

Stability in the 21st Century:

Global Food Security for Peace and Prosperity



Prepared by an Independent Task Force on
Global Food Security
Douglas Bereuter and Dan Glickman, cochairs
March 2017

Sponsored by



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Foreword

For nearly a century, the Chicago Council on Global Affairs has provided a platform for a variety of voices to promote deeper global understanding and active US engagement in the world, with an underlying belief that engagement is a better course of action than isolation. Faced with the pressing global challenge of global food insecurity and malnutrition, it is clear that US leadership on agricultural development is a smart and essential strategy for security, stability, and prosperity—for the United States and the world.

Almost a decade has passed since the 2007-08 food price crisis sparked conflicts and instability, bringing the national security consequences of not paying attention to agriculture and food security into sharp focus. The evidence shows that where food supplies are reliable, prices are stable, and people have enough to eat and to live on, countries and societies are more stable and secure. The opposite is also true. Food insecurity in low-income countries can lead to instability, unrest, and violence, putting America's national security at risk. Prolonged food insecurity and extreme poverty are also powerful drivers of migration, as demonstrated around the world, from Syria to the Horn of Africa to Central America.

As American agricultural productivity continues to grow, developing new markets will be more important than ever. Already, US agricultural exports to Sub-Saharan Africa have increased by 200 percent in the past 10 years. As hunger fades and incomes rise, consumers worldwide increasingly demand not only agricultural products, but all kinds of American goods, with benefits that reverberate throughout our economy. But if the United States turns away now from its commitment to advancing global food security, we will likely witness increasing global hunger and the slowing of agricultural progress, with the potential for major national security and dire humanitarian consequences. And if we pull back from being a leader in promoting food security and helping agricultural development, we will open up these emerging markets to other global powers, whose rising geopolitical interest in agricultural development has become increasingly evident.

The United States has been leading the fight to end global hunger and malnutrition since World War II. In an evolving global context that poses new threats and brings new opportunities, America's commitment to global food security is more important than ever. *Stability in the 21st Century: Global Food Security for Peace and Prosperity* highlights this evolving context and the need for continued action. It puts forth recommendations to the US administration and Congress to continue our leadership in close collaboration with the private sector, research institutions, and civil society alongside our global allies in the fight against hunger.

This report was developed by an independent task force on global food security, cochaired by Douglas Bereuter and Dan Glickman, in close consultation with the Global Food and Agriculture Program advisory group and with valuable input from numerous subject-matter experts from government, business, civil society, and academia. I would like to thank the cochairs for their skillful and dedicated leadership throughout this report's demanding process and the members of the task force for their insights, expertise, and commitment. I would also like to thank the report's signatories, including the task force

and advisory group members. Each brought their respective areas of expertise to this effort, effectively collaborating to shape the report's consensus-based findings and recommendations.

Finally, the Council would like to express its deep appreciation to the Bill & Melinda Gates Foundation for their generous support, which made this report possible.

Ivo Daalder

President

Chicago Council on Global Affairs

Acknowledgments

The Council on Global Affairs is grateful for the contributions of the following individuals, who spoke with the research team in consultative research conversations that supported the development of this report:

American farmers and farmer representatives: Annie Dee, Alabama farmer; Jesse Larios, California farmer; Kassi Rowland, Indiana farmer; Kasey Bamberger and Rick Fruth, Ohio farmers; Rose Barbuto and Stephanie Mercier from the Farm Journal Foundation; Jennifer Sirangelo from the National 4-H Council; and Thomas N. Sleight from the United States Grains Council.

National security leaders: General James L. Jones, former US national security advisor; Rear Admiral Don Loren, former deputy assistant secretary of defense; John Raidt from Jones Group International; Porter Delaney from the Kyle House Group; Rod Schoonover from the National Intelligence Council; and Rear Admiral David W. Titley from the Naval Meteorology and Oceanography Command.

Business leaders, investors, and entrepreneurs: John F. Ginascol from Abbott Nutrition; Christina Conlin from Baker & McKenzie LLP; David Rinneard from BMO Financial Bank; Taryn Barclay and Deanna Petersen from Cargill, Inc.; Tjarko Leifer from the Climate Corporation; Rhiannan Price from Digital Globe; Matthew Vander Laan from Edelman; Jennifer Goldston from FarmLink; William Dietz Jr. from Heartland Produce Company; Sanjeev Asthana from I-Farm Venture Advisors; Jerry Parkes from Injaro Investments; Kris Charles and Diane Holdorf from The Kellogg Company; John Ellenberger from Land O'Lakes, Inc.; Usha Zehr from Mahyco Seeds; Salif Romano Niang from Malo; Eric Trachtenberg from McLarty Associates; Ranveer Chandra from Microsoft Research; Carlton Jones from Monitor Deloitte; Mark Edge from the Monsanto Company; Mark Kahn from Omnivore Partners; Amy Sink Davies and Paul Weisenfeld from RTI International; Angel Solorio from Standard Bank; Alex Botting from the United States Chamber of Commerce; and John Mandyck from United Technologies Corporation.

Land grant university leaders and faculty: Ronnie Coffman from Cornell University; Jagger Harvey from Kansas State University; Thomas Jayne and Thomas Reardon from Michigan State University; Jason Henderson from Purdue University; Josette Lewis from the University of California, Davis; Robert Easter, Craig Gunderson, Prasanta Kalita, and Alex Winter-Nelson from the University of Illinois; Brady Deaton from the University of Missouri; and Peter McCornick from the University of Nebraska.

US government experts: Nicolas Cook, Sonya Hammons, and Randy Schnepf from the Congressional Research Service; Melissa Ho from the Millennium Challenge Corporation;

Sarah C. Marshall from the Peace Corps; Rob Bertram, Beth Dunford, Justin Finnegan, and Melanie Vant from the United States Agency for International Development; Jocelyn Brown, Phil Karsting, and Suzanne Palmieri from the United States Department of Agriculture; Ted Lyng and Caitlin Welsh from the United States Department of State; and Dan Peters from the United States Department of Treasury.

Global researchers: Ruben Echeverria from the International Center for Tropical Agriculture; Regina Kapinga from the International Institute of Tropical Agriculture; Jan Low and Pietro Turilli from the International Potato Center; and Paul Collier from the University of Oxford.

Philanthropic: Diana Horvath from the 2Blades Foundation; Katy Button, Rob Horsch, Kathy Kahn, Yilma Kebede, and Katie Lee from the Bill & Melinda Gates Foundation; and Karina Wong from The Small Foundation.

Civil society leaders and global hunger and nutrition experts: Namanga Ngongi from the Africa Fertilizer and Agribusiness Support Program; Wanjiru Kamau-Rutenberg from African Women in Agricultural Research and Development; Emmy Simmons from AGree; Khalid Bomba from the Agricultural Transformation Agency, Ethiopia; Boaz Blackie-Kenzie from the Alliance for a Green Revolution in Africa; Mumbi Kimath and David Ruchiu from Farm Concern International; Lawrence Haddad and Bonnie McClafferty from the Global Alliance for Improved Nutrition; Thomas Carroll from the Global Development Incubator; Lisa Moon from the Global FoodBanking Network; Margaret Zeigler, Global Harvest Initiative; Mark Green, International Republican Institute; Wendi Chamberlin from The Middle East Institute; Ginya Truitt Nakata from The Nature Conservancy; Marshall Matz from OFW Law; Stephanie Hanson and David Hong from the One Acre Fund; Juergen Hagmann from the PICO Team; Ruth O’niango from Sasakawa Africa; and Kristin Girvetz, an independent consultant.

Several members of the Council staff were integral to bringing this report to fruition. Alesha Black, director, Global Food and Agriculture Program, directed and oversaw the study. Louise Iverson, assistant director, expertly managed the report’s research and development and guided all participants’ engagement. Erik Pederson and Grace Burton provided essential guidance and expertise on US policy and the recommendations for US action. Isabel DoCampo played a key role in the research and report drafting processes with unmatched dedication and accuracy. Research interns Elizabeth Black, Rachel Cole, Lindsay Hill, Tara Mittelberg, Matt Ruby, Mark Sawyer, and Zach Wehrli provided research assistance and other critical support throughout the report’s development. Catherine Hug of Chicago Creative Group provided valuable editorial direction and oversaw the information and graphic design of the report.

EXECUTIVE SUMMARY



Pushpa Budhathoki holds two kid goats at a “goat bazaar” in Nepal’s Banke district. Credit: Heifer International.

America is facing enormous global challenges at the beginning of 2017, including the threat of rapidly increasing global instability, conflict, and migration as a result of inadequate global food supplies and water scarcity. Today's global population of 7.4 billion people is expected to grow to 8 billion by 2024 and 10 billion by 2056.¹ In addition, rising incomes in many low- and middle-income countries are further increasing the demand for food to satisfy the desire for higher quality, more nutritious, and diverse diets.

Yet we have never been as well equipped as we are today to respond to these challenges. Bipartisan leadership from the United States and action by the global community over the past 25 years has led to impressive results in the fight against the destabilizing forces of food insecurity. The US government, in close cooperation with the private sector and university system, is well positioned to expand its legacy of commitment to food security and not only bolster the livelihoods of millions of smallholder farmers and entrepreneurs around the world, but also open up new business opportunities and partnerships in emerging economies.

Global food and nutrition security is in America's national security and economic interests

Food security promotes national security.

Particularly in urban areas of low- and middle-income countries, high food prices and reduced access to food can trigger protests and rioting, including armed conflict, that lead to political and economic instability with global consequences.² The global food crisis of 2007-08 demonstrated how spikes in food prices can plunge millions into hunger and deeper poverty, sparking riots that can undermine progress for years. The food price crisis hit hardest in countries with systems that were least able to respond effectively to global price volatility. For example, food price-related protests toppled governments in Haiti and Madagascar in 2007 and 2008. In 2010 and 2011 food prices and grievances related to food policy were one of the major drivers of the Arab Spring.³ Food insecurity can also be a powerful driver for migration. Despite ongoing conflicts, much of today's global migration crisis is driven by economic factors, as millions of people flee hunger and poverty in their countries. On the other hand, countries that have achieved sustained development progress and greater food security are less susceptible to volatility and violence.

Food security promotes stability and economic opportunity.

Greater prosperity and economic growth in low-income countries create new and expanding markets, presenting growth opportunities for American farmers, ranchers, and businesses. For instance, in Africa alone the value of the agriculture and food sector is expected to reach \$1 trillion by 2030.⁴ Rising incomes and changing diets are increasing demand for more diverse and nutritious foods. As economies grow, so does the demand for agricultural products, benefiting farmers locally and globally. Growing economic opportunities in the agriculture sector reach well beyond food production into sales of machinery and inputs, growth in demand for consumer packaged goods, and digital technologies for agriculture, where American companies are global leaders.

Agricultural development leads to greater food and nutrition security, economic growth, and well-being

If the history of development has taught us anything, it is that a strong agricultural sector is a cornerstone of inclusive and sustainable growth, broad-based development progress, and long-term stability. Simply put, sustainable growth, job creation, and stability in low- and middle-income countries is not possible without a robust and productive agricultural sector.

Agricultural development programs are cost-effective.

Investments in agricultural development have been proven to be more than twice as effective at reducing poverty as investments in other sectors.⁵ And gains to farmer productivity and income have proven enormously important both for the individuals involved and for societal progress more broadly.

Agricultural production has, on average, almost doubled in low- and middle-income countries since 1995.⁶

Private investment in small and large farms and in agricultural value chains has been central to this growth, alongside public investments in infrastructure, R&D, and improvements in agricultural policies. There has been notable progress across almost all regions. These gains in agriculture are central to generating inclusive and sustainable growth, reducing hunger and poverty, improving nutrition, and achieving long-term stability.

The combination of greater food availability and higher incomes over the past two decades has led to substantial reductions in hunger and improved nutrition.

There are 200 million fewer chronically undernourished people in the world today compared with 1990, despite significant increases in population.⁷ The proportion of chronically undernourished people in low- and middle-income countries has fallen from 23 percent to 13 percent.⁸ At the same time, the number of people suffering from physical and cognitive stunting as a result of malnutrition has fallen from 250 million to 150 million.⁹

Current challenges must be met

As important as the gains in fighting hunger and malnutrition over the past several decades have been, they are not nearly enough. Major obstacles for food and nutrition security loom large.

Population growth and rapid urbanization are increasing demand.

The global population will reach 8 billion by 2024 and 10 billion by 2056.¹⁰ Ninety-nine percent of the projected growth in the next century will occur in low- and middle-income countries.¹¹ The challenges posed by this growth are daunting, especially in Africa, where more than half of the total population growth between now and 2050 will take place, adding another 1.3 billion people to the region. Most striking of all, in Nigeria, already the seventh-largest country in the world, the population is projected to grow from 180 million to nearly 400 million, surpassing the population of the United States by 2050. At the same

time, many more people will live in cities than ever have before.¹² The United Nations (UN) projects that the share of people living in urban areas worldwide will increase from about 50 percent today to two-thirds by 2050. Virtually all of the expected growth in world population between now and 2050 is expected to be concentrated in the urban areas of low- and middle-income countries.

Youth populations are exploding.

In much of Africa and South Asia, a large and increasing share of growing populations will be adolescents and young adults—known as a “youth bulge.” Africa has the youngest population in the world. There are currently 200 million people in the region between the ages of 15 and 24, and this number is expected to double within the next 30 years.¹³ As young populations boom, their creativity and productivity can help boost their countries’ gross domestic product (GDP)—creating a pool from which the best and brightest can emerge to help solve problems around the world. Barred from participation in employment and opportunity, however, large populations of young people can be a destabilizing force in economies on the rise. A thriving food and agriculture sector, while by no means a silver bullet, is important to addressing the youth bulge by not only ensuring food and nutrition security, but also offering a source of employment throughout agricultural supply chains.

