of the world population)
DO NOT GET ENOUGH TO EAT
CLIMATE VARIABILITY AND EXTREMES
are among key drivers of
HUNGER
PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION (PERCENT) IN 2015-17
<5%
5-14,9%
15-24,9%
25-34,9%
35% and over
Very low
Moderately low
Moderately high
High
Very high
Missing or insufficient data

Undernourishment is defined as the condition in which an individual's habitual food consumption is insufficient to provide the amount of dietary energy required to maintain a normal, active, healthy life. The indicator is reported as the prevalence of undernourishment (PoU), which is an estimate of the percentage of individuals in the total population that are in a condition of undernourishment. To reduce the influence of possible estimation errors in some of the underlying parameters, national estimates are reported as a three-year moving average.

Source: FAO, IFAD, UNICEF, WFP, and WHO, *The State of Food Security and Nutrition in the World 2018: Building Climate Resilience for Food Security and Nutrition* (Rome: FAO, 2018).

Further information is available at https://www.wfp.org/content/2018-state-food-security-and-nutrition-world-sofi-report.

The designations employed and the presentation of material in this map does not imply the expression of any opinion whatsoever on the part of WFP concerning the legal or constitutional status of any country, territory or sea area or concerning the delimitation of frontiers.

* A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).

** Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.

*** Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined.

Source: World Food Programme

FOOD BANKS ARE AN INDISPENSABLE GREEN INTERVENTION TOWARD ZERO HUNGER AND SUSTAINABILITY

Having first emerged in high-income countries to address the problems of inequality and food insecurity not adequately addressed by public-sector social safety net programs, food banks are now rapidly expanding in emerging market economies (middle- and low-income countries), where adequate social stability and functioning commercial food systems allow the food bank model to effectively serve vulnerable people.

The potential to scale this model even further holds great promise for addressing long-term global food security in thousands of communities, helping to reach zero hunger in a way that also supports the economic, social, and environmental good.

The food bank model has been proven successful in a multitude of ways. As a hunger relief intervention, food banks impact each of the four dimensions of food security—availability, access, utilization, and stability over time (see box 1). In order to distribute food directly to food-insecure people or to local beneficiary agencies, food banks operate dynamic systems of logis-

FIGURE 8

HOW FOOD BANKING WORKS


EXIT出口
No Exit
(非出口)

tics and warehousing infrastructure that function similarly to commercial wholesale food operations. Each food bank typically acts as a central hub for a specific geographical region or community. It secures resources; sorts product, ensures only safe, wholesome food enters the system; inventories product; and then distributes food to a network of local beneficiary agencies and feeding programs, directly and indirectly serving food-insecure people.

Because of these efforts, food banks are highly effective at uniting public and private initiatives to reduce food insecurity in emerging market economies where public-sector nutrition safety net programs may be underfunded, overburdened, or nonexistent. In 24 GFN countries, for example, food banks operate child or school meal programs supplementing government meal programs or providing them where they do not exist.

Box 4: Brief history of the food bank movement

JOHN VAN HENGEL developed the concept of food banking in the late 1960s. Van Hengel, a retired businessman, had been volunteering at a soup kitchen that was trying to find food to serve the hungry. One day he met a desperate mother who regularly rummaged through grocery store garbage bins to find food for her children. She suggested that there should be a place where, instead of being thrown out, discarded food could be stored for people to pick up—similar to the way banks store money for future use. With that, the food banking model was born.

Van Hengel established St. Mary's Food Bank in Phoenix, Arizona, as the nation's first food bank. In the food bank's first year, he and his team of volunteers

distributed 275,000 pounds of food to people in need. Word of the food bank's success quickly spread, and other states began to take note. By 1977 food banks had been established across the United States. In 1979 van Hengel established Second Harvest, which was later called America's Second Harvest. In 2008 the network changed its name to Feeding America to better reflect the mission of the organization. Today, Feeding America is the largest domestic hunger relief organization in the United States—an efficient network of 200 food banks serving more than 40 million low-income people.

In 2006 The Global FoodBanking Network was founded by four of the world's leading national food bank networks—Red Argentina de Bancos de Alimentos, Food Banks Canada, Bancos de Alimentos de México, and Feeding America—guided by the visionary leadership of Robert Forney and William Rudnick, with the support of Christopher Rebstock—to promote food banking expansion around the world.

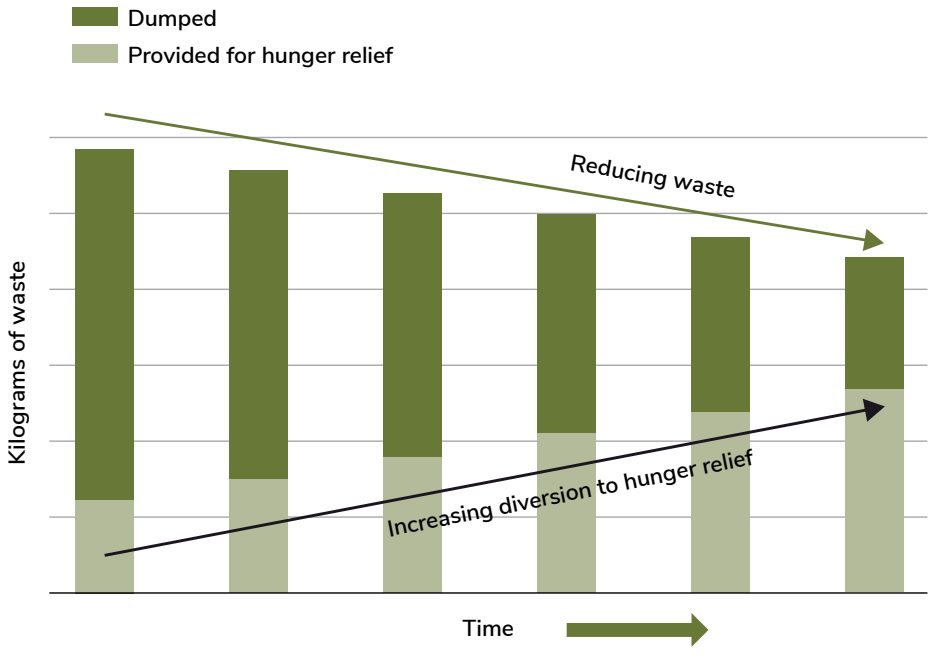
The food bank's model of procuring surplus food for hunger relief, originally viewed as an economical way to divert edible, wholesome food that would otherwise be thrown away, is today a vital response to the growing environmental and food security threats posed by food wastage. While many in-kind food assistance programs distribute benefits to food-insecure people, food banks offer a "green" hunger intervention by collecting safe, unsaleable food (that would otherwise be wasted) and distributing it to hungry people, thereby mitigating the environmental impacts of greenhouse gas emissions that would have been emitted from landfills.

To provide food assistance to the needy, food banks essentially undertake a massive global food recycling effort encompassing all stages of the commercial food system. They glean fields and conduct agricultural recovery at farms and produce markets, pick up excess inventory at food manufacturers, storage facilities and packing houses, receive unsaleable items from packaging errors or internal quality control mistakes at the processor, and recover close-to-code or cosmetically unmarketable produce at retailers and excess product at food service facilities.

In highly developed countries, food banks often have greater opportunities to procure surplus at the processing and retail levels, since food suitable for food banks is lost mainly at later stages in the supply chain such as markets, grocers, food service, and other end users. In these countries food banks have adopted various models utilizing technology to identify the potential surplus food and

FIGURE 9

DESIRED CHANGE IN WASTE FLOW



Source: A.T. Kearney

prevent wastage. In the United States, Feeding America's MealConnect, for instance, matches food businesses with safe, excess food that may be thrown away directly to the Feeding America food banks. Local grocery stores, restaurants, hotels, and other food service operations with excess use MealConnect to alert the local food bank of the donation. The food bank links the donation with a nearby agency for immediate pickup. Other "virtual food bank" models have been implemented in Argentina, Colombia, Ireland, South Africa, the United Kingdom, and other countries where food banks are revolutionizing local food rescue through the better use of technology, securing food donations that a decade ago would have been lost to the garbage heap.

In middle- and low-income countries, where food loss occurs largely in the earlier stages of the supply chain, the greatest opportunity for food banks is to divert nutritious food from surplus product on farms, storage facilities, and

> To progress toward the twin goals of **ending hunger and reducing food wastage,** policymakers should support and promote the further development and scaling up of food banks.

transport companies to feed hungry people. To prevent food losses in the field and post-harvest storage, food banks initiate numerous food recovery efforts. In Mexico, for example, Banco de Alimentos de México (BAMX) rescued more than 8.6 million kilograms of fresh produce from farms for hunger relief in 2017. In Colombia, GFN member and national food bank network ABACO (Asociación de Bancos de Alimentos de Colombia) secured more than 4 million kilograms of produce. Agriculturally gleaned, local produce represents nearly one-fifth (19 percent) of all food provided by food banks in Colombia.

Across the globe, food banks work in partnership with businesses to meet their objectives to feed more hungry people with surplus food from the commercial food chain. From local farmers to grocers and multinational food companies, food banks rely on these collaborations. The partnership of businesses and food banks at each stage of the commercial food value chain manifests a virtuous process, providing shared value for social and environmental good.

The in-kind provision of food through food banks or public food programs is an imperative. Experts on food and nutrition policy agree that governments and businesses should be encouraged to develop "large-scale, high-impact public-private engagements and alliances to fight seemingly intractable malnutrition issues."[80] To progress toward the twin goals of ending hunger and reducing food wastage, policymakers should support and promote the further development and scaling up of food banks. While not a replacement for government programs or policies to reduce hunger, food banks serve as a cross-sector, intermediate step, filling gaps in the social safety net and sustaining human development gains while offering cost-effective and efficient models for extending hunger relief.

When scaled, food banks can operate more broadly as critical elements of civil society, linking and mobilizing stakeholders from the public and private sectors to reduce food insecurity among vulnerable populations and building resilience over the long term in those communities, helping to secure gains toward zero hunger.

THE FOOD BANK MODEL IS ALREADY HELPING SPEED PROGRESS TOWARD THE SDGS

Advancing SDG 2

Since the founding of the first food bank 50 years ago, the food bank model has become a massive nongovernmental movement for food assistance, operating in countries at all stages of development. The networks of GFN, FEBA, and Feeding America, which are the focus in this report, collectively serve 62.5 million people.

An outgrowth of informal, grassroots networks of private-sector and civil society stakeholders, food banks mobilize resources to address food insecurity in local communities. These efforts are often supported by the public sector as an accompaniment to government social safety net programs. While not part of government per se, food banks serve as a sort of "safety net of the safety net,"[81] providing food assistance to vulnerable people who are not adequately reached by government food assistance programs or filling in gaps where no programs exist.

The scope of the food bank model in providing hunger relief can be widespread. In countries where food banks have been long established, such as Argentina, Australia, Canada, Mexico, and the United States, they play a crucial role in supplementing extensive public-sector, low-income support programs. The United States, where the food bank model was founded, has the largest number of member food banks and network of local charitable agencies. Feeding America, the national food bank network and the country's largest hunger relief organization, serves more than 45 million low-income people. In Europe, the European Food Banks Federation (FEBA) members* from 28 European nations provide food assistance to 8.1 million most deprived people.[82] In countries where GFN has an affiliated food bank, more than 9 million impoverished people are receiving assistance from food banks and national food bank networks.

