2025 ACCELERATORS TO END HUNGER AND MALNUTRITION

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PROGRESS IN ELIMINATING HUNGER AND MALNUTRITION IS TOO SLOW. Despite some periods of significant progress, reductions in hunger and undernutrition on a global scale have stagnated since 2000, and progress has varied widely across countries. In 2017, the number of undernourished people worldwide rose to nearly 821 million from around 804 million in 2016, and 151 million children remain stunted. At the same time, overweight, obesity, and associated noncommunicable diseases are rising faster than undernutrition is declining. Rapid urbanization, climate change, and continued conflict pose further threats to our global food system. If the world is to end hunger and malnutrition by 2030—the target year to achieve the Sustainable Development Goals (SDGs)—it is time to pick up the pace.

How can we speed up progress against hunger and malnutrition? Past experience and new innovations point to an array of proven and potential accelerators. **An accelerator is a policy, intervention, or innovation—or a combination of these—**that bypasses, reduces, or eliminates barriers to advance the end of hunger and malnutrition, amplifying impact through synergies, integration, and partnerships among sectors. Accelerators build on fundamental progress in development to speed change. Acceleration toward ending hunger will happen through radical changes and investments in food systems—from farms to processing to retail to consumers—that transform how food security and nutrition are realized.

This note briefly highlights some proven and promising country strategies, policies, programs, and technologies for accelerating the end of hunger and malnutrition.

ACCELERATORS

COUNTRYWIDE STRATEGIES

- Agriculture-led growth and rural reform (China)
- Economic liberalization (Viet Nam)
- Economic and social policy reforms (Bangladesh)
- Investments in agriculture and social protection (Brazil)
- Market-oriented reforms and public investment (Rwanda)
- Community health and nutrition programs (Thailand)
- Multisectoral focus on child nutrition (Peru)

POLICIES, PROGRAMS, AND INSTITUTIONS

- Making nutrition a key goal of agriculture
- Reforming agricultural subsidies and food taxes for nutrition
- Promoting behavior change communication
- Tapping the power of women to improve nutrition
- Engineering social protection programs for nutrition
- Focusing on water, sanitation, and hygiene
- Reorienting food industries for better nutrition

TECHNOLOGIES

- Fortification, biofortification, and alternative proteins
- Big data and information and communication technologies
- Energy and technology for value chains
- Converting yield-enhancing technologies to multiple-win innovations

COUNTRYWIDE STRATEGY ACCELERATORS

Several country successes illustrate the potential of policies that integrate interventions in multiple sectors to drive rapid reductions in hunger and malnutrition. Underlying the design and implementation of these broad-based policies and programs are effective institutions and strong commitment from leaders.

AGRICULTURE-LED GROWTH AND RURAL REFORM IN CHINA

Starting in the late 1970s, China's leaders decollectivized agriculture and introduced the Household Responsibility System, improving the production incentives for smallholder farmers (Fan et al. 2007). These reforms promoted agricultural growth and rural development and led to significantly higher incomes among rural dwellers—where levels of poverty and hunger were initially highest—and to increased access to food at affordable prices (Ravallion and Chen 2007). China also carried out large-scale interventions in nutrition, health, and family planning and expanded its investments in education, clean water, and good sanitation. The positive impact on hunger and undernutrition was dramatic: between 1999–2001 and 2015–2017, China reduced the share of the undernourished population from 16 percent to 9 percent (FAOSTAT). From 1990 to 2010, China's rate of child stunting dropped by 70 percent (WFP 2016).

ECONOMIC LIBERALIZATION IN VIET NAM

Like China, Viet Nam focused on smallholder agriculture-led strategies to accelerate progress. In doing so, it went from a country that suffered food shortages to one of the largest rice exporters in the world. The change from a centrally planned economy to economic liberalization set the pace for further transformation of the country's food system. In the late 1980s, leaders introduced key economic policy reforms, known as Doi Moi (Reform), that consisted of equitable land reform, liberalization of agricultural marketing and trade, openness to foreign direct investment, and investment in human development (Vandemoortele and Bird 2011). These reforms boosted agricultural growth in the 1990s, which helped raise rural incomes and move labor into nonagricultural sectors. In 1999–2001, 24 percent of Viet Nam's population (20 million people) was undernourished; by 2015–2017, that share had fallen to 11 percent (10 million people) (FAOSTAT).