Risks from climate and natural resource pressures are increasing.

Nearly half of the planet’s land is currently used for agricultural and livestock production.¹⁴ As stewards of the land, farmers are among the most committed to preserving the natural resource base. Given that they depend on the land for their livelihood, they are also the most affected by a changing climate, including volatile weather and pressures on the natural resource base. Farmers must be valued as allies in preserving the environment. Indeed, among the most significant threats to food and nutrition security are the interrelated issues of climate change and natural resource constraints, including water scarcity, increased incidences of pests and disease, poor-quality soils, and volatile weather patterns.

Collaboration with our allies and partners is essential to ending hunger and malnutrition through accountability and opportunity

While it is crucial that the United States act to fight hunger and enhance global food security, it should not and will not act alone.

Government leadership is crucial for effective development.

Other governments, including rising global powers and low-income countries themselves, have all contributed significantly to improved global food security in recent years. The 2007-08 food price crisis was a wake-up call that spurred action not only by the United States, but by governments, multilateral institutions, businesses, investors, and civil society organizations around the world. Global leaders stepped up to meet the need for increased action and investment to advance global food security, agricultural production, and improvements in nutrition. Rising powers, especially China, India, and Brazil, have taken an increased interest in global agriculture and food systems, particularly in emerging markets. Moreover, governments in many low-income countries have significantly increased their

own investments at home, improved their policy environments, and begun to strengthen many of the key institutions that provide the foundation for robust agricultural production and better nutrition. Continued action by all of these actors will be crucial for substantial and sustained progress in strengthening global food security.

Agriculture and food production are driven in large part by the private sector.

Up and down the value chain, from seed and tool companies to large and small farm producers to traders to food processors, the business of feeding the planet is stewarded by private investment. Achieving increases in agricultural productivity, improvements in nutrition, and enhanced global food security is only possible through the considerable capital, technological and product development capabilities, knowledge, experience, and distribution capacities of private businesses, large and small. Although private-sector investment in areas related to food security has increased rapidly in recent years, businesses still face many obstacles and impediments, keeping investment from reaching its full potential. Unlocking that potential is a key challenge, but one that brings enormous gains.

The United States must strengthen its commitment to ending hunger and malnutrition

Since World War II, when America's leaders strove to meet the challenges of "hunger, poverty, desperation, and chaos" in the aftermath of such great conflict and suffering, the United States has been strongly committed to ending hunger and malnutrition around the world, not just as a moral imperative but as a matter of national security.¹⁵ Since that time, US efforts to advance global food and nutrition security have been among the greatest triumphs of American ingenuity and generosity.

In July 2016 Congress overwhelmingly passed the Global Food Security Act, authorizing the administration to continue to meet US global food and nutrition security goals. The act passed with strong bipartisan support, with no objections in the Senate and 87 percent approval in the House.

To address the challenges facing the United States and the world and threatening global food and nutrition security, the US administration together with Congress should support investments that take an integrated approach to agricultural-led economic growth, nutrition, and food system resilience through innovation and new technologies. To succeed, the administration and Congress must work closely with private businesses, farmers, entrepreneurs, investors, universities, research institutions, and civil society.

The crises and challenges facing the world and threatening food and nutrition security continue to call for action. To meet these challenges, we recommend that the administration and Congress take urgent action in four key areas.

Recommendation 1: Make global food and nutrition security a pillar of US diplomatic and national security engagement and strengthen the integration and coordination of activities both within the United States and around the world.

- ▶ Amplify the importance of global food security for US national security and diplomatic activities.

- ▶ Maximize resources through smart integration and coordination among agencies and between the US government and civil society.
- ▶ Work closely with bilateral and multilateral partners to achieve collective goals.

Recommendation 2: Prioritize public research investments to unlock innovation and harness new technologies for the agriculture, food, and nutrition sectors.

- ▶ Harness the unparalleled expertise of American universities and their research partners to solve the most pressing problems in agriculture, food, and nutrition at home and abroad.
- ▶ Expand support for the development of scientific and technological innovations that improve agricultural productivity, pest and disease resistance, supply chain development, and nutrition.
- ▶ Develop new technology platforms to collect more and better data and improve communication of information among key stakeholders.

Recommendation 3: Productively partner with committed companies to amplify the power of the private sector to transform food and nutrition security, from individual entrepreneurs to multinational businesses.

- ▶ Form strong public-private partnerships to harness the private sector's strengths and spur inclusive and sustainable growth in smallholder agriculture and food systems in low-income countries.
- ▶ Strengthen and open the environment for investment, action, and collaboration.
- ▶ Increase access to finance and mitigate the risks that undermine opportunities for investors.

Recommendation 4: In strategic alignment with foreign policy goals, ensure that US agriculture and nutrition assistance programs are efficient and support low-income countries' capacity to implement responsible and effective policies.

- ▶ Strengthen the effectiveness of development assistance through strong commitment to monitoring, learning, and evaluation for accountability.
- ▶ Build national governments' capacity to prioritize, implement, manage, and measure their agricultural and nutrition policies, strategies, and goals.

INTRODUCTION



Mary Akrong, 13, carries a container of corn grains in Abokobi, Ghana. Credit: Heifer International.

America is facing enormous global challenges at the beginning of 2017, including the threat of rapidly increasing global instability, conflict, and migration as a result of inadequate global food supplies and water scarcity. Today's global population of 7.4 billion people is expected to grow to 8 billion by 2024 and 10 billion by 2056.¹⁶ In addition, rising incomes in many low- and middle-income countries are further increasing the demand for food to satisfy the desire for higher quality, more nutritious, and diverse diets.

By 2050 the combination of more people and higher incomes will require that global agriculture produces almost 50 percent more food, feed, and biofuel than it did in 2012—and more than double as much in Sub-Saharan Africa and South Asia. This need is occurring just as growing food becomes more difficult due to soil depletion, water and natural resource scarcity, and increasingly volatile weather.¹⁷ These challenges will increasingly affect US national security and global security more broadly. A recent US government Intelligence Community Assessment concluded that during the next decade, “in some countries, declining food security will almost certainly contribute to social disruptions or large-scale political instability or conflict.”¹⁸ The food crisis of 2007-08 that left millions

A recent US government Intelligence Community Assessment concluded that during the next decade, “in some countries, declining food security will almost certainly contribute to social disruptions or large-scale political instability or conflict.”

hungry, sparked violence across more than 40 countries, and brought down governments is just one example of the dangerous consequences of such crises. And, today's unprecedented refugee crisis, with 65.3 million people currently displaced worldwide, will only grow worse if instability and migration born of food-related crises are not addressed.

The good news is that we have never been as well equipped as we are today to respond to these challenges. Bipartisan leadership from the United States and action by the global community over the past 25 years has led to impressive results in the fight against the destabilizing forces of food insecurity. Between 1990 and 2015, more than one billion people were lifted out of extreme poverty.¹⁹ And there are 200 million fewer chronically undernourished people.²⁰

At the core of this progress is agriculture. Public and private investments in the global food system and agricultural development in particular have made these remarkable gains possible. As a global leader in agriculture, the United States has played an indispensable role in this development thanks to the ingenuity, commitment, and know-how of our country's entrepreneurs, farmers and ranchers, researchers, civil society, and business and government leaders.

America is reaping the rewards of this progress through new knowledge, research, and technologies for our food and agriculture sector; expanded markets at home and abroad for American businesses and entrepreneurs; new and renewed strategic relationships in key areas of the world; and increased security from the reduction of hunger-related political and economic instability.

But while the United States and the world have made extraordinary progress in combating the threat of poverty and hunger and its related problems, the fight is far from over. Agricultural advances have not reached everywhere they are needed, and emerging cri-

ses and challenges threaten to reverse the progress that's been made and create greater instability. Agricultural productivity in many low-income countries lags far behind global averages, and the amount of food wasted and lost globally is estimated to be as high as 32 percent of all food produced.²¹

Sustained progress is needed to meet growing food demands, including demand among the 700 million people who are still living in extreme poverty and the nearly 800 million who still are chronically hungry.²² Two billion people suffer from micronutrient deficiencies (lacking key vitamins and minerals), and at least 150 million children under five are stunted, or low height for their age, which leads to diminished physical and cognitive capacity.²³ At the same time, rapidly increasing rates of overweight and obesity, along with diet-related chronic diseases, are a growing global concern.

It is imperative to move quickly and resolutely to address emerging food security issues and further expand the progress that has been achieved. Today's challenges are pervasive and complex, and they call for bolder, more innovative, and more committed American action. There is an urgent need to address global hunger and malnutrition as key components of America's national security and economic agendas. Success will require efforts that more directly address today's key challenges, including building greater resilience in the food system to price spikes, adverse weather events, water scarcity, and other

Agricultural advances have not reached everywhere they are needed, and emerging crises and challenges threaten to reverse the progress that's been made and create greater instability.

shocks; developing innovative approaches for food and nutrition security in failing and fragile states; more effectively integrating agriculture and nutrition programs; addressing the demographic "youth bulge"; ensuring the rights of women and girls; and ensuring the proper reporting, transparency, and efficiency of food security programs.

There is much potential to meet these challenges. Food production can be increased and food waste reduced through innovation, more sustainable practices, more effective training programs, and expanded access to electricity in rural areas. More of the food that is produced can reach consumers by improving infrastructure, strengthening value chains, and reducing the amount of food lost or wasted. Investments aimed at improving health and nutrition for pregnant women, young mothers, and their children, including community nutrition education and new biofortified foods, can help fight both undernutrition and obesity. Investments in R&D to develop new heat- and drought-resistant seeds and plants as well as new technologies for delivering badly needed energy, fertilizers, pest resistance, water management solutions, and more nutritious food varieties have the potential to pay off substantially. Reductions in trade barriers, improvements in infrastructure, and innovations in finance can help unleash the enormous problem-solving capacity of private investors and businesses to help strengthen agriculture, nutrition, and food security.

Addressing these needs is a significant investment opportunity for the private sector. The size of the food and agribusiness sectors in low- and middle-income countries is rapidly growing. In Africa alone the value of the agriculture and food sector is expected to reach \$1 trillion by 2030.²⁴ The force and full power of this economic engine will depend on government support. Even so, many governments recognize the need and benefit of

outside investors in the food and agribusiness sectors given the scale of the development challenge. Continued US leadership can help smooth the way for further development that provides an enabling environment for private-sector investment.

A commitment to global food security and agricultural development can help the world's poor and hungry become not just self-sufficient, but producers for new markets in their own right. While this can alleviate some pressures on food aid, the complex nature of today's food emergencies and the circumstances driving chronic hunger and malnutrition mean that our food aid resources are more strained than ever before. There is clear evidence that emergency food aid requires more resources and can be made more efficient. The administration and Congress should review the many policy ideas on how to make food assistance more effective and impactful in the short term. However, this paper's main focus is the promotion of agricultural development for smallholder farmers in low-income countries to improve nutrition and alleviate food insecurity and poverty sustainably in the medium and long term for stability, peace, and prosperity.

The US government, in close cooperation with the private sector and university system, is well positioned to expand its legacy of commitment to food and nutrition security and not only bolster the livelihoods of millions of smallholder farmers and entrepreneurs around the world, but also open up new business opportunities and partnerships in emerging economies. Today's challenges call for significantly expanding and deepening US global food security and related programs; further enhancing coordination across the US government; and deepening collaboration with other governments, international organizations, businesses, and local leaders in low-income countries.

To achieve these objectives, the US presidential administration and Congress, in close collaboration with the private sector, civil society, universities, multilateral institutions, and other national governments, should take urgent action in four key areas.

1. Make global food and nutrition security a pillar of US diplomatic and national security engagement and strengthen the integration and coordination of activities both within the United States and around the world.
2. Prioritize public research investments to unlock innovation and harness new technologies for the agriculture, food, and nutrition sectors.
3. Productively partner with committed companies to amplify the power of the private sector to transform food and nutrition security, from individual entrepreneurs to multinational businesses.
4. In strategic alignment with foreign policy goals, ensure that US agriculture and nutrition assistance programs are efficient and support low-income countries' capacity to implement responsible and effective policies.

With the growing risks facing the world today, a failure to act with urgency and capitalize on the momentum already under way may very well lead to increasing hunger, greater violence and instability, increased pressures for migration, weakened global security, and missed business opportunities that will go to other countries who get there first. By contrast, strong leadership, smart investments, and concerted action will spur economic growth, improve well-being, and increase America's security through a more stable, prosperous, and food-secure world.

PART I



Indonesian farmers plant rice in a paddy field in Yogyakarta, Java. Credit: Ian Masias/IPRI.

GLOBAL FOOD AND NUTRITION SECURITY IS IN AMERICA'S NATIONAL SECURITY AND ECONOMIC INTERESTS



Increased food and nutrition security directly supports the security interests of the United States. A lack of development and resilience in the world's food and agriculture systems leads to ever more frequent shortages and price volatility that can prompt widespread food crises. Food price-related unrest can have an immensely negative impact on the stability of countries vital to US interests.²⁵ In contrast, stable food prices and secure food supplies enhance global peace and stability—and therefore improve the security of the United States.