GFN, FEBA, and Feeding America food banks alone account for 1,400 local or regional food banking organizations around the globe. Additional food bank networks exist throughout

"Food is a key priority among people living in poverty, often absorbing most of their financial, mental, and emotional resources. Uncertainty about 'where the next meal is coming from' generates profound stress and anxiety, with the net result of focusing on here-and-now thinking. Planning for the future is seldom an option for hundreds of millions of people across the planet."

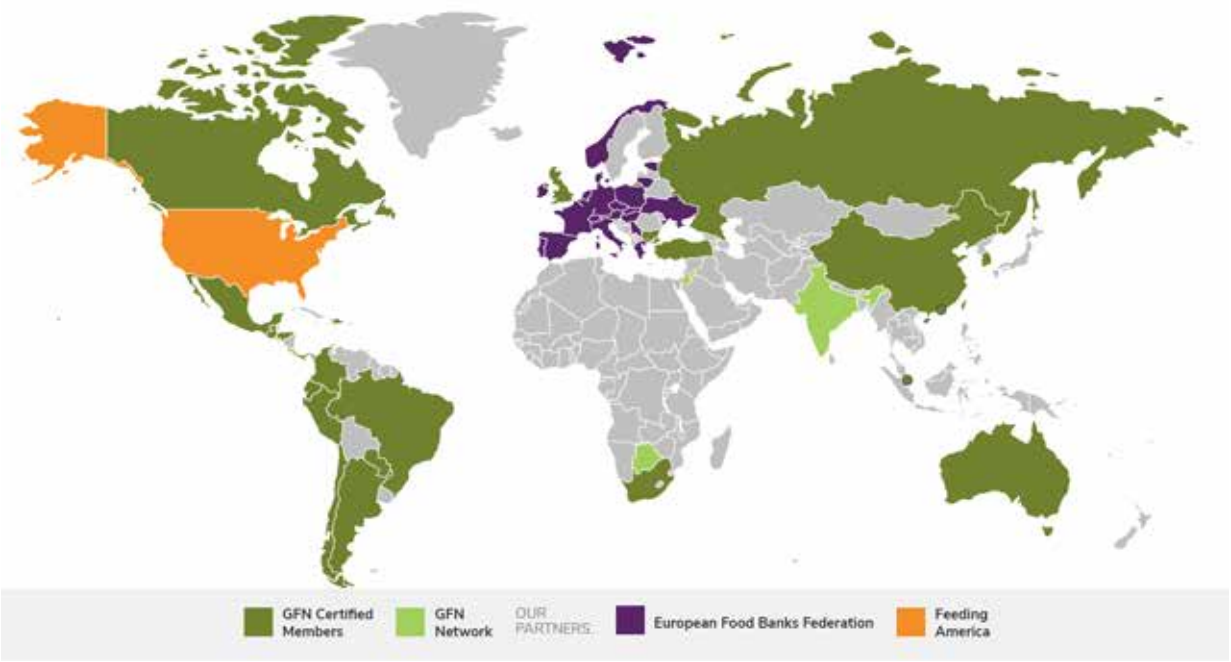
—H. Alderman, U. Gentilini, and R. Yemtsov, The 1.5 Billion People Question: Food, Vouchers, or Cash Transfers? (Washington, DC: World Bank, 2018).

* FEBA and GFN share two members.

Food banks collectively serve nearly 62.5 million people globally.

FIGURE 10

THE GLOBAL FOODBANKING NETWORK IN BRIEF



30 COUNTRIES

811 FOOD BANKS IN NETWORK

MORE THAN **9M** PEOPLE SERVED

4.04 MILLION CHILDREN SERVED

55K BENEFICIARY ORGANIZATIONS

472M+ KILOS DISTRIBUTED

Source: For people served, GFN Pulse Survey 2019; for all other data, GFN Network Survey 2018.

THE GLOBAL FOODBANKING NETWORK was established to advance one of the most promising, community-based solutions to hunger—food banking.

GFN's mission is to alleviate global hunger by developing food banks in communities where they are needed and by supporting food banks where they exist. GFN works with a network of 33 organizations in 30 countries representing 811 food banks. Since 2006 GFN has partnered with local leaders to support the launch of food banking organizations in 15 countries, making it possible for people in need to have access to food and empowering communities to support those who suffer from hunger and poor nutrition.

Through a thorough vetting and certification process, GFN ensures that members achieve the highest levels of service delivery, safety, transparency, and accountability and affirms that members are in compliance with legal, governmental, and operational standards.

Members benefit from expert technical assistance, partnership opportunities, peer-to-peer mentorship, education and training, and a robust grant program. GFN accelerates the impact of member food banks by offering capacity-building programs to improve efficiency, speed scalability, and significantly increase nutritious food distribution. Additionally, GFN creates and expands partnerships to diversify food sourcing and supports programs that increase fruits, vegetables, and protein-rich foods. In FY2017, GFN's capacity-building grants program provided safe and nutritious food for more than 865,000 additional people.

On average, GFN members distributed 57.46 kilograms per person and 8,127 kilograms per agency in 2017. In addition, 13 food banks reported food purchase programs to supplement donated food in 2017, 16 food banks reported nutrition training and education programs, and 14 food banks reported conducting "virtual food bank" distribution models.

the world, and even more operate independently in various countries. A summary of food banking around the world is presented on page 42.

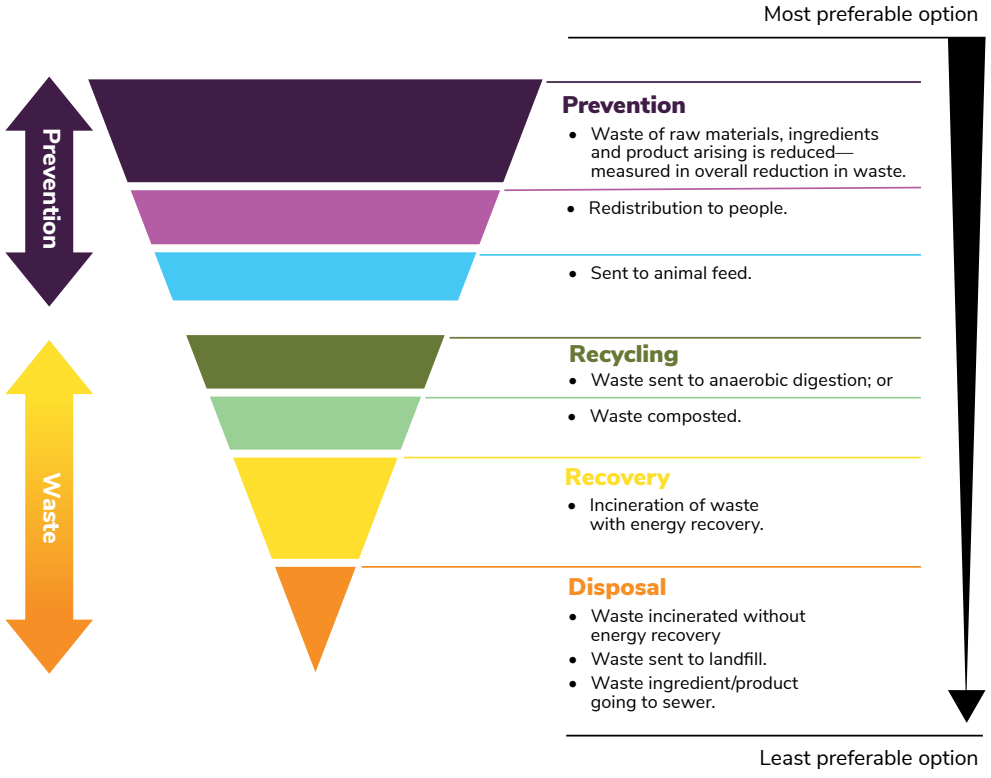
Advancing SDG Target 12.3

As part of their vitally important role in food assistance to the hungry, food banks also play an indispensable role in addressing food wastage and its environmental impact. The food bank model is reliant on available surpluses of in-kind resources to feed the hungry. Food banks receive donated food, most of which is surplus from various points in the food value chain and much of which would otherwise be lost to landfills, if not used for humanitarian purposes. Sources include farmers, manufacturers, retailers, food service providers, and other donors. Food banks are an efficient intermediary between the food donors and the local beneficiaries. By recycling safe, edible surplus and unmarketable food for local distribution, the food bank option to prevent food wastage is second only to prevention (see figure 11).

Throughout the world, food banks prevent billions of kilograms of safe, wholesome food from ending up in landfills and contributing to greenhouse gas emissions, which then contribute to climate change and variability. GFN food banks distributed more than 472 million kilograms of food and grocery

FIGURE 11

FOOD AND DRINK MATERIAL HIERARCHY



Source: WRAP

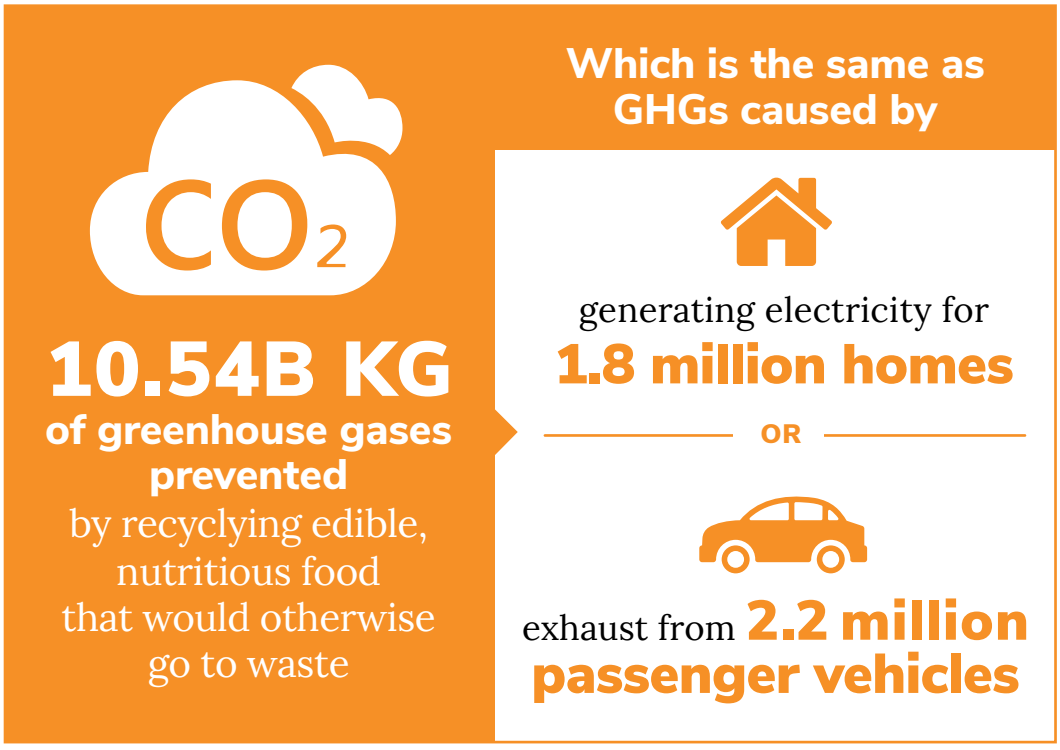
product, much of which would have ended up in a landfill. In Europe, FEBA members collectively sourced more than 756,000 tons of food, providing 4.1 million meals. The Feeding America network of 200 food banks provided more than 4.2 billion meals to people in need and rescued more than 3 billion pounds of food that would have otherwise gone to waste.[83]

Globally, food banks redirect what would have become 2,956,484 cubic yards of food waste in landfills and put it to good use to feed hungry people. According to Waste360, just 1 million cubic yards of debris could fill a US football stadium and extend 500 feet high.[84] If the edible, nutritious food that food banks distribute to needy people were sent to a landfill, the impact would be tremendous: it is equivalent to almost 300,000 large dump trucks or 896 Olympic swimming pools filled with food.