ECONOMIC AND SOCIAL POLICY REFORMS IN BANGLADESH

Bangladesh has achieved one of the world's fastest reductions in child underweight and stunting through rapid changes in economic and social policies. In the past several decades, leadership in Bangladesh has stimulated pro-poor economic growth, achieving a substantial decline in both extreme and moderate poverty; launched safety-net programs that have provided an income and food security floor for the poorest families; and supported greater livelihood activities. Green Revolution policies helped increase agricultural production in Bangladesh, and the country also made advances in family planning, health services, school attendance, access to drinking water and sanitation, and women's empowerment (Davis et al. 2016). From 1999–2001 to 2015–2017, the prevalence of undernourishment in Bangladesh fell from 21 to 15 percent (FAOSTAT). The rate of child stunting dropped from 74 percent in 1991 to 36 percent in 2014 (WHO 2018).

INVESTMENTS IN AGRICULTURE AND SOCIAL PROTECTION IN BRAZIL

Brazil has transformed its food system and improved nutrition through a wide array of investments in agriculture and human capital. Alongside investing in agricultural R&D, Brazil supported farmers through policies related to rural credit, rural extension, marketing and income support, risk management, environmental stewardship, agricultural trade, and management of price volatility (UNESCAP 2012). Between 1985 and 2006,

agricultural output grew by 77 percent. At the same time, the country enacted widespread social protection reforms and targeted nutrition interventions under Fome Zero (Zero Hunger), the national food security policy framework. It consolidated existing transfer programs under a flagship social program popularly known as Bolsa Família (Family Allowance), which promotes improved education and healthcare for beneficiaries. The country has also boosted investments in education, healthcare, clean water, and sanitation. Through these efforts, Brazil has nearly eradicated hunger and undernutrition: the rate of undernourishment fell from 12 percent in 1999–2001 to just 3 percent in 2007–2009 (FAOSTAT), and the rate of child stunting dropped from 19 percent in 1989 to 7 percent in 2006–2007 (WHO 2018).

MARKET-ORIENTED REFORMS AND PUBLIC INVESTMENT IN RWANDA

In 2000, Rwanda's leadership launched a long-term strategy for transforming Rwanda into a knowledge-based economy with middle-income status by 2020. This strategy, known as 2020 Vision, uses a market-oriented approach to reforming Rwandan agriculture and improving smallholder profitability. While the country depends heavily on international aid, government reforms to promote private sector participation have made Rwanda one of the best places to do business in Africa. Rwanda has pursued a culture of delivery and accountability among government ministers and managers, a commitment to education and opportunity for women and girls, and a focus on long-term development. The prevalence of hunger fell from more than 55 percent in 1999–2001 to just over 36 percent in 2015–2017 (FAOSTAT), and the prevalence of undernutrition showed improvements in just over a decade—for example, child stunting fell from 52 percent in 2005 to 38 percent in 2015 (FAO et al. 2017).

COMMUNITY HEALTH AND NUTRITION PROGRAMS IN THAILAND

Recognizing that undernutrition was linked to poverty, Thailand rolled out a multisectoral, community-based approach to combating undernutrition beginning in the early 1980s. The country's Poverty Alleviation Program serviced half the country with nutrition and development interventions, including prenatal care, immunization, and agricultural and education activities. Village health volunteers provided healthcare and nutrition advice, especially to mothers and children. Explicit nutrition goals and indicators were embedded into the implementing institutions' policies, strategies, and action plans to allow for clear accountability (Nondasuta 1991; Tontisirin et al. 2014). This approach also promoted collaboration among the health, agriculture, and education sectors. In 2002, Thailand introduced the Universal Health Coverage Scheme, entitling every citizen to free basic healthcare. Improvements in nutrition have been striking: in the decade from 1982 to 1991, Thailand reduced its rate of child undernutrition from 50 percent to less than 20 percent and further reduced it to 9 percent by 2012. The country has nearly wiped out severe and moderate underweight among its children (UN ACC/SCN 1999).