Food security promotes national security

Prevents food-related violence and conflict

Food price shocks can act as a catalyst for both nonviolent and armed conflict. Particularly in urban areas of low- and middle-income countries, high food prices and reduced access can trigger protests and rioting.²⁶ The global food crisis of 2007-08 demonstrated how spikes in food prices can plunge millions into hunger and deeper poverty, sparking riots that can undermine progress for years. The food price crisis hit hardest in countries with systems that were least able to respond effectively to global price volatility. For example, food price–related protests toppled governments in Haiti and Madagascar in 2007 and 2008. In 2010 and 2011 food prices and grievances related to food policy were one of the major drivers of the Arab Spring.²⁷ Analyses suggest that Angola, Benin, Burkina Faso, Chad, Ethiopia, Gambia, Madagascar, Mali, Mozambique, Rwanda, Tanzania, and Uganda are all ripe for revolt should prices spike again. Several of these countries have recent or ongoing experiences with violent conflict and are strategically significant to the United States.²⁸ Current events in Venezuela also demonstrate the consequences of weak agriculture and food policies.²⁹

These challenges are by no means limited to the agriculture sector. Guinea, Liberia, and Sierra Leone were overwhelmed by Ebola in 2014 largely because they had weak health systems, and modern connectivity meant people far beyond the region, including

Reductions in conflict make the world a safer place for both rich and poor countries and lessen the need for costly international military intervention. As former US Secretary of Defense Robert Gates put it, “Development is a lot cheaper than sending soldiers.”

Americans, were put at risk. Similarly, the world’s poorest countries tend to be the most vulnerable to terrorist financing, drug trafficking, and other illicit crimes that undermine their national security as well as the security of the United States.

In contrast, countries that have achieved sustained development progress and greater food security are less susceptible to volatility and violence, and many have become allies of the United States in the fight to reduce global security threats. Reductions in conflict make the world a safer place for both rich and poor countries and lessen the need for costly international military intervention. As former US Secretary of Defense Robert Gates put it, “Development is a lot cheaper than sending soldiers.”³⁰

Helps stem migration

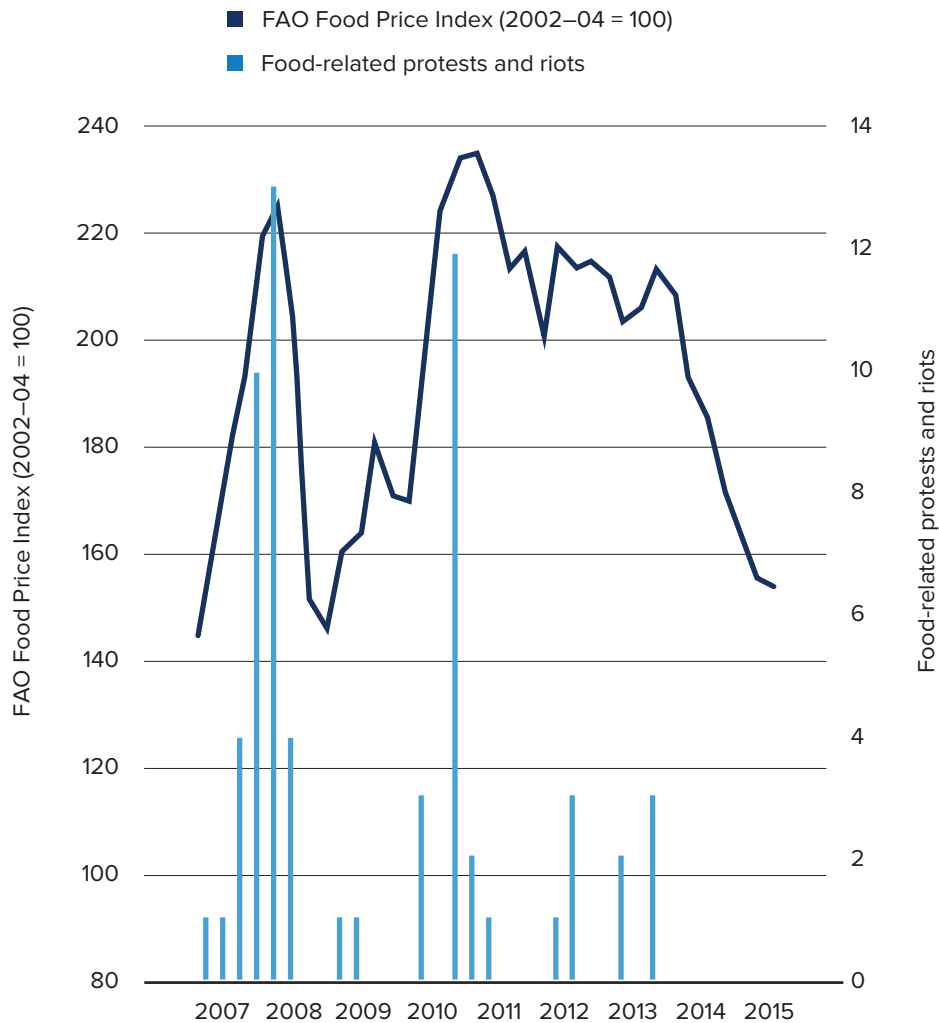
Food insecurity can also be a powerful driver for migration. Despite ongoing conflicts, much of today’s global migration crisis is in fact driven by economic factors, as millions of people flee hunger and poverty in their countries. Food insecurity has been correlated with migration from Central America, particularly from Guatemala, El Salvador, and Honduras.³¹ The conflict in Syria was preceded by years of severe drought, which left numerous Syrian farmers without food or income—adding fuel to the fire of the crisis that was to come.³² Agricultural production in Syria is now severely depressed, with food production

at an all-time low. Even when the conflict comes to an end, the repercussions for food production and hunger will continue, likely for decades.³³

It is critical to US security that countries are able to respond to these kinds of crises within their borders. When hunger recedes and low-income countries grow wealthier as their agriculture systems strengthen, they build infrastructure, strengthen their capacities, and become better equipped to not only enhance food and nutrition security but also fight the spread of disease, international crime, and terrorism. And as incomes rise and progress expands in low-income countries, there is less reason for citizens to flee. The best way to slow migration pressure is to expand the attractiveness of making a life at home by creating better economic opportunities, stronger education and health systems, enhanced safety and security, reduced conflict, and greater political freedom.

Figure 1 - Food prices and food-related protests, 1990-2015

Extreme food price volatility correlates with the occurrence of food-related protests and riots.



Source: Hendrix, 2016. Food price data are from the FAO. Protests and riots data are from the World Bank Food Price Crisis Observatory (2015) and only cover 2007-14.

Box 1 – Food insecurity and migration

Food insecurity is not only a potential driver of conflict, but it can also spur large-scale migration. The World Food Programme (WFP) and the International Organization for Migration identified this relationship in the migratory patterns of subsistence farmers and households impacted by drought in El Salvador, Guatemala, and Honduras in 2014. They found that food insecurity proved a significant factor in decisions to migrate, particularly to the United States, while violence may have also played a less consistent role in outward migration from the region.

This is a phenomenon playing out today across the Middle East and Sub-Saharan Africa. In South Sudan, where nearly one-third of the population

is in need of emergency food assistance as a result of civil war, 450,000 have fled the country since July 2016. Conflict in Syria, meanwhile, has decimated agricultural production, destroying agricultural infrastructure and disrupting food supply chains. With little ability to generate livelihoods or secure sufficient food, many farmers and rural households have had no choice but to migrate. Those that have fled to refugee camps in the region continue to face hunger, as funding cuts have restricted the ability of organizations like WFP and the United Nations Commission on Human Rights to supply sufficient rations and aid. In response, many refugees have chosen to migrate farther, to Europe in many cases.

Sources: FAO, 2015; FEWS NET, 2017; The New York Times, 2015; WFP, 2015.



Somali women wait for food at a distribution center at Ifo camp in Dadaab, Kenya in 2011. Credit: Evelyn Hockstein/CARE.

Food security promotes economic opportunity and new markets

Food security, which fuels greater prosperity and economic growth in low-income countries, creates new and expanding markets. This presents a growth opportunity for American farmers, ranchers, and businesses, which is of increasing importance as US productivity rises. For instance, in Africa alone, the value of the agriculture and food sector is expected to reach \$1 trillion by 2030.³⁴ Rising incomes and changing diets are leading to increasing demand for more diverse and nutritious foods. As economies grow, so does their demand for agricultural and consumer products. According to the US Department of Agriculture (USDA), US commodity exports to Sub-Saharan Africa increased 200 percent in the past decade, and in 2012 American farmers sold more commodities in North Asia than they did in North America.³⁵

Even as growing food demand creates new and burgeoning markets for US farmers, it also will create growing markets for local farmers, particularly for highly perishable goods such as fruits and vegetables, meat, and dairy, which require local supplies and favor shorter transport distances.³⁶ This need to respond both locally and globally to increased food demand will also drive increased local demand for agricultural inputs such as seeds and fertilizer as countries grow in size and in prosperity.

Growing economic opportunities in the agriculture sector reach well beyond food production into sales of machinery and inputs, growth in demand for consumer packaged goods, and digital technologies for agriculture, where American companies are global leaders. The growing demand also goes beyond the food and agriculture sector itself. Low- and middle-income countries are buying more and more American aircraft, automobiles, medical equipment, pharmaceutical products, consultancy services, and entertainment. In 1990 low- and middle-income countries accounted for one-third of the global economy. Today, their share is half, and they purchase more than half of US exports.³⁷

Agricultural development leads to greater food and nutrition security, economic growth, and well-being

While the challenges of hunger, malnutrition, and poverty sometimes appear overwhelming, the past 25 years show us that substantial improvements are realistically achievable. Since 1990 low- and middle-income countries have made unprecedented progress fighting poverty, reducing hunger, improving health and nutrition, and expanding education. By 2015 more than *one billion* people had been lifted out of extreme poverty (defined as living on less than \$1.90 per day in constant prices). Poverty otherwise declined in more than 60 countries, including Brazil, Ghana, Indonesia, Mexico, Mongolia, and Tanzania.³⁸ In this same time period, average incomes in low- and middle-income countries doubled (in real terms), and investment more than quintupled.³⁹

The impact of agriculture

Agriculture has been at the core of this progress. If the history of development has taught us anything, it is that a strong agricultural sector is a cornerstone of inclusive and sustainable growth, broad-based development progress, and long-term stability. Simply put, sus-

tainable growth, job creation, and stability in low-income countries are not possible without a robust and productive agricultural sector.

Poverty alleviation

The majority of the world's poorest people still live in rural areas, and the majority of the rural poor are family farmers, practicing subsistence farming on small, unproductive plots of land.⁴⁰ Smallholder farmers are often unable to grow enough food to earn an income or even feed their families—a great irony that was all-too familiar to many American farm families in generations past. They also frequently lack access to water, electricity, technology, machinery, and even simple inputs like seeds and fertilizer, especially in Sub-Saharan Africa and Southeast Asia. And nearly half of these farmers are women, who often face legal and cultural obstacles that further inhibit their access to land, credit, and other key farming inputs.⁴¹

Agricultural development programs have been shown to improve food availability for these farming families and communities and increase their productivity and incomes. Productive agriculture keeps food prices affordable and stable so that everyone's income

Simply put, sustainable growth, job creation, and stability in low-income countries are not possible without a robust and productive agricultural sector.

goes further, not only for farming families but all consumers, including urban consumers, which in turn helps alleviate a potential source of political instability.

Economic growth

Experience from around the world for the last 200 years shows that increases in agricultural productivity are central to growth in other sectors. Sustained gains in agricultural productivity, particularly in staple crops, create the opportunity for growth in nonstaple, higher value crops like vegetables and livestock, which have positive impacts in the broader rural economy. As rural areas transform and food prices go down, workers can shift into other jobs in the value chain like food processing and food services. This cascades into the broader economy, with more people entering sectors like manufacturing, industry, and other services, providing the foundation for strong, diversified, and dynamic economic growth over time. A strong agricultural sector helps create millions of new jobs across the economy, especially for young workers.

High returns on investment

Agricultural development programs are cost-effective. Investments in agricultural development have been proven to be more than twice as effective at reducing poverty as investments in other sectors.⁴² And gains to farmer productivity and income have proven enormously important both for the individuals involved and for societal progress more broadly. Stunting and malnutrition—which often arise from poor nutrition in the crucial 1,000-day period from a woman's pregnancy to her child's second birthday—prevent both physical and cognitive development and claim losses amounting to 11 percent of GDP every year

Box 2 – Stunting, malnutrition, and the importance of the first 1,000 days

The first 1,000 days, or the period from a woman’s pregnancy until the second birthday of her child, is the single most important period of individual human development. During this time, the foundations for physical growth, neurological capacity, cognitive ability, social skills, and overall health are set for life—largely by the nutrition that mother and child receive during those 1,000 days. When pregnant mothers and infants are malnourished during this period, the ramifications may be severe and largely irreversible.

Malnutrition comes in many forms: undernourishment, or the consumption of too few calories; overweight/obesity, or overconsumption; and micronutrient deficiency, or lack of specific nutrients regardless of caloric intake. Today, one in four

children worldwide are stunted—either physically or cognitively—as a result of malnutrition. These children, along with the 50 million who are wasted (too thin for his or her height) and the 41 million who are overweight, are more likely to perform poorly in school and job environments as they age. They will be more susceptible to chronic diseases like heart and respiratory disease, diabetes, and certain types of cancer. Many will not even survive to face these challenges. Malnutrition still causes 45 percent of all deaths of children under five.