Food banks for which GFN has data cumulatively mitigate greenhouse gas emissions by a conservative estimate of 10.54 billion kilograms (including the food waste mitigation and prevention actions of Feeding America food banks, FEBA member food banks, and GFN member food banks). That is equal to the impact of driving almost 2.2 million passenger vehicles or generating electricity for 1.8 million homes in the United States in a year.*

FIGURE 12

ANNUAL ENVIRONMENTAL IMPACT OF FOOD BANKS



*Figures do not account for the carbon emissions of food bank operations.

Source: GFN

HUNGER INTERVENTION SPOTLIGHT

Box 5: Government support

GOVERNMENTS NOW routinely administer and operate domestic food assistance and targeted nutrition assistance programs such as school meals as integrated elements of national welfare systems or social safety net regimens. Multinational organizational programs such as the World Bank Group's Global Agriculture & Food Security Program (GAFSP) also provide food assistance. These programs include cash transfers to the poor, vouchers, in-kind provision of food or commodities, school meal programs, food coupons or electronic benefit transfers, and similar efforts, all with the aim of providing food access or nutrition assistance to food-insecure people.

According to a study by the World Bank (2017), direct food distribution and food vouchers are a predominant form of support in low- and middle-income countries.[85] Using data from 108 countries, food and voucher programs covered just over 20 percent of the population in the countries studied.[86] Effective food-based social assistance programs across varying contexts and countries can make a tangible difference in the food security of low-income people. Too often, however, the application of effective food assistance, especially in poor countries with large populations of undernourished people, may be uneven or too sparse. Even in middle- and high-income countries, with broad social safety net programs, many socially deprived or low-income people require additional support to address food security concerns.

In a high-income country such as the United States, more than 80 percent (US$98 billion) of the US Department of Agriculture's (USDA) budget is directed to government-supported food assistance. Among the 15 food and nutrition programs are the Supplemental Nutrition Assistance Program (SNAP, formerly food stamps), a voucher program that serves more than 40 million low-income people, and school feeding programs that serve 25 million children and youth.[87] An astonishing one in four Americans received assistance annually from one of the USDA nutrition assistance programs.[88]

In middle-income countries such as Brazil, extensive public food assistance programs have also been established. Brazil's Fome Zero (zero hunger) strategy has proven highly successful since its inception in 2003. Fome Zero deploys a dual strategy of immediate assistance and longer-

term measures to achieve food security. The program includes cash transfers to the impoverished, financial support to smallholder farming families, and community nutrition projects that include school feeding.

Since the establishment of Fome Zero, malnutrition among children under the age of two has fallen from 12.7 to 3.5 percent, and the interventions have contributed to a 47 percent drop in nutrition-related infant mortality.[89] Brazil's Fome Zero initiatives have provided food assistance to more low-income people at a faster rate than any other food assistance program in the world. The success of Fome Zero has led nearly 100 countries, especially those in emerging market economies, to adopt similar strategies and interventions to better address their own problems of hunger and poverty.[90]

FOOD BANKS ARE MAKING A DIFFERENCE IN THE LIVES OF MILLIONS

While the impact of food banking today is great, the potential for expanding the model to reach underserved areas of the world is even greater. This section summarizes the current state of foodbanking in regions around the world.

Food banks in high-income countries

Food banks in high-income countries in North America, Europe, and Oceania largely serve low-income people impacted by short-term food insecurity, mostly because of the strong economic foundations and well-established social safety nets in those nations that help prevent more permanent food insecurity. Nevertheless, analysis indicates that the number of low-income people supported by food banks in high-income countries exceeds 57 million people.[91]

According to Feeding America, for example, 46 million people in 15.5 million households were served by its food bank network in 2014, a substantial portion of the 17.6 million US households estimated to have experienced food insecurity that year.[92] While overall the prevalence of food insecurity in the United States is low, millions meet the societal definition of food insecure and are uncertain about the source of

their next meal or have to sacrifice quality or quantity to make their meals stretch.[93] While hunger in the United States and other high-income countries is fundamentally different from hunger in middle- and low-income nations, these countries still have vulnerable populations that face low wages, high costs of living, and insufficient income supports. Economic downturns can also hit these populations harder, causing "hidden hunger" and food insecurity to rise.

In Australia, Canada, and most of Europe the prevalence of undernourishment is less than 2.5 percent of the general population.[94] Yet poverty, income inequality, and food insecurity are still prevalent. GFN's member Food Banks Canada/Banques alimentaires Canada is serving 850,000 people with food assistance through a network of 4,000 local beneficiary agencies, including remote and rural regions of the country with higher rates of poverty.[95]

In Europe more than 118 million people, or 23.5 percent of the entire population of the European Union, were at risk of poverty or social exclusion,[96] with 7.5 percent "severely materially deprived." This includes people who are at risk of going without something important such as utilities, heat, a car, medical care, or a telephone.[97] FEBA estimates that more than 8 million "most deprived persons" rely on food banks in European nations served by the network.

FIGURE 13

FOOD BANKS: THE GREEN HUNGER INTERVENTION

In Australia an estimated 3.6 million people—including an estimated one in five children—were food insecure in 2018. Indigenous Australian populations were especially vulnerable to food insecurity, with 30 percent of indigenous adults worried about going without food.[98] In one of the wealthiest nations on earth,[99] as measured by per-capita GDP, Foodbank Australia served more than 652,000 low-income persons in 2017, including nearly 200,000 children.[100]

Research shows that in higher-income countries the food bank model can have a profound impact on overall food security and dietary intake. According to a study by Feeding America, participants showed significant improvements in food security,

UNITED KINGDOM

The social value of food banking

A new study in the United Kingdom estimates that the collection and redirection of surplus food by GFN member FareShare, the country's largest hunger relief charity, saves the country £51 million (or US$66 million) annually. This is comprised of an estimated £6.9 million in social value to the recipients and £44 million in savings to the country on things like health services, criminal justice, schools, and the social service system. The potential for growth is huge. If one-half of the available surplus food could be redirected to hungry people who need it, the value to the country could be as much as £500 million per year.

"We have always known food is a catalyst for good, and now we are able to evidence it," said FareShare chief executive Lindsay Boswell. "A balanced, nutritious diet provides obvious health benefits, but sharing a meal also helps alleviate loneliness. The costs avoided by the state by charities serving up nutritious meals with FareShare food is worth a staggering £51m every year, and that's with us accessing just 6 percent of the surplus food available. Imagine what we could do if we could get more of it."

Creating a national movement to reduce food waste

In the UK, public, private, and nonprofit entities, including GFN's member FareShare, worked together to reduce food waste at all levels. Between 2007 and 2012, a multilevel partnership led by the Waste and Resources Programme (WRAP) helped the UK reduce household-level food waste by 21 percent. Keeping that momentum going is Courtauld 2025, a voluntary multisector agreement to reduce food wastage. The agreement among food companies, retailers, NGOs, city councils, and others—including FareShare—calls for cuts to waste and greenhouse gas emissions associated with food and drink by at least one-fifth per person by 2025. Led by WRAP, Courtauld 2025 is funded by various governments and supports the UK government's desire to build a "zero waste economy." WRAP estimates that achieving the target would result in a 40 percent reduction of food waste by 2025, putting the UK on track to deliver a 50 percent reduction by 2030. FareShare's commitment to this target is significant. FareShare, which last year distributed 15 million kilograms of food to an estimated 772,390 people a week, works with other organizations—such as Feedback, which accepts not-yet-harvested foods, and Olio, which helps distribute food already cooked—to collect food at all levels of the supply chain to ensure no food goes to waste.

fruit and vegetable intake, food stability, and management of their diabetes.[101] Another study showed that food bank users in Canada achieved similar levels of nutrient intake as higher-income residents.[102] The use of food pantries (food bank beneficiary organizations providing groceries) boosts dietary variety, energy intake, number of meals consumed, and fruit intake.[103] Food bank beneficiary organizations such as neighborhood food pantries are correlated with a 0.4 percent decrease in the probability of a household being food insecure.[104] In low-income communities with few or no supermarkets, food pantries play a vital role in helping residents access nutritious foods. In one US study, one-quarter of census tracts with no supermarkets had at least one food pantry, providing food assistance to vulnerable populations.[105]

TURKEY

TIDER (Basic Needs Association) provides basic needs beyond food

Begun as the Food Banking Association in 2010, TIDER was established by founding president H. Serhan Süzer, an executive in the food industry, and nine other members from the private sector. The food bank's initial efforts were limited to supporting neighborhood food banks (food pantries) and other grassroots NGOs, sharing its experience and knowledge as the pioneer food banking model in Turkey.

In 2014 the food bank's leadership decided to help address the root causes of hunger and poverty by supporting job skills training in the belief that employment is a basic need for preventing hunger. It added skills development and employment assistance projects into its program, becoming TIDER. Its first Support Market was established in Istanbul Maltepe in 2015.

By providing employment and skills training to low-income people and supporting them through food banking, TIDER developed an indigenous, sustainable model to fight hunger and poverty. TIDER provides these services through its Support HR platform, assisting clients in finding jobs and earning an independent living.

Turkey has one of the largest populations of refugees in the world, with refugees dispersed throughout the country in municipalities and small communities. TIDER provides food assistance to refugees and all impoverished people in its service areas as well as disaster relief services, projects for women in rural regions to empower them socially and economically, and local projects providing food and other necessities targeted to children in poverty.

In 2017 TIDER was recognized for its work, winning GFN's Global Food Banking Innovation Award for the Support HR model. The Global Food Banking Innovation Award recognizes exceptional programs, highlighting innovative service models that can be shared across cultures and borders. In 2018 TIDER became GFN's certified member in Turkey in recognition of the organization's high standards in food safety and food assistance. TIDER is now a national network of 15 food banks in seven cities, reaching 78,660 people and distributing 550 tons of food and grocery product in 2018.

Food banks in emerging market economies

Food banks and food banking models have been widely adopted as a community-based hunger intervention in emerging market economies in the last two decades. Academic research on food bank models in Brazil and Uganda—adapted to local conditions and needs—shows food banks can be effective modes of food assistance and key elements of progressive social policies. They reinforce and spur public-sector programs while helping address the root causes of hunger.[106] Further establishing and scaling food banks in middle- and low-income countries would help support government food assistance activity in emerging market economies and buttress global efforts to achieve zero hunger.

Latin America

An estimated 39.3 million people are undernourished in Latin America, an increase of 400,000 people since 2016 according to FAO.[107] Latin America (including the Caribbean) produces enough food to feed the entire population of the region, and many Latin American nations are significant exporters of food and commodities around the globe. The increased prevalence of hunger in Latin America is not from a lack of available food but the difficulty of the poorest to consistently access it.[108]

In Latin America, food banks in the GFN system distributed more than 200 million kilos of food and grocery products to impoverished people in 2017.

MEXICO

World Bank quantifies food waste

Knowing that global food waste data are largely based on estimates, the World Bank sought to quantify food waste in Mexico and provide a blueprint for future action.[109] Using data from the National Survey of Income and Expenditure in Households in Mexico and consumption data at restaurants, hotels, and schools, the World Bank estimated that the total food loss and waste in the country is 20.4 million tons a year. This calculates to 36,886,460,870 kilograms of CO_2 emissions, the equivalent of the annual emissions of almost 15 million cars. The economic cost of these losses is US$368,864,591. Integral to the policy recommendations, which include education/training and boosting existing infrastructure, is the diversion of edible surplus food to the food bank system.