MULTISECTORAL FOCUS ON CHILD NUTRITION IN PERU

In Peru, a commitment to improving nutrition, stimulated by advocacy from civil society, generated political support from the highest levels of government. In 2006, the Child Nutrition Initiative—a coalition of CARE-Peru, civil society, UN agencies, and donors—obtained "5 by 5 by 5" pledges from 10 presidential candidates, who committed to reduce chronic child malnutrition by 5 percent in children under 5 years of age within 5 years if elected. The newly elected government declared even more far-reaching goals (9 percent reduction). It also created CRECER, a multisectoral strategy promoting interventions for young children, better access to complementary foods, water and sanitation, and conditional cash transfers. Collection of annual data on progress, outcomes, and financial expenditures helped ensure accountability. Ultimately, the responsibility for success lay with the prime minister's office, which had the leveraging power to coordinate multiple sectors for the benefit of nutrition. These efforts had concrete results: from 2005 to 2014, Peru cut the prevalence of stunting among children under five years of age from 29.8 percent to 14.6 percent (FAO et al. 2017).

POLICY, PROGRAM, AND INSTITUTIONAL ACCELERATORS

Innovative policies and programs have achieved dramatic declines in hunger and undernutrition. Among the particular interventions that have great potential to speed progress, those that leverage agriculture–nutrition linkages, promote cross-sectoral synergies, improve food environments, and build human capacity and effective institutions stand out as potential gamechangers for food security and nutrition.

MAKING NUTRITION A KEY GOAL OF AGRICULTURE

Agriculture has vast, largely untapped potential to improve nutrition. The close links between agriculture and nutrition have only just begun to be explored, but recent evidence makes clear that nutrition-driven agriculture can significantly improve household access to nutritious foods and dietary diversity (Fan, Yosef, and Pandya-Lorch, forthcoming). Moving beyond staple crops is important to increasing dietary diversity, and complementary programs such as behavior change communication and water, sanitation, and hygiene (WASH) practices can enhance the impact of nutrition-driven agricultural programs. Evidence from research on agriculture–nutrition linkages also points to the importance of making nutrition a clear, measurable goal of agricultural programs and interventions, of creating an enabling environment, and of building up incentives for government and private sector actors to shift the food system toward demanding and producing more nutritious foods. A number of countries have introduced nutrition-driven programs. For example, Ethiopia has launched a nutrition-sensitive agricultural strategy that aims to address malnutrition though increased production and productivity, agricultural income, and women's empowerment. Bangladesh's national nutrition policy uses multisectoral coordination to promote dietary diversity, and includes behavior change communication and food fortification components.

REFORMING AGRICULTURE SUBSIDIES AND FOOD TAXES FOR NUTRITION

Subsidies for agricultural inputs and staple crops must be redirected to support the production of healthy, nutrient-rich foods (Tiffin and Arnoult 2011). Nutrient-poor foods could also be taxed to provide revenue for investing in or subsidizing more nutritious foods. A growing number of middle-income countries, including Mexico and some Caribbean and Pacific island nations, have taxed certain foods, particularly sugary drinks. Studies, while limited, point to positive effects on reducing consumption and promising potential to address overweight and obesity.

PROMOTING BEHAVIOR CHANGE COMMUNICATION

Nutrition-sensitive interventions can be especially effective when they include behavior change communication (BCC)—a range of interpersonal, group, and mass-media channels and methods that provide participants with relevant information to encourage the adoption of optimal nutrition and child feeding practices and behaviors (McNulty 2013). BCC programs, when integrated with WASH interventions or provision of fortified foods, can improve child nutrition outcomes such as dietary diversity and nutrient intakes and reduce anemia, diarrhea, and wasting. Coupling BCC with activities that empower women and promote gender equality within households has also proven effective. In Senegal, a dairy value chain project that included BCC on infant and child feeding and distributed fortified yoghurt to women increased hemoglobin levels in children (Le Port et al. 2017). BCC may prove to be an even more important tool in combating overweight and obesity—use of food information and warning labels provides an example of this approach.