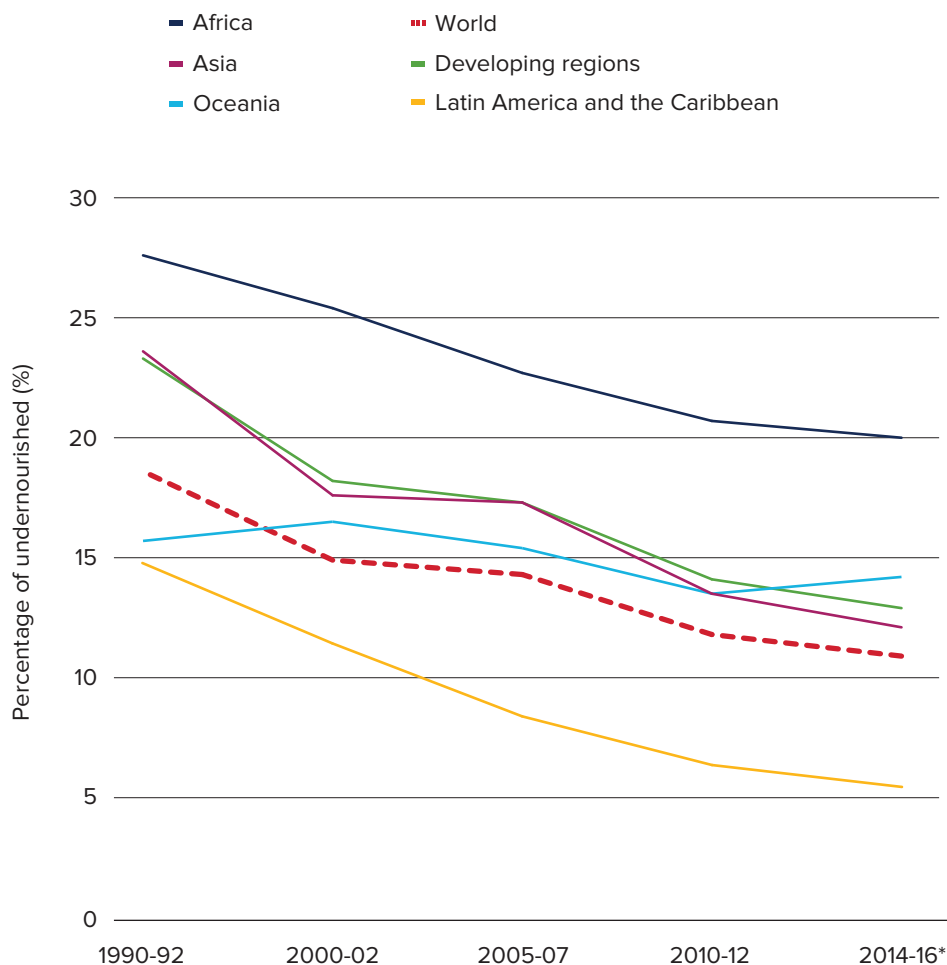
Given the scale and societal implications of global child malnutrition, efforts that promote food security and agricultural development are ever more important to securing a healthy and more prosperous world.

Sources: Global Nutrition Report, 2016; The First 1,000 Days, 2016.



In the village of Rampur Khas, India, Shyamkali props up her daughter, Anshika, as she is measured for height. Credit: Anne Thurow.

Figure 2a - Falling rates of hunger since 1990



*Data for 2014–16 refer to provisional estimates.

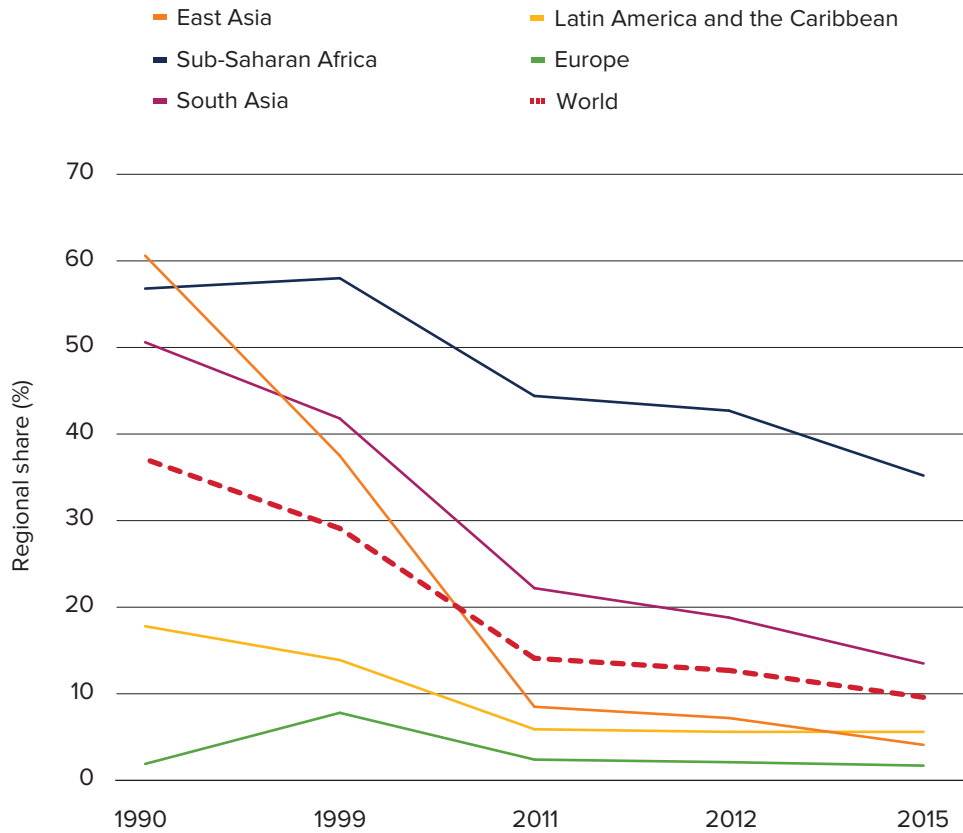
Source: FAO, IFAD, and WFP, 2015.

in Africa and Asia.⁴³ In particular, investments in reaching mothers and children are enormously cost-effective. Research shows that \$1 spent in nutrition yields \$16 in productivity returns.⁴⁴ Since women account for nearly half of agricultural workers in low-income countries, increasing agricultural productivity translates into expanded economic opportunities for women and girls.⁴⁵

Results

Investments in agricultural development are paying off, and the results speak for themselves. Agricultural production has, on average, almost doubled in low- and middle-income countries since 1995.⁴⁶ Cereal production has increased by 50 percent, and production of fruits, vegetables, and other crops has increased even more.⁴⁷ Private investment in small and large farms and in agricultural value chains has been central to this growth, alongside public investments in infrastructure and R&D and improvements in agricultural

Figure 2b - Falling rates of poverty since 1990



Source: World Bank Group, 2016.

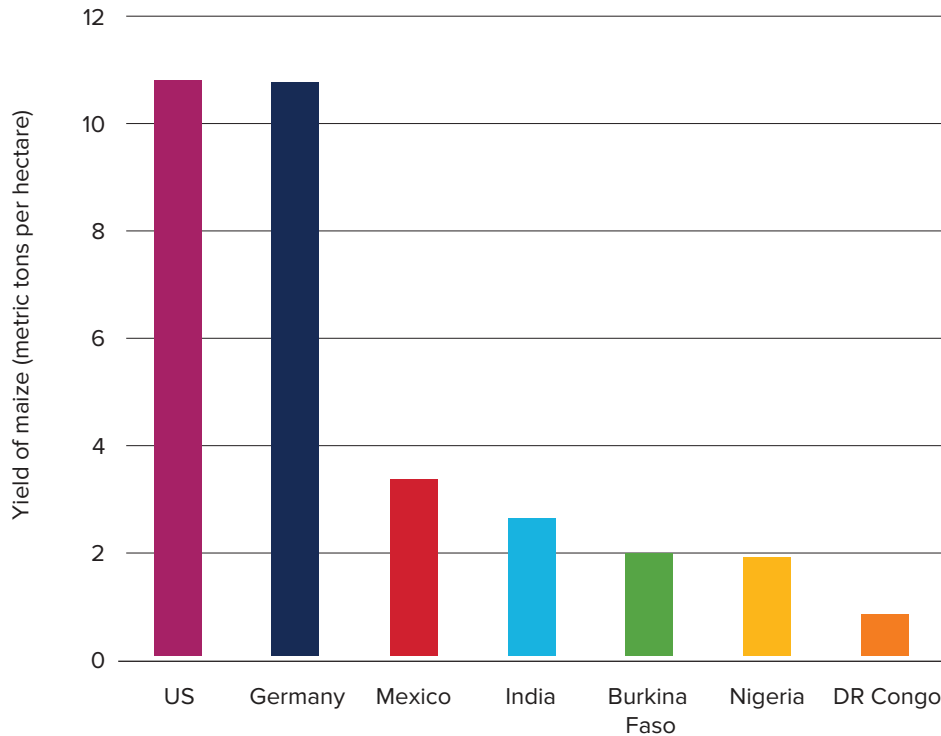
policies. There has been notable progress across almost all regions. In Sub-Saharan Africa, for example, cereal production has increased by more than 60 percent, while in South Asia it has increased by 47 percent.⁴⁸ These gains in agriculture are central to generating inclusive and sustainable growth, reducing hunger and poverty, improving nutrition, and contributing to long-term stability.

The combination of greater food availability and higher incomes over the past two decades—in tandem with renewed focus on overall development goals—has led to substantial reductions in hunger and improved nutrition. In addition to the one billion who have been lifted out of extreme poverty, there are 200 million fewer chronically undernourished people in the world today compared with 1990, despite significant increases in population.⁴⁹ The proportion of chronically undernourished people in low- and middle-income countries has fallen from 23 percent to 13 percent.⁵⁰ At the same time, the number of people suffering from physical and cognitive stunting as a result of malnutrition has fallen from 250 million to 150 million.⁵¹

Deaths from a wide range of diseases have fallen substantially: tuberculosis and HIV by one-third, malaria by half, measles by three-quarters, and diarrhea by four-fifths. By 2015 the rate of child deaths had fallen by two-thirds since 1980—a pace of improvement never seen before in human history.⁵² Remarkably, this improvement has truly been global. The

Figure 3 – Production of maize by country (2014)

Maize production is used for comparison due to its high yield potential and because it is one of the most widely cultivated crops globally.



Source: FAOSTAT, 2017.

available data indicate that the rate of child death has declined in every single country in the world since 1980.

Meanwhile, millions more poor people have access to clean water and basic sanitation facilities. Ninety percent of girls in low- and middle-income countries now complete primary school, and women’s literacy rates have reached 80 percent.⁵³ Many of these gains came in the context of the framework of the Millennium Development Goals (MDGs), and the new Sustainable Development Goals (SDGs) provide an important framework for continued progress in the future. The SDGs, adopted in 2015 by more than 150 world leaders, set global targets for 2030. In particular, SDG 2 aims for the global community to “end hunger, achieve food security and improved nutrition, and promote sustainable agriculture,” alongside related goals, including ending poverty, promoting health and education, and ensuring access to clean water and sanitation.⁵⁴

Notably, democracy has also taken root—tentatively and imperfectly—in more countries than ever before.⁵⁵ As development progress has accelerated in the last two decades, the number of civil wars has been cut nearly in half. While the world faces several very difficult conflicts today, there were far more conflicts in the 1980s and early 1990s, when much of Central America was engaged in bloody civil wars; Colombia and Peru faced major internal conflicts; several countries in southern Africa were in flames during the height of apartheid; West Africa was in chaos; and much of southeast Asia was still reeling in the aftermath of

the wars in Vietnam and Cambodia. Even with threats of violence from terrorist attacks, the reduction in conflict since then still makes the world a safer place for both rich and poor countries, and reduces the need for international military intervention.

The enormous gains—including the gains of agricultural development programs—have been achieved because of a combination of forces working together, including a renewed focus on private sector–led growth and investment, the spread of new innovations and technologies, stronger leadership, improved governance in many low-income countries,

As development progress has accelerated in the last two decades, the number of civil wars has been cut nearly in half.

and leadership and financial commitments from the United States and its allies. Indeed, gains can be multiplied and solidified through American leadership in partnership with those who share a similar vision and values as has been witnessed under the President’s Emergency Plan for AIDS Relief (PEPFAR) since 2003, which has led to 1.5 million babies to be born free of HIV who would have otherwise been infected.⁵⁶ These gains show that achieving significant progress on difficult development problems is possible with strong policy, smart investments, and effective, persistent action.

Current challenges must be met

As important as the gains in fighting hunger and malnutrition over the past several decades have been, they are not nearly enough. The risks facing low-income countries have heightened considerably. While agricultural productivity has grown, most low- and middle-income countries still lag far behind high-income countries in agricultural production, especially in staple food crops (see figure 3). Global economic growth has slowed significantly, straining currencies and budgets. The refugee crisis and conflicts in the Middle East are creating instability around the world. Against this backdrop, major obstacles for food and nutrition security loom large, including population pressures (particularly growing youth populations), water scarcity and soil depletion, and increasingly volatile weather.