Today, Bancos de Alimentos de México (BAMX) distributes 128,995,445 kilograms of food to needy Mexicans.[110] If all the food that is wasted in Mexico were redistributed, it could feed every hungry person in the country.[111]

Nearly half of GFN member organizations are in Latin America, though most are not fully scaled in the communities where the need is greatest. They operate in nations where pervasive food insecurity exists despite significant economic growth, including Argentina, Brazil, Chile, and Mexico. Food banks, while not a replacement for more established government social interventions, effectively partner with the public sector to extend services and provide better access to vulnerable people.

In Brazil, for example, Mesa Brasil SESC is a national network of food banks helping improve the quality of life of people living in poverty from a perspective of social inclusion.[112] Mesa Brasil serves more than 1.4 million Brazilians through a public-private partnership with government and business in more than 500 municipalities. Each Brazilian state is also a strategic partner as part of the government's Fome Zero initiative. In Mexico the government's principal food assistance program, Programa de Apoyo Alimentario (PAL), a food voucher support program, serves nearly 3 mil-

DOMINICAN REPUBLIC

BARD recovers and redistributes food in Constanza

Banco de Alimentos República Dominicana (BARD) works to end hunger in the Dominican Republic through the rescue and distribution of food to people in need. Between 2013 and 2017, 3.6 million servings of food were distributed by the food bank to an estimated 3,000 people through 45 beneficiary institutions in seven provinces in the country.

According to a survey conducted by FAO in 2014, about 2.5 million pounds of food are lost every week in the operations of 130 companies. Ninety-three percent, or 2.3 million pounds, of this food is lost at the production stage. While 84 percent of those surveyed said they are willing to donate their surplus products, only 51 percent did so at the time of the survey. Most of the producers who were surveyed are located in the Constanza area, meaning that a large part of the 2.3 million pounds lost each week is located in Constanza. This is a huge opportunity to collect these untapped resources and allow BARD to reach thousands of additional people who are currently on BARD's waiting list.

Recently, the food bank completed its cold chain system and can now distribute perishable products such as fruits, vegetables, dairy, meats, and fish. A food rescue program that collects the surplus product from the fields in Constanza is a win-win: it alleviates waste as well as improves the nutritional basket of donations and consequently the nutritional status of the beneficiaries. BARD began its agriculture rescue program in the fall of 2018, and from October through December alone the food bank recovered 32,100 pounds of nutritious produce, including cucumbers, tomatoes, and carrots, from the Constanza region. With this program, BARD has more than doubled the average amount of food that it distributes each month.

lion people. It is augmented by the government's support of Bancos de Alimentos de México (BAMX) and new food bank expansions, funding new warehouses and facilities, helping the network scale throughout the country and serve more than 1.2 million food-insecure people.

GFN members in Central and South America and the Caribbean play an important role in reducing food insecurity in seven middle and low-income countries with a moderately low prevalence of undernutrition (5 to 14.9 percent of the population), including Colombia, the Dominican Republic, Ecuador, El Salvador, Panama, Paraguay, and Peru.[113] Two Latin American emerging market nations with GFN members—Guatemala and Honduras—experience moderately high rates of undernutrition (15 to 24.9 percent).

Food banks, when operating to scale, serve as a civil society buttress to government social safety nets, helping mitigate socioeconomic and environmental impacts. By procuring surplus food from commercial food systems already established in the country and redirecting it to the needy, food banks can soften the effects of economic downturns and similar shocks, which disproportionately affect the vulnerable populations most at risk of hunger.

Africa

Africa, together with Asia, accounts for the greatest share of the hungry worldwide while having the fewest number of food banks globally. Africa has the highest rate of hunger according to FAO, with one in five people (21 percent), or more than 256 million people in total, undernourished. The majority of undernourished people in Africa reside in countries affected by conflict.

SOUTH AFRICA

FoodForward SA saves food and the environment

In May 2018 the Green House authored a report with GFN's member in South Africa, FoodForward SA, titled "Estimate of the GHG emission reductions due to FoodForward SA operations," which calculates the approximate greenhouse gases reduced due to the redirection efforts of the food bank. FoodForward SA serves an estimated 250,000 people daily, providing 17.6 million meals annually through nearly 600 beneficiary organizations.

The efforts of FoodForward SA not only benefit the people they serve but have environmental impact as well, saving 17,400 metric tons of CO_2 equivalents between March 2017 and April 2018 alone. This number is a comprehensive measure that includes emissions due not only to the environmental degradation of the food rescued by the food bank but also the environmental costs of transportation to landfills and landfill construction and operations.

To address hunger in Africa, the United Nations has supported the advancement of "community-based approaches that build social cohesion and the capacity of local institutions." It recommends that governments create enabling conditions for much greater investment by the private sector, including civil society and enterprises that can generate benefits for the poor and the food insecure.[114] Market inefficiencies and underdeveloped infrastructure hamper the development of commercial food systems in many parts of Africa. Many countries lack easy and reliable access to local markets, and regional market integration is insufficient. As noted by the World Bank, nations in Africa are "comparative latecomers" to state-sponsored food assistance programs, generally relying instead on government interventions in markets and regulation to achieve broader food policy objectives.[115]

In the past two decades, African nations have been building upon global experiences, especially in South-South exchanges such as the FAO-Brazil initiative, in partnership with the World Food Programme, the UK's Department for International Development (DFID), and school feeding programs modeled after the Brazilian Food Purchase Programme (PAA).[116] As a result, state interventions such as South Africa's social protection system are being established.

In many countries, civil society is launching food bank models that can be implemented at the community level. In Egypt, for example, the food bank model is well established, providing a basis for operations throughout Africa and the Near East. In Sub-Saharan Africa, GFN's member FoodForward SA serves an estimated 218,000 people throughout South Africa. Elsewhere in Sub-Saharan Africa, emerging food bank projects (Botswana), independent food banks (Ghana, Nigeria, Sierra Leone), and nascent food banking operations (Kenya) have also been established.

TAIWAN

Food banks reach underserved rural children

Taiwan People's Food Bank Association runs the Nutrition Supplements for Children in Rural Areas of Taiwan (NSCRT) program. The program provides nutrient-rich food supplements to elementary school students from low-income families living in underserved rural communities. It also provides nutrition education, supported by licensed nutritionists, to teach children how to make good food choices. Taiwan's remote areas have limited access to healthy food and without the correct dietary influences, children will often turn to junk food. Since many rural families are economically disadvantaged, NSCRT also promotes healthy eating habits by arranging nutritional classes and free summer and winter camps with the help of nutritionists.

The program was piloted in 2016 in collaboration with Taiwan Nutrition Foundation professionals who recommended quantities and types of food to be distributed. This now includes one bottle of milk, 30 grams of cereal, and 10 grams of nuts given to a child three times per week to supplement their nutrition needs. With positive feedback and outcomes from the pilot program at four initial schools, the food bank formally launched the program during the 2017 school year and selected eight elementary schools to support for a total of 300 children served. Each school will have at least two hours of nutritional education per semester and free summer camp to attract children and reinforce the lessons learned. In the 2018 school year, the food bank expanded the program to serve around 360 students from 10 elementary schools. There is a lot of potential for further growth.

"With this NSCRT program, we would like to raise the attention of the public and private sectors in Taiwan to see to children's needs in rural areas of Taiwan." —*Nancy Liu*

Asia

Asia overall has lower hunger rates than Africa, owing in part to rapid economic growth in the region. Nevertheless, two-thirds of all the hungry on the planet live in Asia, with more than 515 million people, or 11.4 percent, undernourished. Half of the hungry in Asia are in South Asia (including Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka), where hunger rates have remained persistently high despite significant progress in agricultural production and food availability. India alone accounts for 195.9 million undernourished people.

Despite the huge numbers of hungry people, the food bank model is the least expanded in Asia. GFN member food banks currently operate in India, China (Shanghai, Hong Kong SAR), Singapore, South Korea, and Taiwan. Independent food banks and food bank networks also operate in several East and Southeast Asian countries, including Indonesia, Japan, Malaysia, the Philippines, and others.

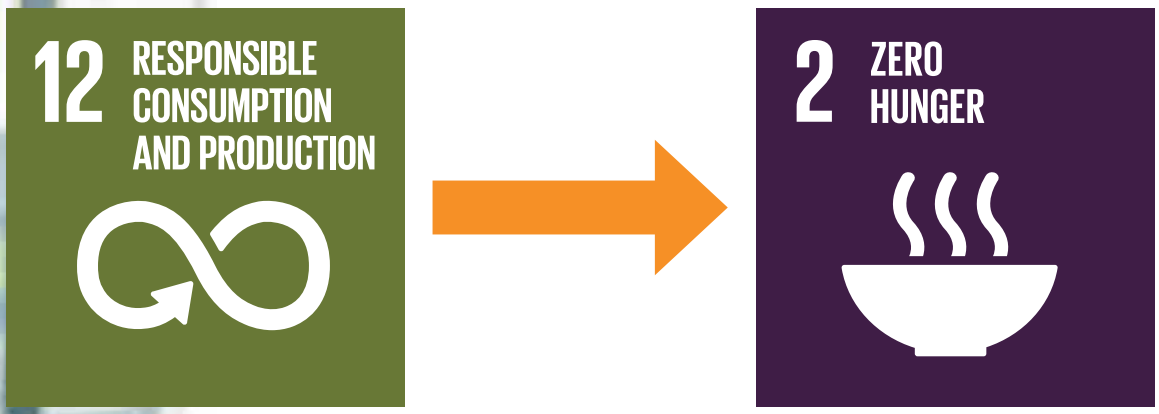
Hunger has not increased in Asia in recent years as it has overall worldwide, but the lack of progress in the region despite rapid economic growth and substantial gains in agricultural productivity is a major barrier to achieving SDG 2.[117] In high-income cities where food banks operate such as Hong Kong SAR and Singapore, food insecurity is typified by "hidden hunger" and transitory food insecurity. In much of South Asia, chronic food in-

security rates are high, and impoverished people are unable to meet their minimum food requirements for longer periods and with lasting impact. FAO regional estimates for Asia show that the number of hungry people in the region has "barely changed during the past two years,"[118] strongly suggesting that additional public- and private-sector hunger interventions are necessary to achieve the zero hunger target.

Hunger and food insecurity in the emerging market economies of Asia are complex, owing in part to the large population of undernourished. Yet the establishment or further expansion of the food bank model in the region may make the difference between life and death for millions of the most vulnerable people in these countries.[119] More than half of the world's malnourished children live in Asia. This includes 79 million—or one child in every four below the age of five—who suffer from stunting, 34 million who suffer from wasting, and 12 million who suffer from severe acute malnutrition and increased risk of death.[120] In Asian countries such as India where socioeconomic conditions allow and business, civil society, and government can support the establishment of food-oriented social assistance programs, the food bank model has significant potential to reduce human misery from food insecurity and help progress toward zero hunger.

In India, broad coalitions of public- and private-sector institutions, committed individuals, foundations, and businesses are working to further establish food distribution and food bank models. The government's effort to increase food commodities, target public distribution systems, and establish school meal requirements—instituted with the National Food Security Act of 2013—is one example. The Food Safety and Standards Authority of India is also encouraging local food banking and food recovery partners to become licensed (to ensure food safety and quality of donated food) in order to collect and distribute surplus food from large social events, food service entities, and food processors for hunger relief.