TAPPING THE POWER OF WOMEN TO IMPROVE NUTRITION

Closing gender gaps and empowering women and girls sets off a virtuous circle, paving the way for many development goals, including reducing hunger and improving nutrition. Growing recognition of women's importance in agricultural

development has sparked more serious efforts to ensure that agricultural development programs are socially inclusive and consider the gendered roles and responsibilities, resources, and constraints of both women and men. Investments in education of girls and women is a critical component of empowerment, which is key to improving nutrition. In Brazil, improving women's education was identified as one of the most important factors behind improvements in child nutrition in Brazil, along with investments in maternal and child healthcare (Keefe 2016). Greater equality within households is also linked to positive nutritional outcomes, suggesting that nutritional programs that also aim to reduce intrahousehold inequality could have greater impacts than those that do not (Quisumbing et al. 2017). Integrated homestead production and nutrition programs in Burkina Faso also boosted women's production and consumption of nutritious foods, contributing to improved outcomes for maternal underweight and child anemia and wasting (Olney et al. 2015, 2016). Ensuring that women are empowered to play a larger role in reducing hunger and malnutrition can bring us closer to meeting global goals for improving nutrition.

ENGINEERING SOCIAL PROTECTION PROGRAMS FOR NUTRITION

Social protection programs—such as cash transfer and public works programs—play a fundamental role in scaling up improvements in nutrition and food security. Social protection programs can increase the quality and quantity of food consumed directly, and contribute to better diets through improvements in agricultural productivity, livelihoods, and resilience to food shocks. For example, national cash transfer programs in Lesotho and Zambia have reported increases in expenditures on food as well as in diversity of food consumed (FAO 2016). In Bolivia, poor rural households receiving a social pension experienced an average increase in food consumption of almost 165 percent of the value of the transfer because the transfers enabled investments in agricultural inputs (FAO 2015). It is equally important to enhance nutrition-sensitive social protection, particularly to improve child nutrition. By combining cash transfers with high-quality behavior change communication in Bangladesh, children's consumption of multiple-micronutrient powder or iron supplements increased by 22 percentage points (Hoddinott et al. 2018).

FOCUSING ON WATER, SANITATION, AND HYGIENE

Access to improved water, sanitation, and hygiene (WASH) is a critical complement to nutrition programs, contributing substantially to improvements in nutrition and related health outcomes. By reducing the incidence of waterborne disease, WASH investments, especially when supported by behavior change communication, can improve absorption of nutrients and reduce malnutrition. Access to clean drinking water has been shown to reduce diarrhea and diarrhea-related deaths among children, and reductions in open defecation help decrease child stunting. A community-level program in Mali to build sanitation facilities reduced stunting in children under age five, and had even greater impacts for children younger than one year (Pickering et al. 2015).

REORIENTING FOOD INDUSTRIES FOR BETTER NUTRITION

Nutrition outcomes can be improved by ensuring that people have access to healthy diets and information to make healthy food choices. Food industries are expanding, especially in developing countries, presenting opportunities for diet diversification, improved nutrition, and enhanced food safety. Expansion of supermarkets and the emergence of ICTs and online distribution channels have the potential to transform the nature of food access (Ruel, Garrett, and Yosef 2017). Leaders and activists in a number of countries are pursuing policies designed to promote nutrition by creating healthy food environments, particularly to address overweight and obesity. Chile has adopted warning labels on packaged foods high in fats, sugars, and salt, and Ecuador has a system of "stoplight" labels, with red indicating high levels of fats, sugars, and salt. Mexico, the Republic of Korea, and Taiwan, China, have put restrictions on the marketing of foods to children. Some middle-income countries such as Brazil regulate foods available in schools, including through guidelines for school meals, and many countries have established national dietary guidelines. Several upper-middle-income countries, including Argentina and South Africa, are promoting the reformulation of processed foods to reduce levels of salt and trans fats. Food retailing is an area ripe for further policy innovation and entrepreneurship to orient it toward healthier diets (Hawkes, Harris, and Gillespie 2017).

TECHNOLOGY ACCELERATORS

Emerging technological innovations can drive rapid reductions in hunger and malnutrition by increasing the nutritional value of foods and helping markets deliver better nutrition for farmers and consumers. Many technologies with proven, multiple benefits will be important contributors to a healthy and sustainable food future. Others are ripe for experimentation and may speed progress in ways only beginning to be understood. Investing in the development of new technologies—both in the field and in the lab—and in their deployment across the food system, particularly in ways that reach the poor, will play a key role in speeding and scaling up progress.