Population growth and rapid urbanization

Even though global population growth has slowed—from 2 percent per year in the 1960s to around 1.2 percent per year today—the world population, estimated at 7.4 billion in 2016, is still growing fast. The latest midrange projections suggest that the global population will reach 8 billion by 2024 and 10 billion by 2056.⁵⁷ Ninety-nine percent of the projected growth in the next century will occur in low- and middle-income countries.⁵⁸

The challenges posed by this growth are daunting, especially in Africa, where more than half of the total population growth between now and 2050 will take place—adding another 1.3 billion people to the region. For example, Tanzania’s population is projected to grow from 50 million in 2015 to 137 million in 2050, and the Democratic Republic of the Congo will grow from 80 million to 200 million. Most striking of all, in Nigeria, already the seventh-largest country in the world, the population is projected to grow from 180 million to nearly 400 million, surpassing the population of the United States. This would make it the third-most populous country in the world after India and China. Significant population

Figure 4a - Population growth by region

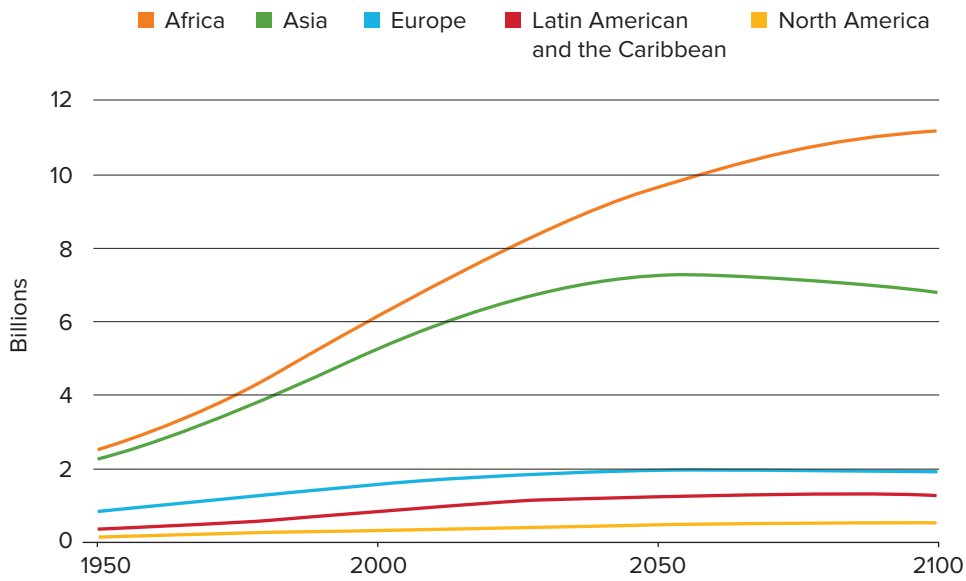
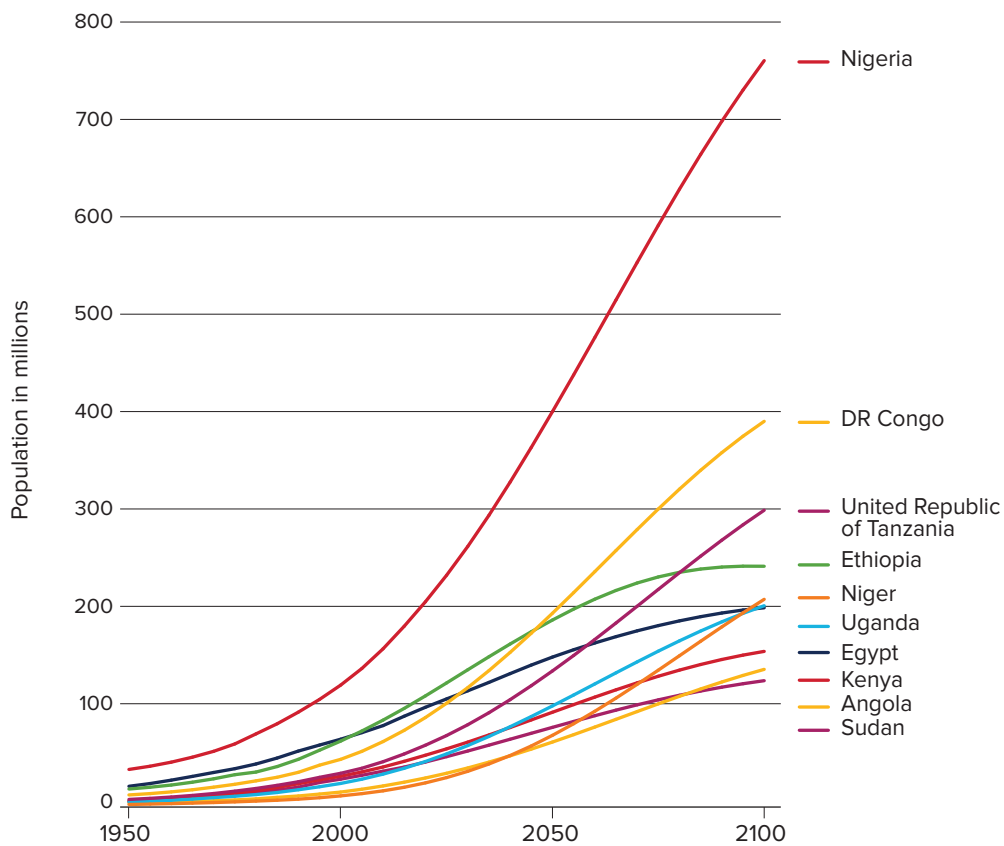
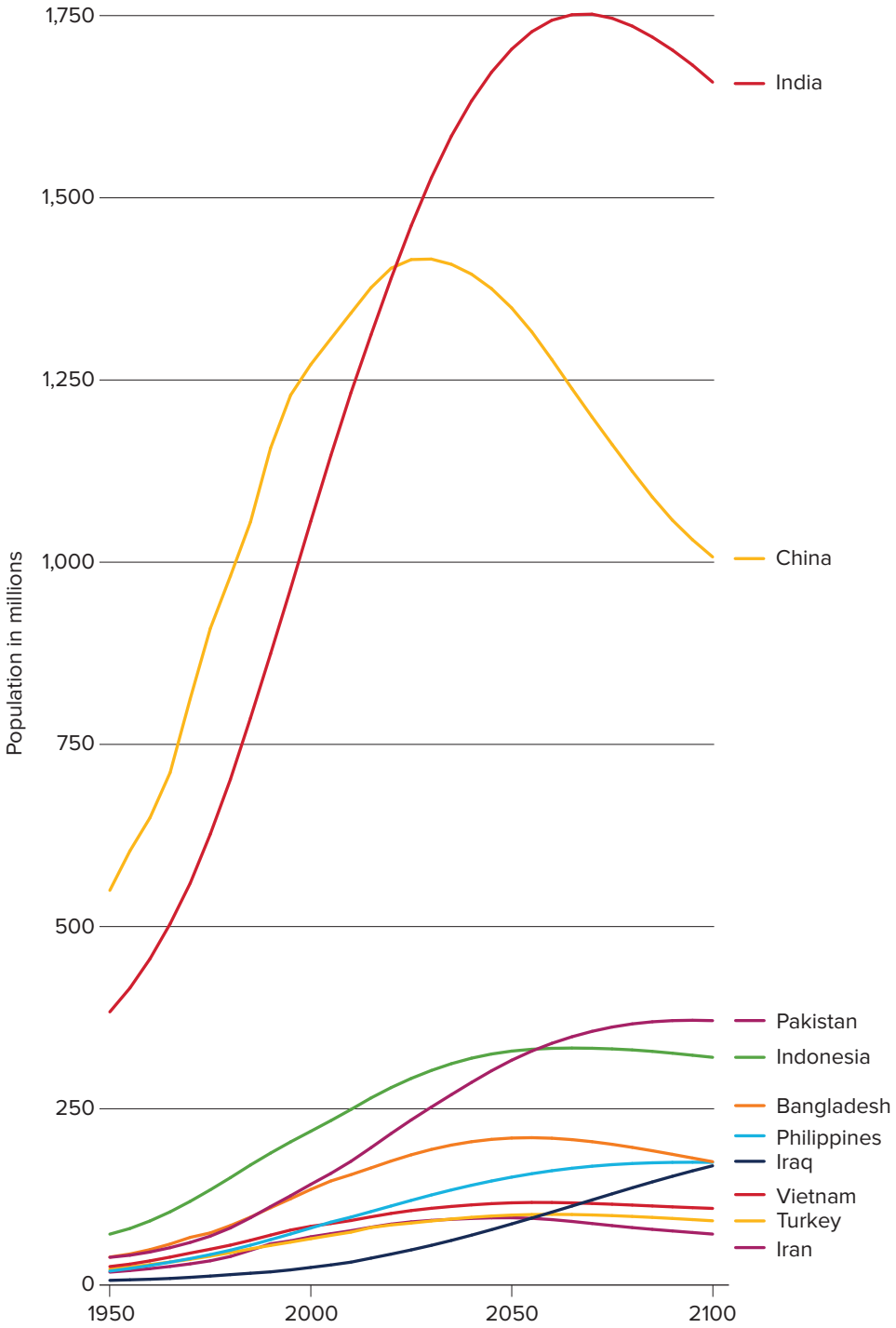


Figure 4b - Population growth in Africa



Source: UN, 2015.

Figure 4c - Population growth in Asia



Source: UN, 2015.

increases are also expected in South Asia, especially India and Pakistan, alongside several other large and rapidly growing countries.⁵⁹

At the same time, many more people will live in cities than ever have before.⁶⁰ The UN projects that the share of people living in urban areas worldwide will increase from about 50 percent today to two-thirds by 2050. Half the population of Asia will live in urban areas by 2020, and half the population of Africa will do so by 2035.⁶¹ Virtually all of the expected growth in world population between now and 2050 is expected to be concentrated in the urban areas of low- and middle-income countries. Far more people will live in megacities

In Nigeria, already the seventh-largest country in the world, the population is projected to grow from 180 million to nearly 400 million, surpassing the population of the United States.

with populations greater than 10 million people. In 1970 the world had only two megacities—New York City and Tokyo. Today there are 22 megacities, and 16 of them are in low- and middle-income countries in Asia, Latin America, and Africa. Many more urban dwellers will also live in a growing number of secondary and tertiary cities.

With urbanization comes changing global diets, as people in cities demand both more food and an increasingly diverse diet. Urban households in low- and middle-income countries are demanding larger amounts of fruits, vegetables, meat, fish, and dairy as well as more processed foods.⁶² While diverse diets have immense nutritional benefits, increased consumption of highly processed foods is also linked to health concerns such as obesity, type 2 diabetes, hypertension, and other diet-related chronic diseases. Rapidly rising rates of obesity around the world, along with continued challenges of hunger and malnutrition, are causing many nations to face a growing “triple burden of malnutrition.”

To meet urban food demand, food supply chains are growing geographically longer and reaching farther into rural areas—and around the world—to satisfy consumers. The lengthening of food supply chains brings new opportunities for local farmers, but also raises concerns about food safety such as the risk of food contamination and foodborne illness as well as the question of food loss and waste. Food loss and waste can occur at every point in the food supply chain—in low- and high-income countries alike—from on-farm losses and spoilage during transport to waste by retailers and consumers, particularly in high-income countries. As urban food demand booms, technology and practices for food harvesting, storage, and transport can either keep pace or add to the potential for enormous food losses and increased risks to food safety.

Growing youth populations

In much of Africa and South Asia, a large and increasing share of growing populations will be adolescents and young adults—known as a “youth bulge.” India alone is home to the largest working-age population in the world, with one million Indians turning 18 years old each month.⁶³ Africa, meanwhile, has the youngest population in the world. There are currently 200 million people in Africa between the ages of 15 and 24, and this number is expected to double within the next 30 years.⁶⁴ Nigeria is projected to see an increase of 60 million people in this age bracket by 2060, with similarly large youth population increases projected in Ethiopia, Niger, and Tanzania.⁶⁵ This trend presents an enormous

challenge, but also a unique opportunity to transform societies for the better. These youth can be tomorrow’s farmers, scientists, entrepreneurs, and policymakers, and they must be ready and equipped to meet the dynamic and evolving challenges of the 21st century. As young populations boom, their creativity and productivity can help boost their countries’ GDP—creating a pool from which the best and brightest can emerge to help solve problems around the world. Barred from participation in employment and opportunity, however, large populations of young people can be a destabilizing force in economies on the rise, which can prove particularly damaging to long-term progress and development.

Rapid population growth and the accompanying demographic shifts are not new phenomena and are not necessarily negative. A youth bulge is the result of a great success—reductions in child mortality that lead to more children surviving into adulthood. Ultimately, this change leads to lower population growth. As child mortality recedes, families decide to have fewer children, and the resulting lower fertility rates lead to much slower population growth in subsequent generations. Western Europe, Latin America, East Asia, and more recently most of South and Southeast Asia have gone through similar population booms and demographic shifts during the last two centuries, showing that managing these transitions is possible. Between 1950 and 2015 the world population nearly tripled from 2.5 to 7.4 billion. Asia’s population increased by 3 billion people in 60 years, transitioning even more quickly than the projected growth in Sub-Saharan Africa.