In the private sector, food bank and food recovery models now operate in more than 60 cities throughout India, recovering surplus food that may go to waste and redirecting it to local agencies and feeding programs. Various technologies are likewise being deployed such as mobile phone applications to link donations of food with volunteers and agencies nearest the donation point. The Bangalore Food Bank, an emerging GFN project, is already serving nearly 16,000 impoverished people in the community, including 12,000 children, with school breakfast and other feeding programs.[121] Promising innovations and strategies such as those now emerging throughout India, linking the capacity and energy of the public and private sectors together, exemplify the collaborative nature of the food bank model around the globe.



AGENDA FOR GLOBAL ACTION

Ending hunger and undernutrition (SDG 2) is the foundational SDG that catalyzes improvements across other SDGs, including environmental sustainability, economic development, community health, equity and inclusion, education, and peace.[122] Food banks are a "green" hunger intervention, providing food assistance to the hungry, building up civil society, supporting sustainable food systems, and protecting the environment through community-based, multisector collaborations. With its tremendous collective impact on reducing hunger, food waste, and greenhouse gas emissions that contribute to a changing climate, food banking can play a vital role in creating a more environmentally sustainable, just, and equitable society.

Food banks, however, cannot do it alone. Food banks' growth and efficacy rely on outside partnerships and investments. The following recommendations will support the efforts of food banks and advance public-private collaboration and engagement, accelerating achievement of SDG 2 and SDG Target 12.3 to achieve a hunger-free world and a more sustainable planet.

RECOMMENDED ACTIONS FOR GOVERNMENTS

Progress toward SDG 2 (Zero Hunger) has stalled, but effective policies and interventions can put the international community back on track and speed progress toward ending hunger, malnutrition, and food insecurity. Governments have the opportunity and responsibility to engage in the promotion of food banking and targeted nutrition programs.

Quantify food loss and waste—support food recycling and redistribution

In order to accurately measure what is being done to divert healthy surplus food from landfills to food banks, governments must first develop a protocol for understanding the problem. What is being thrown away and how much? How much

of it is safe and edible and how can it be captured and donated for future use?[123] Today, national governments representing more than 10 percent of the world's population are tracking food loss and waste.[124] Instituting a comprehensive measurement system based on the accepted Food Loss and Waste Standard[125] can then lead to the establishment of food loss and waste targets and, subsequently, a specific agency tasked with developing the initiatives, partnerships, and policies to better redistribute food to the vulnerable citizens who need it most.[126] It also can lead governments to embrace the food and drink material hierarchy (see figure 11).

Establish public policies to encourage surplus food donation

Governments should adopt public policies that encourage the donation of surplus food for hunger relief. This includes good samaritan–type legislation protecting good-faith food donors and tax benefits that makes it easier to donate product than to send it to a landfill. Companies need to know that they are protected from liability when they donate food in good faith to a nonprofit institution.

In 1996 the United States enacted the Bill Emerson Good Samaritan Food Donation Act, which standardized states' food donation laws, eliminating liability except in cases in gross negligence.[127] Currently, the following countries in which GFN has a presence have a good samaritan–type food donation law either nationwide or in a state, county, or municipality: Argentina, Australia, Botswana, Canada, Chile, China, Israel, Mexico, Panama, Peru, and Taiwan.

GFN has just established an innovative partnership with the Harvard Law School Food Law and Policy Clinic (FLPC) to develop the Global Food Donation Legal Atlas, which will map the laws and policies affecting food donations in 15 countries in various regions of the world. The FLPC is a national leader in systematically researching, analyzing, and documenting law and policy related to food donation at all levels of government.

Instituting protections encourages donations and the opening of potential markets and partners throughout the commercial food system. Governments should adopt domestic standardization of national food donation laws, giving companies and charities confidence that they can donate surplus food. Tax incentives may also encourage the donation of edible, surplus food.

Partner with food banks to expand the informal social safety net

While government programs are foundational to the food insecurity safety net, food banks play a critical, complementary role. Food banks can help make up for a lack of social service programs, fill in gaps where income supports do not exist, and respond quickly and effectively to economic downturns.

The food banking formula is tested and has been proven effective. In collaboration with public-sector programs—using local, community-based resources, food and grocery products, personnel, and volunteers—food banks extend the social safety net and become pillars of civil society in their communities. Food

banks, as a local response to need, are agile and can meet the specific and changing needs of their communities. When government and food banks work collaboratively, they bring together local businesses, foundations, staff members, and volunteers to create a homegrown solution uniquely positioned to address community hunger.

Governments can support and encourage the establishment and expansion of food banks in emerging market economies through investments and resource transfers. Examples include the donation of land or warehouses by municipalities for food banks and grants for food bank and beneficiary agency cold chains. Policies that encourage food recovery efforts are also needed.

When unable to do so alone, governments can encourage cross-sector support for food assistance through social safety net policies such as collaborations between government agencies and food banks for school meal programs, before and after school programs, and targeted nutrition assistance. Currently, GFN member food bank organizations in 24 countries support school feeding programs. Ensuring that children begin their day with a wholesome breakfast leads to increased attendance and punctuality, higher energy levels, greater concentration, and better moods among children. In addition to providing support throughout the school year, some food banks work to ensure children in need do not go hungry during school breaks. Food Banks Canada and Korea National Food Bank, for example, provide school vacation feeding programs.

Commodity purchase programs for food assistance should also be implemented to help stabilize food resources for food banks when food donations fluctuate. Examples include the Emergency Food Assistance Program (TEFAP) in the United States and Brazil's Fome Zero purchase program of food commodities from smallholder farmers. These programs can serve the dual purpose of providing market supports for farmers and supplementing the food assistance efforts of food banks, making less processed, highly nutritious food commodities more accessible to low-income residents. If governments are involved in purchasing commodities to support farmers, the country's food banking network should be the first outlet of consideration.

Direct Official Development Assistance funding to support food banking expansion

Data on international aid are compiled by the Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC). DAC sets standards and global norms for Official Development Assistance (ODA) and tracks financial ODA flows to countries for the promotion of economic development and welfare. Globally, ODA levels fell slightly in 2017 compared with 2016, totaling US$146.6 billion in 2017, the first year-on-year fall in net ODA since 2011–2012. Three of the top 10 nations receiving ODA—China, India, and Jordan—have nascent food bank models. ODA should be reframed not exclusively as charity or aid but as a vital public finance tool to achieve important public aims like addressing food insecurity and food system infrastructure. Food banks can then be included as a crucial vehicle for development assis-

tance that should be supported. When including national food bank networks as eligible ODA recipients, significant long-term results can be achieved in developing countries, better protecting vulnerable populations from food access shocks, health concerns, and environmental degradation associated with food wastage that further undermine food security.

Measure food insecurity using the Food Insecurity Experience Scale

To assess what interventions are necessary to address food insecurity—and all forms of malnutrition—governments should commit to collecting nutrition and food security data. Such data provide detailed demographic information on who is in the greatest need. More than 130 countries have insufficient or no trend data on key measures such as child wasting, child stunting, adolescent malnutrition, or low birth weight.[128] Governments are also encouraged to partner with FAO's "Voices of the Hungry" Food Insecurity Experience Scale (FIES) project, the global standard for data collection. The project provides access to the tools and resources necessary to gather information, including survey questions that can be adapted into any existing population survey, translations, and guidance on implementation and analysis. In countries where FIES has already been adopted, data should be made public so that all stakeholders have access to information critical to targeted service delivery.

RECOMMENDED ACTIONS FOR BUSINESS

There is an increasing awareness that meeting the SDGs will not be possible without the private sector's involvement. Various stakeholders like customers, employees, and governments are urging corporations to get more involved.[129] While many are deeply engaged, more can be done to close the gap in the cost of achieving the SDGs.[130] Food banks rely on the private sector. Focusing on those partnerships will create meaningful change and progress toward zero hunger.

Measure and manage food loss and waste

While more than a quarter of the world's 50 largest food companies are measuring food loss and waste,[131] more progress can be made. Companies should track food waste on the country and local levels and track how much edible surplus goes to feeding humans vs. nonhuman uses. This can then lead to improved efficiency and engagement with food banks. Ultimately, food loss and waste reduction efforts pay off: 99 percent of corporations saw a positive return on investment from food loss and waste reduction efforts, with the median company realizing a US$14 return for every US$1 invested.[132]

Develop and implement a global donation policy

Food companies can establish policies that make food donation the preferred option for excess and unmarketable food. Top-level executives should set company-wide policies that prioritize food donation to food banks. When food is dumped, an asset is lost. Safe, excess food donated to food banks creates social impact—more hungry people are fed, less food is wasted, and more money is saved.

Social responsibility has a tangible benefit to the bottom line. Consumer packaged goods companies that are top performers in socially responsible sourcing saw margins 4.8 percent higher than median performers.[133] Companies known for social investments can encourage consumers' loyalty and trust, which may translate into increased sales or even premium pricing.[134] Charitable contributions may also qualify for tax benefits that help the bottom line.

Standardize date coding

Almost 20 percent of safe, edible food is wasted over confusion with coding dates.[135] With "best by," "best before," "use by," and "sell by" dates on packages, consumers likely overbuy and then waste perfectly edible food. Food producers, retailers, and governments should adopt the simplified label recommendations of Champions 12.3 and the Consumer Goods Forum, taking three important steps to simplify date labels on food packaging: (1) use only one label at a time on a product, (2) use an expiration date label for perishable items (e.g., "use by") and a food quality indicator for nonperishable items (e.g., "best if used by"), with the exact wording tailored to regional context, and (3) provide consumer education to explain what the dates mean.

Box 6: Business working with food banks to reduce hunger and prevent food waste: **Cargill**

A conversation with corporate partner Cargill's Taryn Barclay, senior director, strategic partnerships and stakeholder engagement–corporate affairs, and Brecht de Roo, global sustainability director–food waste

Collaboration across sectors is crucial to achieving the Sustainable Development Goals. Cargill shares how it works with food banks in a joint commitment to ending hunger and reducing food waste.

"Cargill has a history of working in partnership with governments, multilateral organizations, and civil society groups to develop long-term solutions that build resilience across the global food system and in local communities. We're drawing on the power of our diverse partners to create, identify, and scale new solutions to shared social challenges.

"Like so many of the challenges we're facing, no one organization or company can do it alone. In an effort to drive change on a global scale we need to partner with organizations like food banks to make these changes. Food banks have an important role to play in enriching communities. At every income level around the world, people deserve access to nutritious food. We are proud to partner with food banks in 19 countries to help them achieve their goals to end hunger and improve nutrition. For example, we are partnering with Food Banks Canada to improve their Safe Food Handling program. The improved program will provide food bank employees with a new, more comprehensive online platform and e-learning module that reflects the current realities of food banking. Cargill is also coleading the Food Loss and Waste work of the World Business Council for Sustainable Development's Food Reform for Sustainability and Health, which is a consortia of companies coming together to drive progress across the value chain. Cargill is creating and deploying an accounting system toolkit to reduce food loss and waste, with input from the World Resource Institute. Cargill has been focused on measurement by exploring reduction targets, conducting inventories of food loss and waste, creating measurement and reporting processes, and establishing a waste baseline for 2020. Cargill will also provide training around awareness about food waste, conducting internal and external benchmarking, increasing compliance expertise, and ways to identify and reduce food waste."