FORTIFICATION, BIOFORTIFICATION, AND ALTERNATIVE PROTEINS

Food fortification—the addition of vitamins and minerals, such as iron, folate, and iodine, to widely consumed foods—has long been used to improve nutrition across target populations. Extending the fortification of salt, cooking oil, flour, milk, and other foods with essential micronutrients—by incorporating it into national nutrition guidelines and policies, promoting consumer education, and fostering public-private partnerships—would further spread the nutritional benefits (Gayer and Smith 2015).

Biofortification takes a big step beyond traditional fortification by breeding crops to increase levels of scarce micronutrients. When consumed regularly, biofortified staple crops, such as vitamin A sweet potato and cassava, zinc rice and maize, and iron beans and millet, help fight the "hidden hunger" of micronutrient deficiencies and can generate measurable improvements in human health and nutrition in an environmentally sustainable manner (Bouis et al., forthcoming). In Uganda, the introduction and promotion of orange sweet potato resulted in significantly increased serum retinol, an indicator of vitamin A, in young children. In India, children who consumed iron-biofortified pearl millet experienced greater improvement in some types of cognitive performance (attention and memory) than those who consumed unfortified millet (Scott et al. 2018). To date, these vitamin- and mineral-rich crops are grown in more than 30 countries and reach more than 30 million people (HarvestPlus 2018). The potential for scaling up and accelerating is enormous: the groundwork is now being laid to reach 1 billion consumers with biofortified crops by 2030 (Bouis et al., forthcoming).

New, transformative technologies for nutrition are being developed not just in the field but also in the lab. Lab-grown meats offer potential to deliver cheap, sustainable protein. These alternative proteins not only may help to reduce hunger and malnutrition but also to address health and environmental issues linked to rising consumption of animal products (Tuomisto and de Mattos 2011; Schenck and Huizenga 2014). Gene sequencing and editing for seed improvements offer another promising set of tools with potential to rapidly improve yields and nutritional outcomes. CRISPR-Cas is a prominent example–this inexpensive tool for gene editing could help increase crop yields and create food that is healthier and more nutritious (WEF 2018).

BIG DATA AND INFORMATION AND COMMUNICATION TECHNOLOGIES

Data and information and communication technologies (ICTs) can accelerate progress against hunger and malnutrition by providing timely information to policy makers and actors across the food system. Innovations in data and related tools are crucial in tracking progress on food security and nutrition goals, helping to show what works (and what doesn't) in accelerating progress. Big data and analytical power can also be leveraged across value chains from farmers to processors to consumers—through crowdsourcing, cellphone apps, satellite and radar-based imaging, and drone-based imaging—to improve agricultural production, market access, and food safety, all of which are essential for acceleration (WEF 2018). The digital revolution, for example, is transforming food retail in developing countries. China is now among the leaders in online grocery markets. Mobile health

technologies, particularly wearable technologies to track physical activity and sleep, could help address overweight and obesity (Spruijt-Metz et al. 2015; Bacigalupo et al. 2013).

ENERGY AND TECHNOLOGY FOR VALUE CHAINS

New technologies, particularly distributed energy systems such as solar power, can lead to improvements along the food value chain, from production to consumption. Nutrient-dense foods, such as vegetables, fruits, and animal products, often require electric power for irrigation for production and refrigeration after harvest. Interventions that improve management of food products after harvest can help reduce food loss and waste, minimize nutrient losses, and improve food safety. In Burkina Faso and Uganda, improved packaging and dry chain development helped reduce food losses among smallholders by nearly 98 percent (Costa 2014). Low-cost solutions to strengthen cold chains include the zero-energy cool chamber (ZECC) in India and SunDanzer—a small-scale portable cooling system—that plays major role in the Kenyan dairy sector (Lal Basediya, Samuel, and Beera 2013). Nutrient-preserving and nutrient-enhancing processing, packaging, transport, and storage can contribute as well. In Rwanda and Uganda, improved processing procedures enhance the digestibility and nutritional value of beans by reducing phytates and polyphenols that limit iron uptake (FAO 2013). In conjunction with rural roads and ICTs that increase connectivity, these technologies can make value chains work for better nutrition.