A youth bulge—if managed properly—creates the potential for what is known as a “demographic dividend.” The growing share of young adults leads to more eligible workers and savers in an economy, which can spur economic growth and generate more savings to be allocated to investments in factories, roads, electricity, and schools. This

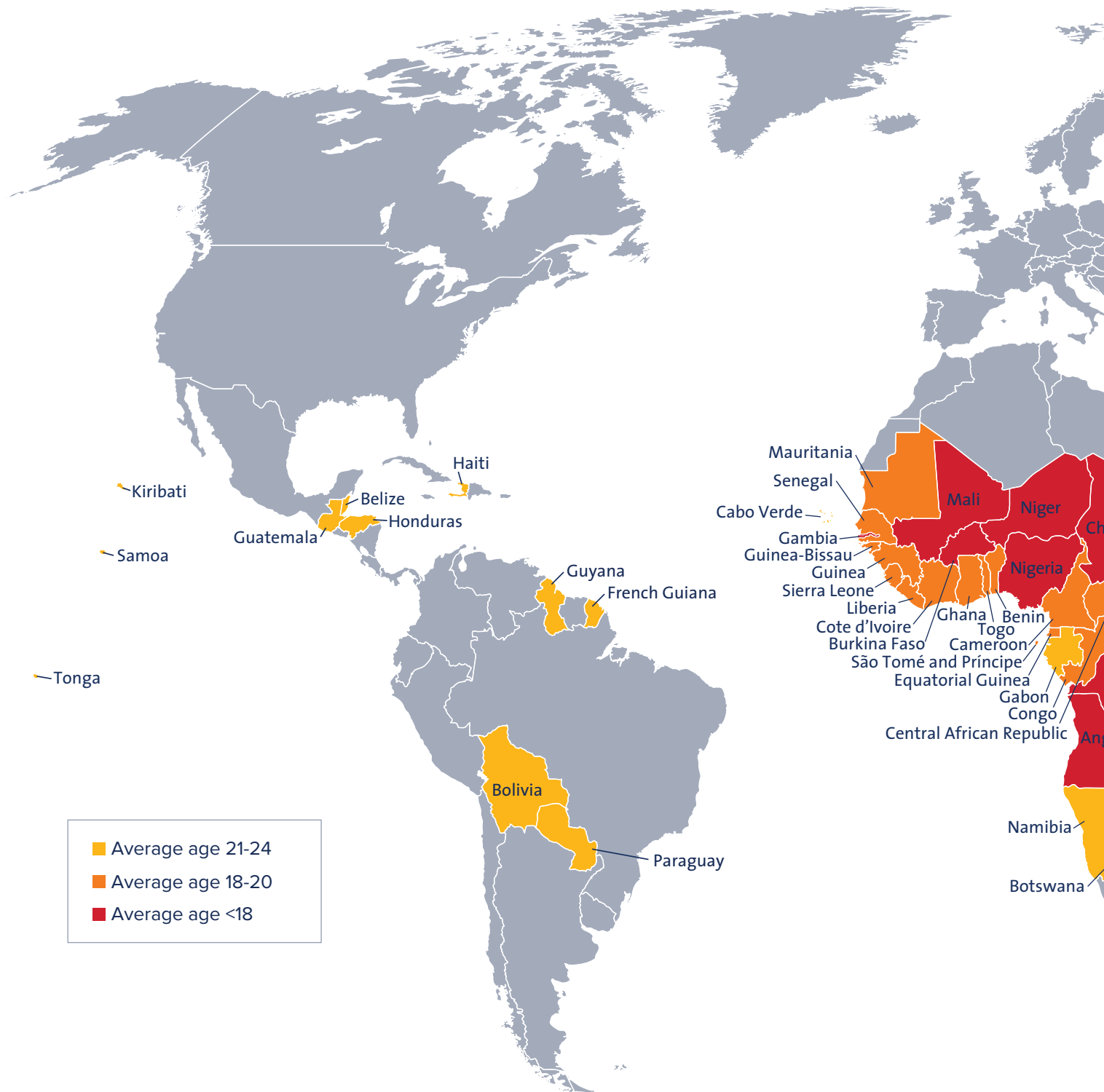
There are currently 200 million people in Africa between the ages of 15 and 24, and this number is expected to double within the next 30 years.

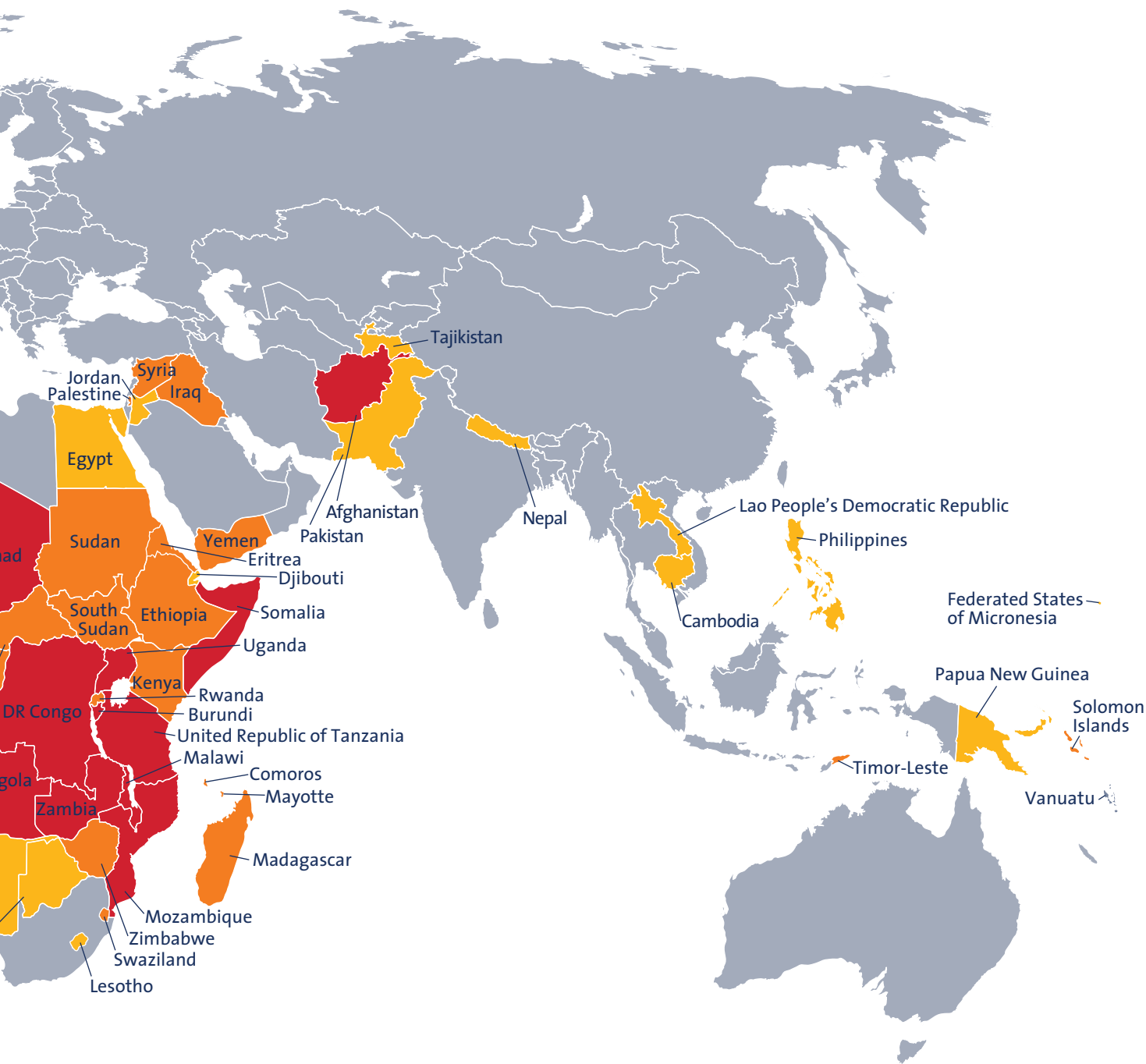
demographic dividend was a major feature of East Asia’s growth over the last several decades as the youth bulge turned into an engine for increased agricultural production, manufacturing, and services. Strong investments in raising agricultural productivity were absolutely central to driving these positive outcomes. But a demographic dividend is far from guaranteed. If the transition is not managed well and the policies and investments to create jobs are not put in place, the outcome can be far less favorable and possibly disastrous.

First, the combination of the growing youth bulge and greater urbanization creates new pressures for a food system already struggling to deliver food and nutrition security—encompassing food production, transport, storage, availability, and safety. And second, in countries where job opportunities are already scarce, the addition of millions more young people has the potential to plunge these populations into ever greater poverty and hunger. Already, 60 percent of Africa’s unemployed today are young people.⁶⁶

Despite rapid urbanization, the majority of youth in Sub-Saharan Africa still live in rural areas, with more than two-thirds working in agriculture.⁶⁷ But a lack of agricultural productivity in many regions limits the capacity—and appeal—of employment opportunities

Figure 5 – The “youth bulge”—countries where average age of population is 24 or less (2015)





Source: UN, 2015.

Box 3 – Rural youth migration

Not only are youth populations growing at astounding rates, but they are also migrating with increasing frequency—particularly those who live in rural areas in Sub-Saharan Africa. Globally, young people ages 15 to 24 account for the bulk of migration flows and one-eighth of the migrant working population.

Rural youth migrate either to urban areas or abroad because of the dearth of gainful employment or entrepreneurial opportunities in agricultural and other rural industries. In Sub-Saharan Africa, youth are more likely to face unemployment or underemployment—including work in part-time, seasonal, or unstable jobs—than any other segment of the working population. They lack representation or organization in rural areas, where land degradation and economic stagnation may limit agricultural opportunities. Even where opportunities do exist, rural youth may not be attracted to work in low productivity, subsistence agriculture.

When youth migrate, their communities are invariably impacted. On the one hand, rural communities may lose portions of their most productive agricultural workforce and become dependent

on remittances from youth migrants. If youth do not return, rural areas stand to suffer from a “brain drain” of skill and intellectual capacity. And, young people may face hardships themselves in urban environments, including prohibitive competition in job markets, social exclusion, and vulnerability to radicalization or human rights violations.

On the other hand, however, rural communities stand to gain from youth migration when youth secure productive employment and remain engaged with their home regions. Their remittances may contribute to better sanitary conditions, improved healthcare, educational outcomes, and new agricultural investment in their areas of origin. They may transfer new norms and values (related to democracy, gender and youth equality, and others), and knowledge to their home societies. Rural areas may also benefit from lesser job competition, reduced pressure on natural resources, and increased availability of agricultural land.

On the whole, rural youth are in need of greater support to either ensure the availability of gainful employment in their home regions or the skills, training, and connections they need to succeed in larger centers of employment.

Sources: FAO, 2016.



Members of Mgunga farmer group use Jembes (hoes), a planting string, and a planting scoop during a maize planting exercise in Kalenga, Tanzania. Credit: Hailey Tucker/One Acre Fund.

in agricultural or off-farm work in rural areas. Too many national agricultural policies and extension programs do not account for the youth population's unique needs and assets. Lack of access to finance limits aspiring young farmers from acquiring their own farmland—or aspiring young entrepreneurs from launching a small business.⁶⁸ If young people—particularly those in rural areas—are unable to find opportunities where they live, they may have no choice but to search elsewhere, whether in an urban center or beyond their own country's borders.⁶⁹ If these population pressures are not managed well, they could lead to significant tensions, hopelessness, and even instability.

Agriculture as a boon to food security and jobs

A thriving food and agriculture sector, while by no means a silver bullet, is important to addressing the youth bulge. It not only ensures food and nutrition security, but offers a source of employment throughout agricultural supply chains, from farms to food retail to every point in between, including the development of new technologies for the sector. Small- and medium-sized enterprises (SMEs)—which form the backbone of food supply chains in these regions—are also a critical source of employment and income for youth.⁷⁰

Despite rapid urbanization, the majority of youth in Sub-Saharan Africa still live in rural areas, and more than two-thirds of young people working in rural areas are employed in the agriculture sector.

Investments in agricultural productivity, research, extension systems, strengthening of food supply chains, and increased access to capital would all improve youth employment opportunities in food and agriculture, particularly in rural areas. With good governance, the food and agriculture sector has the potential to create an economic transformation, with improved delivery of public services and political inclusion, which also complement a robust investment environment.

Young women and men are absolutely central to the future of their countries, their countries' relations with the United States, and, ultimately, to ending hunger and malnutrition. While growing youth populations will add to food insecurity pressures, its members also have the potential to become our future customers and business partners, particularly in the agricultural sector, with the right investments in place.

Despite their growth and increasing sophistication, the fields of agriculture, food, and nutrition are not always viewed favorably by young people in terms of their career choices. The United States, like many other nations around the world, faces a challenge with its own youth populations and the need to engage young talent in the food and agriculture sector. Studies have found that only 3 percent of recent American college graduates are interested in working in agriculture.⁷¹ Meanwhile, the average US farmer is 58 years old—and in 2012 more than 30 percent of principal farm operators were age 65 or older.⁷² If we are to ensure our own food security and lead efforts to advance global food security, harnessing innovation and opportunities to engage and empower youth in the agriculture and food sectors—in the United States and in the developing world alike—will be vital to building a global food system that can feed a projected 9.73 billion people by 2050.

Box 4 – Youth development: 4-H around the world

4-H is a network of youth development organizations that enables young people to learn “by doing,” building proactive leadership roles for their future. The roots of 4-H reach back to 1902 when American land grant universities realized that rural communities were not adopting new technologies and farming practices at sufficient rates. At the same time, youth populations were growing; the nation faced a dual problem of needing to translate scientific advancements to the field and also equip rural youth populations with practical, entrepreneurial skills to thrive in rural life.

Young people were thought to be more open to new agricultural techniques, and the hands-on learning offered by 4-H programming, including small business skills, food preservation, and overall citizenship and leadership skills, were found to be critical assets to enabling the success of rural populations. 4-H has evolved a great deal in the last 100 years, now working with urban and suburban youth with a curriculum that supports skill development far beyond the farm. In the United States alone, 4-H now has over 6 million participants and 25 million alumni.

Today, 4-H has become global, with more than 7 million participants—half of them girls—in more than 70 countries, including places as diverse as China, Ghana, and Finland. In African countries the roots of 4-H are a perfect match for environments that may resist updates to traditional production practices and perhaps view agriculture

as a livelihood that offers little economic opportunity beyond subsistence. Participation in 4-H can change mindsets. Surveys of participating young people in Kenya, Ghana, and Tanzania found that 80 percent of 4-H participants wanted to pursue both a career in agriculture and a tertiary education to assist them in doing so.