Some companies are voluntarily making changes. For example, WalMart is now labeling nonperishables in the Great Value brand with a single "best if used by" date. Kellogg's, Unilever, and Nestle are enacting changes as well. In the United States, ReFED is working to accelerate the Grocery Manufacturers Association and Food Marketing Institute's voluntary date labeling standards by developing a tool to help manufacturers determine which code to use with which products. ReFED also recommends that the FDA modify and simplify its own regulations, thereby making it easier for companies to standardize their wording.[136]

Increase support and resources for local food banks

Food banks rely on the generosity of corporate partners not just for food and grocery products but for financial resources. Companies have a unique opportunity to provide financial support, critical labor (volunteers), professional expertise, and logistics support for food banks operating in their local communities. In return, many businesses consider food banks a valuable business-to-business solution for managing waste and reducing dumping fees while creating social impact. Food banking—through its partnerships with government and industry—provides a model for preventing localized increases in hunger and serves as a catalyst for longer-term development. One study in the United States found that food banks promoted an increase in business activity of US$1.5 billion in gross product each year and generated 16,100 permanent jobs in the United States.[137] This is good for everyone's bottom line.

Box 7: Business working with food banks to reduce hunger and prevent food waste: **Bank of America**

A conversation with corporate partner Bank of America's Kerry H. Sullivan, president of the Bank of America Charitable Foundation

Bank of America has been a valued corporate partner of GFN, food banks, and food bank networks since 2013. Its commitment to furthering economic and social progress has been invaluable to the growth and reach of food banking.

"As part of our approach to advance economic mobility and social progress around the world, we are helping individuals and families at risk of hunger. We recognize that hunger is a global challenge, and working with partners like The Global FoodBanking Network is one way we work to be part of the solution.

"Our investments focused on hunger relief are multifaceted, from providing philanthropic capital to partners like The Global FoodBanking Network, to engaging our employees around the world to roll up their sleeves and make an impact. We recognize that it takes all of us working together to develop innovative solutions to break the cycle of hunger.

"We believe food banks play a critical role in hunger relief, and we recognize that it takes collaborative work across sectors to break the cycle of hunger. That's why we partner with The Global FoodBanking Network to foster collective action that will create long-term economic and social progress."

RECOMMENDED ACTIONS FOR INTERNATIONAL AGENCIES AND MULTILATERAL INSTITUTIONS

International agencies and multilateral institutions can deploy various hunger interventions based on the situation and the timing, such as emergency food distribution in times of crisis. As locally based and nimble multisector agents, food banks can play a crucial role in supporting hunger relief efforts by these organizations. Food assistance safety net programs like school feeding programs or promotion of sustainable agricultural production techniques can be developed in concert with local and national food banking networks to extend benefits and reach more people over extended periods.

For example, the World Food Programme (WFP), with operations in 80 countries and serving more than 80 million people, can look to food banks in countries where food assistance efforts and the building of resilient food systems overlap. FAO, as the UN's "custodian" in monitoring progress toward SDG 2 and initiating multisector efforts toward zero hunger, also has an opportunity to strengthen ties with food banks and food bank networks.

Gather better data

FAO led the way in quantifying global food wastage with its groundbreaking 2011 report, *Global Food Losses and Waste*. FAO's Save Food Initiative, of which GFN has been a member since 2014, in partnership with multiple international organizations has been influential in crafting the strategy and policies needed within the public and private sectors to enact change.

Nevertheless, while food waste is an increasingly pressing social concern, specific data are still scarce. An international literature review found that there were significant gaps in estimates, and those that existed varied widely.[138] Commodity-specific and country-specific data are still not consistently available.

Utilize food banks for logistics and storage to support in-kind emergency relief

The WFP moves more than 5 million metric tons of food per year to people in crisis in more than 80 countries. Vast

logistical operations combined with extensive local networks allow WFP to manage these large-scale and complex operations of emergency assistance. Similarly, USAID prepositions up to 100,000 metric tons of food along with supply chains at any given time to help it more rapidly respond to emergencies. For WFP and USAID, prepositioning food aid has shortened delivery response times by as much as a month.[139]

Food banks at the local and regional levels likewise maintain effective, dynamic food warehousing and logistical operations around the globe. Many food banks operate in regions and emerging market economies near or bordering nations at special risk of humanitarian crisis or natural disasters. Food banks in Brazil, Colombia, Ecuador, Jordan, and Turkey, for example, have received significant influxes of refugees and migrants from bordering countries with strife. WFP, USAID, and other donor agencies should consider utilizing food banks as cost-effective and technically proficient partners for prepositioning food assistance when appropriate. Working together, the public and private sectors can effectively extend benefits quickly and efficiently to reduce hunger in crisis situations.

initiative SAVE FOOD Solutions for a world aware of its resources

SAVE FOOD: Global Initiative on Food Loss and Waste Reduction

Since 2014 GFN has been a member of FAO's SAVE FOOD global network, a collaboration and coordination of worldwide initiatives on food loss and waste reduction. SAVE FOOD is a global partnership of public- and private-sector organizations and companies, working to develop, plan, and implement interventions and use resources efficiently.

Achieving the Sustainable Development Goals

cannot happen without ending hunger and supporting sustainable and resilient food systems that deliver for people and the planet. The future of food systems and access to food for the most vulnerable people throughout the world is one of the most critical challenges of our time. The food bank model operates at the nexus between SDG 2 and SDG Target 12.3, offering a "green hunger intervention" applicable across cultures and socioeconomic contexts in all parts of the world. Eliminating hunger from our midst is a formidable task, but through collaboration and commitment to action, the world can move closer to reaching the 2030 goal.

QUANTIFIYING THE IMPACT OF FOOD BANKING

To date, there is no global resource that accounts for the collective impact of food banking on hunger relief and sustainability, thereby quantifying its impact and properly highlighting the progress that can be made if this model is scaled.

Greenhouse gas emissions

To better quantify the impact food banks around the world play in ameliorating food waste and promoting a more sustainable environment, GFN has estimated the amount of greenhouse gases (expressed in CO_2e) prevented through the redirection of food from landfills to vulnerable people. The estimate is a global total of agricultural and landfill impacts, which includes not only GFN's member food banks but regional partners Feeding America, which represents 200 member food banks in the United States, and European Food Banks Federation (FEBA), which represents member food banks in 24 countries and an additional four associate members in other countries.

The estimation of greenhouse gas mitigation from food recycling by food banks includes informed assumptions, developed with sound methodology that uses validated internal survey data as well as authoritative external research. The estimates tend to be conservative to avoid overstating any benefits.

To develop the estimate, GFN closely followed similar (although in some cases, more expansive) studies calculating the greenouse gas emissions of food waste, including the World Bank's work in Mexico[140] and the Green House's work on behalf of Food Forward SA.[141]

We began by taking total kilograms distributed, data gathered for GFN through our annual Network Survey, which provides overall information about the operations and impact of member food banks. In order to ameliorate any unexpected, severe changes in distribution levels (likely due to circumstances not associated with regular growth or decreased market share, but rather circumstances like a natural disaster or food bank closure), we are using three-year averages of distribution totals from 2015 to 2017. Although we are considering three-year averages, some food banks do not have three years' worth of reported data. In those cases, we are using only the data available. Feeding America provided data on product distributed in their fiscal year 2018. FEBA provided volume of food distributed per category for 2017. We accounted for the duplication of data from FareShare in the United Kingdom and the Bulgarian Food Bank, which are members of both GFN and FEBA.

We have eliminated nonfood items (e.g., valuable grocery products like cleaning and personal hygiene products). For GFN members, this distribution information was accessed through GFN's 2018 Network Survey. In cases in which a GFN food bank did not provide a specific percentage of nonfood items, we applied the network average of 11 percent.

We also endeavored to eliminate purchased food, items that likely would not have ended up in a landfill. Our 2016 Network Survey gathered information by food bank on the percentage of food purchased. In cases when we had information about specific product categories purchased, we subtracted the commensurate number of kilograms from the appropriate categories (often oil, dairy, fruits, and vegetables). Otherwise, we eliminated the flat percentage provided to us by the food bank across the distribution averages.

Our 2015 Network Survey gathered detailed information about product categories distributed, which we aligned with the global standard of food categories set by FAO in its groundbreaking 2011 and 2013 food waste studies: cereals; starchy roots; oilcrops and pulses; fruits and vegetables; meat; dairy and eggs. [142]

Using available data of donated food product categories, we aligned these with FAO categories (e.g., considering bakery items and rice under cereals and cooking oils as oilseeds). We assumed that 100 percent of foods categorized by FAO are diverted

from landfills (when information is available), but the categories do not always represent 100 percent of a food bank's distribution or inventory. In cases in which items were not represented by FAO, including nondairy beverages, candy/sweets, spices/seasoning, sauces/condiments, mixed foods (unknown), and nutritional supplements (e.g., meal replacement shakes), we did not include their environmental impact in our final estimations. Therefore, these are conservative estimates of impact.

Several GFN food banks have additional product category information beyond what was shared in the Network Survey. For Colombia and the Dominican Republic, we had access to more detailed information provided by the food bank. For Canada we used in-country waste data.[143] For South Africa we used the distribution categories as defined in the Green House study.[144] In some cases, we had no available product category data, so we instead created a proxy using FAO data of the global average of wasted foods by category.[145]

FoodForward SA participated in its own study, providing estimates of the food bank's environmental impact.[146] That study included many more factors (such as preventing emission costs from transportation to landfill and landfill construction), providing a holistic picture of the environmental impact of the food bank's operations. To preserve comparability across nearly 60 countries from which we have data, we have elected to use our own more conservative calculations to reach an aggregate impact estimate.

For these calculations, food banks are grouped into FAO regional categories: Europe (FEBA) & Russia; North America & Oceania (Australia, Canada, Feeding America); Industrialized Asia (China, Hong Kong, Korea, Singapore, and Taiwan); Sub-Saharan Africa (Botswana and South Africa); North Africa, Western Asia, and Central Asia (Israel and Turkey); South and Southeast Asia (India); and Latin America.

Once we developed kilograms totals by category, we entered regional data into the publicly available World Resource Institute's (WRI) Food Waste Value Calculator. This calculator provides an updated model to make assessments of the food waste impact. The WRI, along with the World Business Council for Sustainable Development, codeveloped the Greenhouse Gas Protocol Product Lifecycle Accounting and Reporting Standard. Their partners in this work include Boston Consulting Group, Cargill, Dupont, Kellogg Company, Google, and

PepsiCo. The calculator utilizes authoritative inputs, including CO_2e emissions from the Quantis World Food LCA Database, using publicly available sources from FAO and peer-reviewed literature. The WRI tool provided an assessment of both agricultural impacts and landfill impacts from food potentially wasted. The main contributing processes to agricultural CO_2e emissions are generally direct emissions from fertilizers (e.g., N_2O), emissions related to fertilizer production, and fossil fuel combustion from agricultural machinery. Yields per hectare can vary regionally. The landfill gas emissions are estimated from a mass balance of carbon (adjusting for dry weight and biodegradability fraction following the Intergovernmental Panel on Climage Change's guidelines), however, assuming no landfill gas capture.

Landfill estimates

In addition to assessing the greenhouse gas emissions that were mitigated by food banks' recovery and redistribution efforts, we have elected to provide an estimate of landfill space saved through food banking (for illustrative purposes only).