CONVERTING YIELD-ENHANCING TECHNOLOGIES TO MULTIPLE-WIN INNOVATIONS

Climate-resilient and yield-enhancing technologies can be multiple-win innovations by helping provide nutrition while also reducing environmental impact. Crop-sensing technologies can help producers ensure efficiency in their fertilizer use for optimal yield while minimizing environmental impact. Greenseeker, a hand-held crop sensor that assesses plant nitrogen needs, increased profits by $37 per hectare and avoided over 9,500 tons of greenhouse gas emissions for wheat farmers in Yaqui Valley, Mexico (Lapidus et al. 2017). Precision agriculture is another technology that enables sustainable yield enhancements, including microdosing, which saw millet yields increase by over 50 percent and improved water absorption in Niger, Mali, and Burkina Faso (ICRISAT 2015). Improved climate-resilient crop varieties can protect food supplies in the context of increasing climate risk. Cassava varieties in Nigeria are early-maturing, pest- and drought- resistant, and increased yields by over 60 percent (ISPC 2018). Further mainstreaming nutrition into these multiple-win technologies will be key to accelerating progress on hunger and malnutrition.

INVESTING FOR FASTER PROGRESS

With this array of proven and potential accelerators and growing knowledge of what is needed to accelerate progress in ending hunger and malnutrition, some broad recommendations can be made:

- INVEST IN EFFECTIVE POLICIES AND PROGRAMS: The promise of multisectoral initiatives makes it clear that policy must break out of traditional silos. Designing, refining, and implementing policies and combinations of policies that work must be a priority. Action must be coordinated at the policy, program, and implementation levels, from local to national to regional and global levels. Acceleration of progress will require effective institutions and leadership across sectors to address not only hunger and malnutrition but also the closely related issues of poverty, disempowerment, particularly of women, and poor access to healthcare and education (Ruel et al. 2013).
- INVEST IN INNOVATION: New tools and technologies will be essential to addressing hunger and malnutrition on a global scale. Support for innovation incubators—from the field to the lab to the policy office—can help foster new ideas. Already governments, donors, companies, nongovernmental organizations, and communities are testing innovations for improving food security and nutrition. Fostering a culture of

experimentation can generate a host of potential solutions, particularly by tapping into the potential of the digital revolution to transform our food systems.

- INVEST IN DATA: Building the capacities of national institutions to gather data and assess the scope and scale of the problem can help identify the right policies and investments for combating hunger and malnutrition. Without timely data, it is impossible to know whether we are accelerating progress at all. Sharing evidence and actionable information with key stakeholders ensures that the evidence can be put to work informing policy choices and in the formulation of nutrition-driven strategies, policies, and programs.
- INVEST IN PEOPLE: Interventions that have proven effective in accelerating progress invest in people, especially women. These include a range of social protection programs, behavior change communication programs, and investments in education, healthcare, and women's empowerment. Without improvements in income, knowledge, and capacity, people cannot fully benefit from the policies, programs, and opportunities to improve their food security and nutrition.
- INVEST IN LEADERSHIP: Investing in building capacity and supporting the development of leaders and champions from community to national levels can pay large dividends. Establishing a basis for accountability can also incentivize actors and foster buy-in from stakeholders for commitments made. Political will and commitment by leadership are important to creating an enabling environment in which stakeholders can collaborate to accelerate progress in improving nutrition and ending hunger by 2030.
- INVEST IN INNOVATIVE FINANCING: Accelerating the end of hunger and malnutrition will require drawing on new sources of funding, including governments and the private sector. Financing the investments described could require US$1.5–2.5 trillion per year of additional investments just in developing countries (Schmidt-Traub 2015; Laborde 2016; Fan et al. 2018). Foreign aid and lending by multilateral financial organizations, as well cross-border investments, are relevant, but they pale in comparison with the combined resources of the fiscal sectors and banking systems. An adequate allocation of both fiscal and financial sources of funds will be crucial to transforming the world's food systems (Díaz-Bonilla and Callaway 2018).

Hunger and malnutrition are inherently complex problems. By looking at ways to accelerate the end of hunger and malnutrition in the context not only of entire food systems but also in the context of links with poverty, agriculture, gender, and health, we can develop innovative, multisectoral initiatives that will speed progress by introducing effective technologies and leveraging these links. The world has solved large, seemingly insurmountable problems before. In hunger and malnutrition, the world faces a significant challenge—it is a challenge we can and must meet.

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