As youth populations grow steadily and the future of the workforce shifts, young people need programs like 4-H to help them adapt and take advantage of opportunity wherever it exists. Global 4-H has a goal of reaching 25 million participants by 2020, but with youth populations estimated to reach nearly 1.3 billion by 2030, the need is far greater. Expansion of 4-H programs could be more intentionally driven through the Peace Corps, which already supports many in-country programs. Or simply making materials available in local languages could allow clubs to form on their own.

It may be that the symbol of the next agricultural revolution could be a four-leaf clover.

The 4-H pledge

*I pledge my head to clearer thinking,
my heart to greater loyalty,
my hands to larger service,
and my health to better living,
for my club, my community,
my country, and my world.*

Sources: 4-H Ghana; Africa Platform for Development Effectiveness; National 4-H Council, 2017; UN, 2015.

Climate and natural resource pressures

Nearly half of the planet's land is currently used for agricultural and livestock production.⁷³ As stewards of the land, farmers are among the most committed to preserving the natural resource base. Given that they depend on the land for their livelihoods, they are also the most affected by a changing climate, including volatile weather and pressures on the natural resource base. Farmers must be valued as allies in preserving the environment. Indeed, among the most significant threats to food and nutrition security are the interrelated issues of climate change and natural resource constraints, including water scarcity, increased incidences of pests and disease, poor-quality soils, and volatile weather patterns.

American farmers demonstrate tremendous ingenuity in the face of a changing climate, but continue to face an uphill battle. Their ingenuity and mechanisms for adaptation can provide a roadmap to farmers in low-income countries, where smallholder farmers count on good soils, reliable rains, and moderate temperatures for their very survival and stand to suffer the greatest consequences.

As temperatures across the globe rise, weather patterns are becoming increasingly variable and are expected to become more volatile and unpredictable from month to month and season to season. Weather volatility substantially increases the risks and uncertainties facing farmers, who rely heavily on predictable weather patterns to make core decisions about what to plant, when to plant, and when to harvest. As global temperatures rise, there will be more frequent hot and fewer cold temperature extremes over most land

By 2050 more than half of the world's population will live in water-stressed areas, and about a billion or more people will have insufficient water resources.

areas. Heat waves are likely to occur with higher frequency and duration, and occasional cold winter extremes will continue to occur.⁷⁴

Water scarcity is increasing as a result of population growth, urbanization, changes in weather and climate, and poor management of existing supplies. The demand for water will continue to increase as populations grow and agricultural and energy production increase, while supplies become stressed due to changes in rainfall, the melting of glaciers and seasonal snowpacks, and poor water management. A recent US government Intelligence Community Assessment on global water security concluded that within the next decade, water problems would contribute to instability in several countries important to the United States and would add to tension and possible conflict among countries that depend on common water sources. It also concluded that the depletion of groundwater supplies could pose risks to national and global food markets. Notably, the most nutritious foods—such as fruits, vegetables, meat, and dairy products—both require the greatest volume of water to produce and are the most perishable, making them more prone to being lost in the value chain. As a result, both precious nutrients and water are wasted. By 2050 more than half of the world's population will live in water-stressed areas, and about a billion or more people will have insufficient water resources.⁷⁵

Soil degradation and poor soil health also pose a major threat to agricultural production and food security on a global scale. In the United States alone, croplands lost nearly half—more than 1.3 billion tons—of their soil from 1982 to 2007.⁷⁶ Such losses lead to decreased

Box 5 – Ethiopia’s significant progress and the harsh reality of drought

Ethiopia is a country of nearly 100 million people and growing. Once associated with frequent famine conditions in the 1980s and ranked the second poorest nation in the world in 2000, Ethiopia is now on track to become a middle-income country within the next decade, and agriculture is a primary driver.

In the mid-2000s Ethiopia began a serious effort to invest in and revitalize its agricultural sector, which has largely paid off. From 2005 to 2014 total national cereal production increased more than 70 percent. Over that same period, annual GDP growth averaged 10 percent, a remarkable feat. Significant reductions in child stunting have also accompanied reductions in poverty. And, cereal yields have increased an average of 7 percent per year over the period, though there is further to go to meet global averages. Ethiopia has made concerted efforts to build a robust agricultural extension system, one of the largest in the world. They have undertaken land reforms to improve land security, for women farmers in particular, and have established the Agricultural Transformation Agency, which supports intragovernment agency

cooperation and reform to accelerate progress in the agriculture sector.

While huge progress is under way, the drought that began in 2015 has been the worst since 1950. The drought has severely undermined the largely rain-fed agriculture sector in several regions, resulting in the need for emergency food aid in 2016 for nearly 6 million people, with more need predicted for 2017. While Ethiopia had developed emergency preparedness strategies and stocks given past crises, the severity of the drought required international help. Many families lost livestock—an important part of resilience strategies. It could take years for families to rebuild without concerted efforts to support them.

Ethiopia has shown that even with persistence, dedication, and resources by the government, robust progress can be stymied by extreme weather events. Global food assistance, therefore, remains both a life-saving and necessary tool for countries to move beyond harsh weather events toward sustained development progress, which Ethiopia most certainly will do.

Sources: AfDB; Ethiopian Agricultural Transformation Agency, 2014; FAOSTAT, 2017; World Bank; WFP.



Women carry harvested rice in baskets atop their heads in rural Benin. Credit: Jawoo Koo/IPFRI.

agricultural productivity by reducing the quality of soils, stripping them of water, organic matter, and nutrients. It is estimated that worldwide the productive capacity of some regions has been halved as a result of soil erosion.⁷⁷ In addition, degraded soils unable to retain water contribute to increased risk of floods and runoff, causing further destruction of agricultural lands, the pollution of waterways, and the decline of fish populations.⁷⁸

Farmers in the United States and around the world—including those in key markets and countries that are strategic national security partners—are experiencing the challenges of water scarcity and poor-quality soils as well as volatile and increasingly unpredictable weather patterns. For example, in 2008 the Mississippi River flooded just as crops were beginning to grow, causing an estimated \$8 billion in losses for farmers.⁷⁹ Iowa farmers have seen an increase in soil erosion due to more intense rains and crop damage due

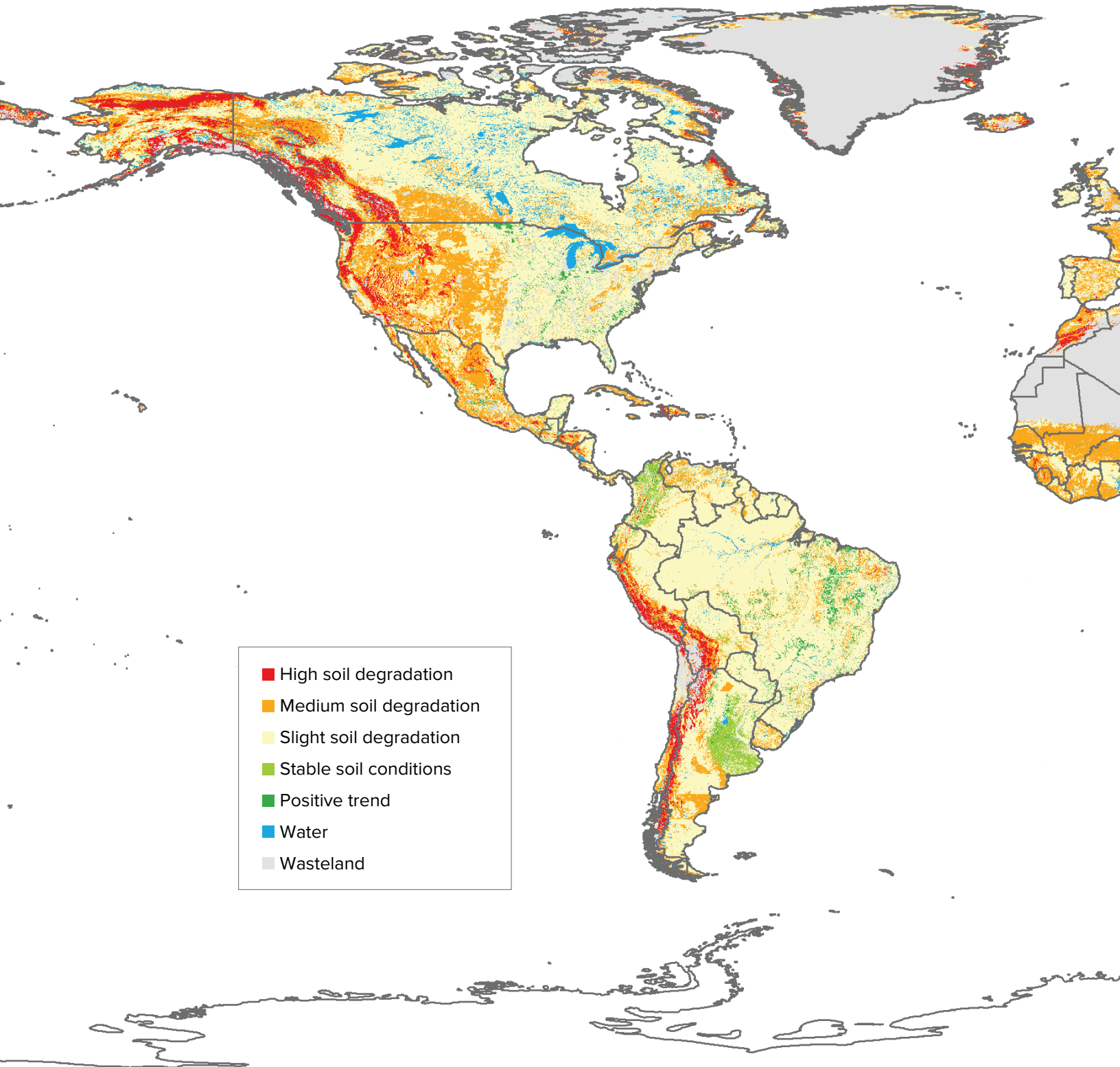
It is estimated that worldwide the productive capacity of some regions has been halved as a result of soil erosion.

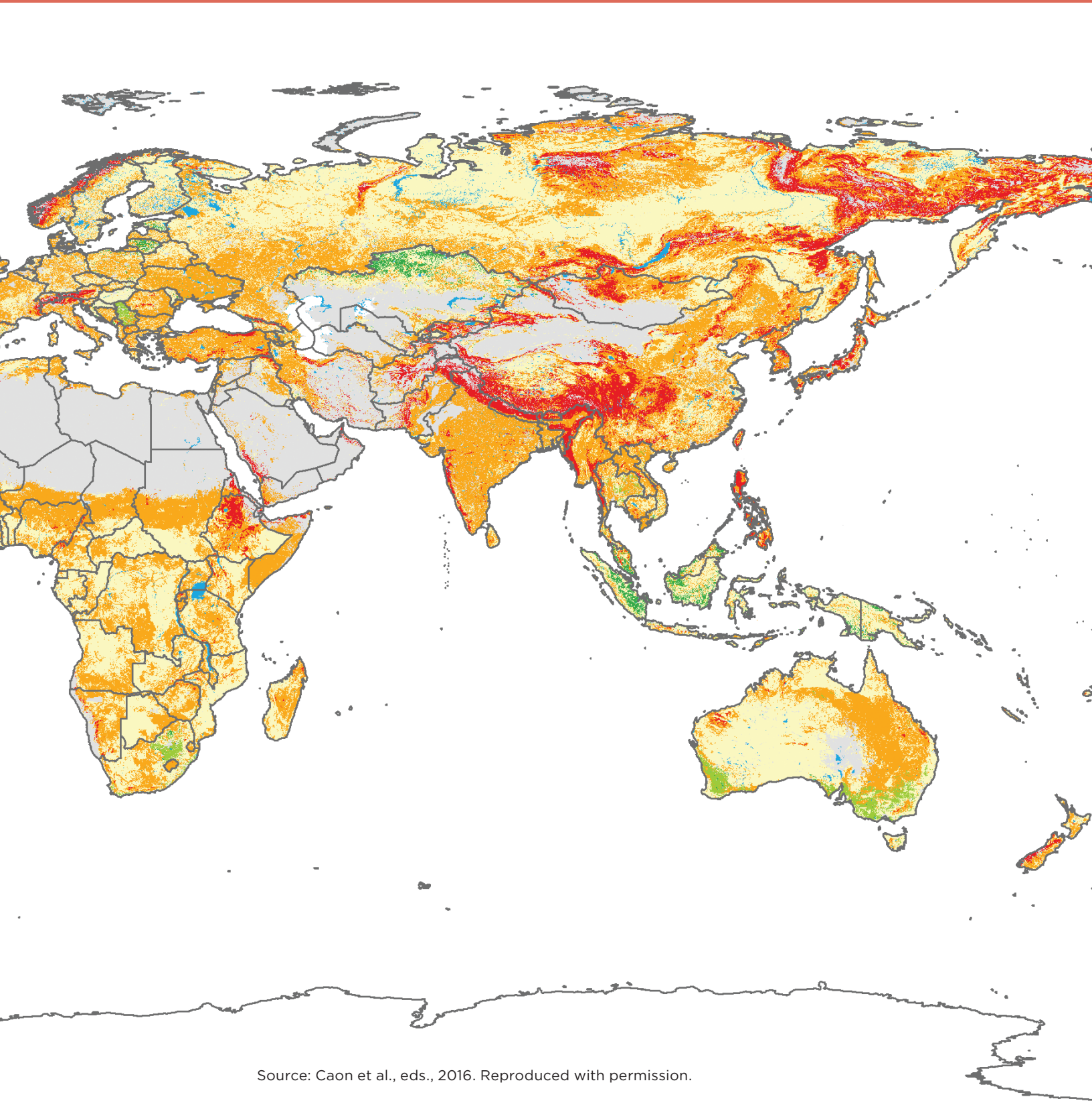
to increased moisture from rising humidity.⁸⁰ In 2015 more than 95 percent of California's \$43 billion agriculture sector experienced severe, extreme, or exceptional drought.⁸¹ In 2010 monsoons in Pakistan submerged 17 million acres of the country's most fertile crop-lands and killed more than 200,000 head of livestock.⁸² Among the Near East and North African countries (including Egypt, Jordan, Lebanon, Turkey, and other countries), where agriculture uses more than 85 percent of the available rain-fed, irrigated, and freshwater resources, per-capita fresh water availability has fallen by two-thirds in the past 40 years.⁸³

The potential effects of a changing climate and natural resource pressures are complex and vary widely around the world. Nevertheless, there is little doubt that low-income countries stand to be the biggest losers, both directly from the disruptions and indirectly because they are the most constrained in their capacity to respond effectively. Moreover, within these countries, the most vulnerable are the rural poor, especially farmers.⁸⁴ Smallholder farmers in particular are highly dependent on rain-fed agriculture. Only 5 percent of the cultivated farmland in Sub-Saharan Africa is irrigated.⁸⁵ In the face of increasingly unpredictable weather, all farmers will depend on innovative solutions and technology to continue their production.