In this instance, our estimations include GFN regional partners, Feeding America, which represents 200 member food banks in the United States, and European Food Banks Federation (FEBA), which represents 388 food banks/branches in 24 countries and supports associate members in an additional four countries. Both Feeding America and FEBA have publicly available information on the amount of food rescued and distributed.[147] We added the Feeding America and FEBA numbers to GFN's previously calculated estimate of kilograms rescued from landfills and then converted the kilograms to pounds to attain a total number of pounds rescued.[148] Using a calculation from Waste360, a leading global professional association of solid waste, recycling, organics, and sustainable communities, we assumed that each cubic yard of landfill food waste weighed 2,000 pounds.[149]

From these calculations, food banks for which data are available redirect an estimated 2,956,484 cubic yards of food waste. According to Waste360, just 1 million cubic yards of debris could fill a football stadium and extend 500 feet high or fill nearly 300,000 dump trucks annually.[150]

Calculations not undertaken in this study, but no less important, include the nutrients lost, the transportation to the landfill, the landfill construction, dumping fees saved, the land use during production, water used to irrigate crops, labor, and the many facets of wasted production time, product, and labor, including packaging, labeling, transportation, inspection, quality control, and storage. These represent great loss at all stages of the supply chain.

We believe these estimates highlight the net good food banking provides and the tremendous potential of food banks to help move the world toward achieving SDG 2 and SDG Target 12.3.

ENDNOTES

1 FAO, IFAD, UNICEF, WFP, and WHO, *The State of Food Security and Nutrition in the World 2018: Building Climate Resilience for Food Security and Nutrition* (Rome: FAO, 2018).

2 FAO, *Global Food Losses and Food Waste: Extent, Causes and Prevention* (Rome: FAO, 2011).

3 FAO, IFAD, UNICEF, WFP, and WHO, *The State of Food Security and Nutrition in the World 2018*.

4 FAO, *Global Food Losses and Food Waste*.

5 FAO, IFAD, UNICEF, WFP, and WHO, *The State of Food Security and Nutrition in the World 2018*.

6 FAO, IFAD, UNICEF, WFP, and WHO, *The State of Food Security and Nutrition in the World 2018*.

7 M. Fickes, "Choreographed Chaos," Waste360, March 2, 2013, https://www.waste360.com/disaster-preparedness/choreographed-chaos.

8 Global Panel, *Healthy Diets for All: A Key to Meeting the SDGs* (London, UK: Global Panel on Agriculture and Food Systems for Nutrition, 2017).

9 FAO, IFAD, UNICEF, WFP, and WHO, *The State of Food Security and Nutrition in the World 2018*.

10 Development Initiatives, *Global Nutrition Report 2017: Nourishing the SDGs* (Bristol, UK: Development Initiatives, 2017).

11 FAO, *Global Food Losses and Food Waste*.

12 FAO, *Global Food Losses and Food Waste*.

13 FAO, *Strategic Work of FAO to Help Eliminate Hunger and Malnutrition* (Rome: FAO, 2017).

14 FAO, IFAD, UNICEF, WFP, and WHO, *The State of Food Security and Nutrition in the World 2018*.

15 FAO, IFAD, UNICEF, WFP, and WHO, *The State of Food Security and Nutrition in the World 2018*.

16 FAO, IFAD, UNICEF, WFP, and WHO, *The State of Food Security and Nutrition in the World 2018*.

17 Flour Fortification Initiative, GAIN, Micronutrient Initiative, USAID, World Bank, and UNICEF, *Investing in the Future: A United Call to Action on Vitamin and Mineral Deficiencies* (Ottawa: The Micronutrient Initiative, 2009).

18 K. von Grebmer, A. Saltzman, E. Birol, D. Wiesmann, N. Prasai, S. Yin, Y. Yohannes, P. Menon, J. Thompson, and A. Sonntag, *2014 Global Hunger Index: The Challenge of Hidden Hunger* (Bonn, Washington, DC, and Dublin: Welthungerhilfe, International Food Policy Research Institute, and Concern Worldwide, 2014), http://dx.doi.org/10.2499/9780896299580.

19 Development Initiatives, *2018 Global Nutrition Report: Shining a Light to Spur Action on Nutrition* (Bristol, UK: Development Initiatives, 2018).

20 Flour Fortification Initiative, GAIN, Micronutrient Initiative, USAID, World Bank, and UNICEF, *Investing in the Future*.

21 FAO, IFAD, UNICEF, WFP, and WHO, *The State of Food Security and Nutrition in the World 2018*.

22 Development Initiatives, *Global Nutrition Report 2017*.

23 Global Panel, *The Cost of Malnutrition: Why Policy Action Is Urgent* (London, UK: Global Panel on Agriculture and Food Systems for Nutrition, 2016).

24 Global Panel, *Food Systems and Diets: Facing the Challenges of the 21st Century* (London, UK: Global Panel on Agriculture and Food Systems for Nutrition, 2016).

25 Global Panel, *The Cost of Malnutrition*.

26 FAO's Voices of the Hungry project does not interview children, so food security status is determined by measuring the presence of household food security.

27 Audrey Pereira, Sudhanshu Handa and Goran Holmqvist, "Prevalence and Correlates of Food Insecurity among Children Across the Globe" (Innocenti Working Papers no. 2017-09, UNICEF Office of Research, Innocenti, Florence, 2017).

28 Development Initiatives, *2018 Global Nutrition Report*.

29 R. E. Black, L. H. Allen, Z. A. Bhutta, L. E. Caulfield, M. de Onis, M. Ezzati, C. Mathers, J. Rivera, and the Maternal and Child Undernutrition Study Group, "Maternal and Child Undernutrition: Global and Regional Exposures and Health Consequences," *The Lancet* 371, no. 9608 (2008): 243–60. http://doi.org/10.1016/S0140-6736(07)61690-0.

30 Black, Allen, Bhutta, Caulfield, de Onis, Ezzati, Mathers, Rivera, and the Maternal and Child Undernutrition Study Group, "Maternal and Child Undernutrition."

30 L. Weinreb, C. Wehler, J. Perloff, R. Scott, D. Hosmer, L. Sagor, and C. Gundersen, "Hunger: Its Impact on Children's Health and Mental Health," *Pediatrics* 110, no. 4 (October 2002): e41.

32 Development Initiatives, *Global Nutrition Report 2017*.

33 FAO, *An Introduction to the Basic Concepts of Food Security* (Rome: EC - FAO Food Security Program, 2008), http://www.fao.org/docrep/013/al936e/al936e00.pdf.

34 H. Ghattas, *Food Security and Nutrition in the Context of the Nutrition Transition* (Rome: FAO, 2014), http://www.fao.org/3/a-i3862e.pdf.

35 FAO, *An Introduction to the Basic Concepts of Food Security*.

36 United Nations Children's Fund, *Improving Child Nutrition: The Achievable Imperative for Global Progress* (New York: UNICEF, 2013).

37 United Nations Children's Fund, *Improving Child Nutrition*.

38 Black, Allen, Bhutta, Caulfield, de Onis, Ezzati, Mathers, Rivera, and the Maternal and Child Undernutrition Study Group, "Maternal and Child Undernutrition."

39 FAO, IFAD, UNICEF, WFP, and WHO, *The State of Food Security and Nutrition in the World 2018*.

40 R. Horton, "Maternal and Child Undernutrition: An Urgent Opportunity," *The Lancet* 371, no. 9608 (2008): P179, https://doi.org/10.1016/S0140-6736(07)61869-8.

41 H. Alderman, U. Gentilini, and R. Yemtsov, *The 1.5 Billion People Question: Food, Vouchers, or Cash Transfers?* (Washington, DC: World Bank, 2018), http://doi.org/10.1596/978-1-4648-1087-9.

42 Development Initiatives, *Global Nutrition Report 2017*.

43 Ghattas, *Food Security and Nutrition in the Context of the Nutrition Transition*.

44 Development Initiatives, *2018 Global Nutrition Report*.

45 Development Initiatives, *2018 Global Nutrition Report*.

46 Development Initiatives, *2018 Global Nutrition Report*.

47 N. Alexandratos and J. Bruinsma, "World Agriculture Towards 2030/2050: The 2012 Revision" (ESA Working paper No. 12-03, Rome, FAO, 2012).

48 FAO, *The Future of Food and Agriculture: Trends and Challenges* (Rome: FAO, 2017).

49 FAO, *Global Food Losses and Food Waste*.

50 FAO, *Food Wastage Footprint: Full-Cost Accounting* (Rome: FAO, 2013).

51 FAO, *Global Food Losses and Food Waste*.

52 Food wastage refers to any food lost by deterioration or waste. Thus, the term "wastage" encompasses both food loss and food waste.

53 FAO, *Global Food Losses and Food Waste*.

54 A. Meybeck, E. Laval, R. Lévesque, and G. Parent, 2018. "Food Security and Nutrition in the Age of Climate Change," in *Proceedings of the International Symposium Organized by the Government of Québec in Collaboration with FAO, Québec City, September 24-27, 2017* (Rome: FAO, 2018).

55 FAO, *Food Wastage Footprint: Impacts on Natural Resources* (Rome: FAO, 2013).

56 FAO, *Food Wastage Footprint: Impacts on Natural Resources*.

57 FAO, *Food Wastage Footprint: Impacts on Natural Resources*.

58 FAO, *Food Wastage Footprint & Climate Change* (Rome: FAO, 2015).

59 FAO, *Food Wastage Footprint: Impacts on Natural Resources*.

60 FAO, *Food Wastage Footprint: Impacts on Natural Resources*.

61 FAO, *Food Wastage Footprint: Full-Cost Accounting*.

62 Boston Consulting Group, *Tackling the 1.6-Billion-Ton Food Loss and Waste Crisis* (Copenhagen: Boston Consulting Group, 2018).

63 Boston Consulting Group, *Tackling the 1.6-Billion-Ton Food Loss and Waste Crisis*.

64 Climate Action Tracker, "Reducing Food Waste and Changing Diet Could Drastically Reduce Agricultural Emissions," Climate Action Tracker, January 1, 2018, https://climateactiontracker.org/press/reducing-food-waste-and-changing-diet-could-drastically-reduce-agricultural-emissions.

65 B. K. Adhikari, S. Barrington, and J. Martinez, "Predicted Growth of World Urban Food Waste and Methane Production," *Waste Management & Research* 24, no. 5 (2006): 421–33.

66 FAO, *Global Food Losses and Food Waste*.

67 ReFED, *Rethinking Food Waste Through Economics and Data: A Roadmap to Reduce Food Waste* (Berkeley, CA: ReFED, 2016).

68 M. Rutten, P. Nowicki, M. J. Bogaardt, and L. Aramyan, *Reducing Food Waste by Households and in Retail in the EU* (The Netherlands: The Hague, 2013).

69 FAO, *Food Wastage Footprint: Full-Cost Accounting*.

70 C. Hanson and P. Mitchell, *The Business Case for Reducing Food Loss and Waste* (Washington, DC: Champions 12.3, 2017).

71 B. Lipinski, C. Hanson, J. Lomax, L. Itinoja, R. Waite, and T. Searchinger, *Reducing Food Loss and Waste* (Washington, DC: World Resources Institute, 2013).

72 "Food: Reduced Food Waste," Drawdown, n.d., https://www.drawdown.org/solutions/food/reduced-food-waste.

73 C. Christensen, "World Hunger: A Structural Approach," *Journal of International Organization* 32, no. 3 (1978): 745–74, http://www.jstor.org/stable/2706332.

74 A. de Waal, "Ending Mass Atrocity and Ending Famine," *The Lancet* 386, no. 10003 (October 17, 2015): 1528–29.

75 UN, Division for Sustainable Development Goals Department of Economic and Social Affairs, United Nations Secretariat, New York, 2016.

76 FAO, IFAD, UNICEF, WFP, and WHO, *The State of Food Security and Nutrition in the World 2018*.

77 M. Torero, "Food Security Brings Economic Growth — Not the Other Way Around," IFPRI blog, International Food and Policy Research Institute, October 15, 2014.

78 Shenggen Fan, Derek D. Headey, David Laborde Debucquet, Daniel Mason-D'Croz, Christopher Rue, Timothy B. Sulser, and Keith D. Wiebe, *Quantifying the Cost and Benefits of Ending Hunger and Undernutrition: Examining the Differences Among Alternative Approaches* (Washington, DC: International Food Policy Research Institute, 2018), https://doi.org/10.2499/9780896292994.

79 Development Initiatives, *Global Nutrition Report 2017*.

80 GAIN-USCIB, *No More Missed Opportunities: Advancing Public-Private Partnerships to Achieve the Global Nutrition Goals* (Geneva: Global Alliance for Improved Nutrition and the USCIB Foundation, 2018).

81 Ugo Gentilini, "Banking on Food: The State of Food Banks in High-Income Countries" (IDS Working Paper 415, Centre for Social Protection, Institute of Development Studies, London, UK, 2013).

82 The Global FoodBanking Network, *The State of Global Food Banking 2018: Nourishing the World* (Chicago: GFN, 2018).

83 M. Shea, "Food Waste & Hunger: Solutions to the Paradox," Rockefeller Foundation blog, February 21, 2018, https://www.rockefellerfoundation.org/blog/food-waste-hunger-solutions-paradox.

84 Fickes, "Choreographed Chaos."

85 Alderman, Gentilini, and Yemtsov, *The 1.5 Billion People Question*.

86 Alderman, Gentilini, and Yemtsov, *The 1.5 Billion People Question*.

87 USDA-ERS, "Food Security and Nutrition Assistance," United States Department of Agriculture-Economic Research Service, Washington, DC, 2018, https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/food-security-and-nutrition-assistance.

88 J. Kinsey, *The Economics of Federal Food Programs: Weighing the Costs and Benefits* (Washington, DC: The Council on Food, Agricultural & Resource Economics (C-FARE), 2013).

89 FAO, "Fome Zero and #ZeroHunger," FAO Director-General José Graziano da Silva (blog), 2015, http://www.fao.org/director-general/from-fomezero-to-zerohunger/en.

90 FAO, "Fome Zero and #ZeroHunger."

91 Ugo Gentilini, "Banking on Food."

92 Food insecurity is defined as households whose members experienced limited or uncertain access to adequate food, including reports of reduced quality, variety, or desirability of diet. Feeding America, *Hunger in America 2014* (Chicago: Feeding America, 2014).

93 A. Coleman-Jensen, M. Rabbitt, C. Gregory, and A. Singh, *Household Food Security in the United States in 2017* (Economic Research Report No. 256, US Department of Agriculture, Economic Research Service, September 2018).

94 FAO, IFAD, UNICEF, WFP, and WHO, *The State of Food Security and Nutrition in the World 2018*.

95 The Global FoodBanking Network, *The State of Global Food Banking 2018*.

96 "People at Risk of Poverty or Social Exclusion," Eurostat, Statistics Explained, January 2019, https://ec.europa.eu/eurostat/statistics-explained/index.php/People_at_risk_of_poverty_or_social_exclusion#Material_deprivation.

97 Eurostat, "People at Risk of Poverty or Social Exclusion."

98 K. Rosier, *Food Insecurity in Australia: What Is It, Who Experiences It and How Can Child and Family Services Support Families Experiencing It?* (CAFCA Practice Sheet. Australian Institute of Family Studies, July 2011).

99 OECD countries by GDP per capita.

100 The Global FoodBanking Network, *The State of Global Food Banking 2018*.

101 Hilary K. Seligman, Morgan Smith, Sophie Rosenmoss, Michelle Berger Marshall, Elaine Waxman, "Comprehensive Diabetes Self-Management Support from Food Banks: A Randomized Controlled Trial," *American Journal of Public Health* 108, no. 9 (September 1, 2018): 1227–34.

102 Linda Jacobs Starkey, Katherine Gray-Donald, and Harriet V. Kuhnlein, "Nutrient Intake of Food Bank Users Is Related to Frequency of Food Bank Use, Household Size, Smoking, Education and Country of Birth," *The Journal of Nutrition* 129, no. 4 (1 April 1999): 883–89.

103 B. N. Wright, R. L. Bailey, B. A. Craig, R. D. Mattes, L. McCormack, S. Stluka, L. Franzen-Castle, B. Henne, D. Mehrle, D. Remley, and H. A. Eicher-Miller, "Daily Dietary Intake Patterns Improve after Visiting a Food Pantry among Food-Insecure Rural Midwestern Adults," *Nutrients* 10, no. 5 (2018): 583, http://doi.org/10.3390/nu10050583.

104 James Mabli and David Jones, *Food Security and Food Access among Emergency Food Pantry Households* (Cambridge, MA: Mathematica Policy Research, 2012).

105 James Mabli, David Jones, and Phillip Kaufman, "Characterizing Food Access in America: Considering the Role of Emergency Food Pantries in Areas without Supermarkets," *Journal of Hunger & Environmental Nutrition* 8, no. 3 (2013): 310–23.

106 E. Görmüş, "Food Banks and Food Insecurity: Cases of Brazil and Turkey," *Forum for Development Studies* 46, no. 1 (2019): 67–81, https://doi.org/10.1080/08039410.2018.1450288; Joseph Watuleke, *The Role of Food Banks in Food Security in Uganda: The Case of the Hunger Project Food Bank, Mbale Epicentre* (Uppsala, Sweden: Nordiska Afrikainstitutet, 2015).

107 FAO, IFAD, UNICEF, WFP, and WHO, *The State of Food Security and Nutrition in the World 2018*.

108 FAO Regional Office for Latin America and the Caribbean, 2015.

109 G. A. Gutiérrez, *Food Losses and Food Waste in Mexico: Quantification and Some Proposals for Public Policy* (CDMX: World Bank, 2018), http://www.cec.org/sites/default/files/pdf/fww/wb-presentations/6-genaro-aguilar.pdf.

110 The Global FoodBanking Network, GFN Network Activity Report 2018.

111 Gutiérrez, *Food Losses and Food Waste in Mexico*.

112 Mesa Brasil SESC.

113 FAO, IFAD, UNICEF, WFP, and WHO, *The State of Food Security and Nutrition in the World 2018*.

114 António Guterres, "Renewed Partnership to End Hunger in Africa by 2025," Inter Press Service, January 29, 2018, http://www.ipsnews.net/2018/01/renewed-partnership-end-hunger-africa-2025.

115 Alderman, Gentilini, and Yemtsov, *The 1.5 Billion People Question*.

116 FAO, "Africa to Benefit from Brazil-FAO School Meals Experience," Food and Agriculture Organization of the United Nations, August 16, 2013.

117 FAO, *Asia and the Pacific Regional Overview of Food Security and Nutrition 2018: Accelerating Progress towards the SDGs* (Bangkok: Food and Agriculture Organization, 2018).

118 FAO. "UN Agencies Raise Alarm Over Weakened Fight against Hunger and Malnutrition in Asia and the Pacific," Food and Agriculture Organization of the United Nations, November 2, 2018.

119 Ugo Gentilini, "Banking on Food."

120 FAO, *Asia and the Pacific Regional Overview of Food Security and Nutrition 2018*.

121 The Global FoodBanking Network, *The State of Global Food Banking 2018*.

122 Global Panel, *Healthy Diets for All*.

123 Lipinski et al., *Reducing Food Loss and Waste*.

124 K. Flanagan, A. Clowes, B. Lipinski, L. Goodwin, and R. Swannell, *SDG Target 12.3 on Food Loss and Waste: 2018 Progress Report* (Washington, DC: Champions 12.3, 2018).

125 The Global Food Loss and Waste Accounting and Reporting Standard was developed by a multistakeholder partnership, including the Consumer Goods Forum, UN-FAO, World Resources Institute, etc. For more information, see https://www.wri.org/sites/default/files/REP_FLW_Standard.pdf.

126 Lipinski et al., *Reducing Food Loss and Waste*.

127 Bill Emerson Good Samaritan Food Donation Act, Pub. L. No. 104-210.

128 Development Initiatives, *2018 Global Nutrition Report*.

129 Boston Consulting Group, *Total Societal Impact: A New Lens for Strategy* (Boston: Boston Consulting Group, 2017).

130 United Nations Conference on Trade and Development, *World Investment Report 2014: Investing in the SDGs* (New York and Geneva: UN, 2014).

131 Flanagan et al., *SDG Target 12.3 on Food Loss and Waste*.

132 Hanson and Mitchell, *The Business Case for Reducing Food Loss and Waste*.

133 Boston Consulting Group, *Total Societal Impact*.

134 Boston Consulting Group, *Total Societal Impact*.

135 Waste and Resources Action Programme, *Consumer Insight: Date Labels and Storage Guidance* (Banbury: WRAP, 2010).

136 "Standardize Date Labeling," ReFED, https://www.refed.com/solutions/standardized-date-labeling.

137 The Perryman Group, *Hunger: Economic Perspectives, Sustainable Solutions* (Waco: The Perryman Group, 2014).

138 J. Parfitt, M. Barthel, and S. Macnaughton, Food Waste within Food Supply Chains: Quantification and Potential for Change to 2050," *Philosophical Transactions of the British Society B: Biological Sciences* 365, no. 1554 (2010): 3065–81.

139 US Government Accountability Office, *International Food Aid: Prepositioning Speeds Delivery of Emergency Aid, but Additional Monitoring of Time Frames and Costs Is Needed* (Report to the U.S. Senate Committee on Agriculture, Nutrition and Forestry, Washington, DC, 2014).

140 Gutiérrez, *Food Losses and Food Waste in Mexico*.

141 M. Burke, Y. Lewis, and P. Notten, *Estimate of the GHG Emissions Reductions Due to FoodForward SA Operations* (Kenilworth: The Green House, 2018).

142 Jenny Gustavsson, Christel Cederberg, Ulf Sonesson, Robert van Otterdijk, and Alexandre Meybeck, *Global Food Losses and Food Waste* (Rome: FAO, 2011), http://www.fao.org/docrep/014/mb060e/mb060e00.pdf; FAO, *Food Wastage Footprint: Impacts on Natural Resources*.

143 "Food Waste in Canada," National Zero Waste Council, n.d., https://lovefoodhatewaste.ca/about/food-waste.

144 Burke, Lewis, and Notten, *Estimate of the GHG Emissions Reductions Due to FoodForward SA Operations*.

145 Infographic provided by Boston Consulting Group: https://www.bcg.com/en-us/publications/2018/infographic-why-is-one-third-world-food-being-lost-wasted.aspx.

146 Burke, Lewis, and Notten, *Estimate of the GHG Emissions Reductions Due to FoodForward SA Operations*.

147 GFN, *The State of Global Food Banking 2018: Nourishing the World* (Chicago, IL: The Global FoodBanking Network, 2018).

148 GFN total kilos distributed minus nonfood, purchased, mixed, nondairy beverages, spices/sauces, condiments, candy, and other categories not recognized by FAO food waste reports.

149 Waste 360, https://www.waste360.com.

150 Fickes, "Choreographed Chaos."

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TOWARD ZERO HUNGER

70 E. Lake Street, Suite 1200
Chicago, IL 60601 USA
+1 312-782-4560
www.foodbanking.org