The effects on food production will reach well beyond rural areas. Food prices are likely to become less predictable, especially affecting consumers when prices spike and causing the potential for greater political or civil instability.⁸⁶ Without strong action, declining water quality, water scarcity, soil depletion, and volatile weather will impact the world's ability to provide sufficient food for its growing population during the next several decades.

Figure 6 – Global soil degradation





Source: Caon et al., eds., 2016. Reproduced with permission.

PART II



**OWNERSHIP, CAPACITY,
AND ACCOUNTABILITY
ARE KEY TO GOVERNMENT
LEADERSHIP FOR
EFFECTIVE DEVELOPMENT**



Jaconda Chengula sits atop her maize harvest in Mitu, Tanzania. Despite the large pile outside her house, Jaconda still has more maize to harvest from her field. Credit: Hailey Tucker/One Acre Fund.

While it is crucial that the United States act to fight hunger and enhance global food security, it should not and will not act alone. Other governments, including rising global powers and low-income countries themselves, have all contributed significantly to improved global food security in recent years. The 2007-08 food price crisis is a case in point. The crisis was a wake-up call that spurred action not only by the United States, but by governments, multilateral institutions, businesses, investors, and civil society organizations around the world. Global leaders stepped up to meet the need for increased action and investment to advance global food security, agricultural production, and improvements in nutrition. Rising powers, especially China, India, and Brazil, have taken an interest in and invested in the development of agriculture and food systems, particularly in emerging markets. Moreover, governments in many low-income countries have significantly increased their own investments at home, improved their policy environments, and begun to strengthen many of the key institutions that provide the foundation for robust agricultural production and better nutrition. Private-sector investment has also been critical and will be discussed in Part III. Continued action by all of these actors will be crucial for substantial and sustained progress in strengthening global food security.

The importance of continued leadership

Strong leadership and action by the United States has a multiplier effect many times over by eliciting bilateral, multilateral, and philanthropic efforts by others. The rates of return on US investments are high not just because of the power of those investments themselves, but because they lead to much larger investments by others that enhance agricultural production, food security, and improved nutrition.

For example, several major bilateral donors stood up in 2009 at the G8 Summit in L'Aquila, Italy, to launch major commitments to global food security. In addition to the US commitment of \$3.5 billion over three years, the European Union pledged \$3.8 billion, Germany and Japan each \$3 billion, France \$2.2 billion, the Netherlands \$2 billion, the United Kingdom \$1.7 billion, and Canada \$1 billion. Australia, Italy, Russia, Spain, and

Each \$1 dollar of US commitment at the G8 Summit in L'Aquila helped leverage more than \$6 from other donors. By 2015 more than 93 percent of these commitments had been disbursed, helping to strengthen agriculture and nutrition efforts around the world.

Sweden also contributed, bringing the total pledge to \$22.2 billion over a three-year period.⁸⁷ The Bill & Melinda Gates Foundation also made a pledge at the 2009 summit and has committed more than \$2 billion to global food security efforts. Each \$1 dollar of US commitment helped leverage more than \$6 from other donors. By 2015 more than 93 percent of these commitments had been disbursed, helping to strengthen agriculture and nutrition efforts around the world.

In conjunction with these efforts, the World Bank established the Global Agriculture and Food Security Program (GAFSP) as a multilateral mechanism to support global food security efforts. Nine countries, again with the Gates Foundation, have contributed to the fund. GAFSP has both a public-sector window to support government and regional programs and a private-sector window to provide loans, credit guarantees, and equity to support private-sector activities related to agricultural development and food security. In addition to GAFSP, the World Bank has committed more than \$8 billion to agriculture and food security related issues, based in part on strong leadership from the United States as its largest shareholder. The African Development Bank (AfDB), the region's multilateral development bank, also finances a range of programs related to agricultural production, food security, and nutrition, which have taken on increasing priority within the institution in recent years. For example, at the 2016 African Green Revolution Forum (AGRF) the AfDB pledged \$24 billion over the next 10 years to agricultural transformation in Africa.⁸⁸ Similarly, the Asian Development Bank has recently shifted its strategic focus from agricultural production to a more comprehensive strategy on food security.

The wide range of funding sources makes clear that a new model of financing for global food security has emerged in recent years in which US leadership spurs global support for food security goals. The importance of US leadership cannot be underestimated and must continue to drive the desperately needed commitments by others to solve food and nutrition security challenges.

The rising influence of BRICS countries

In addition to traditional donors, rising world leaders—most notably China, but also Brazil and India—are playing an increasingly prominent role in global agricultural development and food security. China’s role in Africa is multifaceted and not always well understood, but its prominent engagement in the region is evident.⁸⁹ China is financing major infrastructure investment projects in roads and power in many African countries, providing advice on agricultural policies, acquiring land, and importing a wide range of African agricultural products. For example, the Chinese government has established agricultural demo centers in 23 countries—and counting—across the continent, which aim to provide training, technology, and market access for African farmers.⁹⁰ More than 10,000 African students are trained in Chinese-sponsored agriculture programs each year, far more than those trained in the United States or by other countries.⁹¹ In 2007 the China-Africa Development Fund was established as the first Chinese equity investment fund focused on Africa, with a target fund size of \$5 billion.⁹² China’s increasingly important role in the region was underscored by President Xi Jinping’s high-profile visit to South Africa for the sixth Forum on China-Africa Cooperation in December 2015. China signed multiple business deals and brought offers of billions in new grants, loans, export credits, and investment funds.



Bolivian couple Luiz Alberto Burgas and Mercedes Parada pose with their harvest of berries. Credit: Heifer International.

Box 6 – India’s innovative funding for agriculture and evolution of policies

India is home to tremendous private-sector activity in entrepreneurial development and agricultural innovation. India has 2 million social enterprises, for example, 28 percent of which focus on the agricultural sector.

Not only do these social enterprises generate employment and skills development among disadvantaged groups, but they are producing innovations that are helping farmers and agricultural SMEs advance their operations. For example, Star Agri provides high-quality warehousing infrastructure to over 100,000 farmers throughout India to reduce postharvest loss. Digital Green is a development organization that uses video platforms to share knowledge on agricultural practices, livelihoods, and nutrition, providing farmers and producers across nine states in India and five countries in Sub-Saharan Africa with cost-effective extension services. And Jain Irrigation Systems, an Indian manufacturer of microirrigation systems, is now reaching 29 countries with water-saving technologies that increase crop yields.

Efforts like these prove that it’s possible to generate profit while providing services towards a social good. India’s thriving impact investment climate is further evidence of this. Between 2010 and 2015, Indian impact investments amounted to \$4.1 billion and generated average returns of 10 to 12 percent. There are over 50 investors and impact funds operating throughout the country, and many specifically target agriculture. Omnivore Partners is one such impact fund. Operating

in 22 states across India, Omnivore is investing in a variety of start-ups throughout the country that focus on agricultural technology, innovative food, and rural livelihoods. Others, like Lok Capital, fund entrepreneurs that are providing financial services to underserved populations—an essential offering, as smallholder agriculture universally lacks appropriate financing.

Despite a thriving start-up climate, however, private investment contracted in India in 2016 after several years of stagnant investment (both foreign and domestic). Historically, foreign exchange controls and complicated tax regimes have discouraged foreign investors to the point that India has seen losses of more than \$10 billion in missed opportunities and investor withdrawal. Domestic policy has also deterred investment particularly in the agricultural sector as a result of restrictions on the transport, storage, and marketing of agricultural goods, caps on the size of agricultural firms, and complex laws related to food safety.

In response, the Indian government has made a recent push to “crowd in” private investment. Investors have applauded the passage of the country’s first national bankruptcy law as well as amendments to the Indian goods and services tax, which will overhaul the current indirect tax system. Ultimately, the continued alleviation of barriers to investment will be essential to the growth of the Indian agricultural sector and to the economy more broadly.

Sources: The British Council, 2016; Digital Green; Ernst and Young, 2016; Financial Times, 2016; International Finance Corporation, 2012; Jain Irrigation Systems; Live Mint, 2016; Lok Capital; Omnivore Partners; Quartz, 2015; Star Agri; USDA ERS, 2008; World Bank, 2016.

China has committed similar investments in Latin America. At the first ministerial meeting of the Forum of China and the Community of Latin America and Caribbean States in 2015, President Xi pledged to conduct \$500 billion in trade with the region and \$250 billion in foreign direct investment through 2019.⁹³ China has also announced numerous high profile infrastructure projects in the region, including a transcontinental railroad as well as a canal across Nicaragua that would accommodate ships too large to pass through the Panama Canal—although it is unclear whether all of these projects will come to fruition.⁹⁴ The emergence of such a robust suite of investment tools and human capacity development on China’s part makes clear that low-income countries now have greater choice among donors as they develop their agriculture and food systems to achieve food and nutrition security.

China is not alone in these efforts. Brazil, India, and other emerging powers are helping to finance infrastructure and investing in an array of agricultural projects in Africa. Brazil, for example, opened an African office for its Brazil Agricultural Research Cooperation (Embrapa) in Ghana in 2006. It operates agricultural development programs such as More Food Africa in Ghana, Zimbabwe, Senegal, Kenya, and Mozambique, which aims to increase smallholder agricultural production for school feeding programs by providing Brazilian agricultural machinery to farmers.⁹⁵ Brazil’s ProSavana effort in Mozambique,

China, Brazil, India, and other emerging powers are helping to finance infrastructure and investing in an array of agricultural projects in Africa.

with additional investment from Japan, seeks to transfer Brazilian agricultural experience and technology to African savanna areas and is expected to cover 14 million hectares.⁹⁶ In India, nearly 80 private companies have invested roughly \$2.5 billion into Africa’s agricultural sector.⁹⁷ In addition to these countries’ respective bilateral efforts, in 2014 Brazil, Russia, India, China, and South Africa (the so-called BRICS countries) together formed the New Development Bank, which established its headquarters in Shanghai in 2016 and opened its first regional office in South Africa later that same year.

Support for policy actions and financial commitments by low-income countries

The actions and financing provided by low-income countries themselves in strengthening agricultural systems and improving food security are paramount. In most low-income countries, agricultural policies have improved significantly over the last two decades, providing greater opportunities for farmers and paving the way for major increases in agricultural production. For example, today national currencies are much less likely to be overvalued and distorted in ways that penalize farmers, and exchange rates in most countries approximate market values. State-owned marketing boards that forced farmers to sell at low prices are largely gone and have been replaced in many cases by more robust and efficient agricultural marketing systems. Some governments have invested more heavily in research and development of new agricultural varieties and begun to strengthen agricul-

tural extension services as well as rural infrastructure. National rules and regulations have been streamlined in order to remove barriers that impeded agricultural production.

A key to success has been improvement in the enabling environment for private-sector investment, from individual family farmers to larger private-sector investors, with overall policy clarity and stability that is critical for attracting and retaining private-sector investment. For many farmers, depending greatly on their circumstances, access is increasing for key inputs such as seeds, fertilizers, insecticides, and tools, and they can also sell their crops more easily at harvest time for better prices. Trade restrictions, tariff rates, and effective tax rates have fallen in many countries, helping farm profits grow and encouraging production.

But while the business environment for farmers is much better today than in the recent past, in many countries there is still far to go. Rural road and power networks, while more extensive than they once were, still do not reach millions of farms. Farmers that are disconnected from markets face higher prices for all of their inputs and are paid lower prices for all the goods they sell. All other factors being equal, the further away a farmer is from

A key to success has been improvement in the enabling environment for private-sector investment with overall policy clarity and stability that is critical for attracting and retaining investment.

a road, the more likely they are to live in poverty. In addition, in some countries policy distortions impede input markets, making it more difficult for farmers to get the seeds and tools they need. Rural financial markets remain largely undeveloped, depriving farmers of the access to credit and insurance they so often need to increase production. Land tenure and titling systems are often weak, outdated, or ambiguous, undermining farmers' incentives and abilities to invest in their farms. The quality of extension services is poor in many countries, so advances that lead to higher productivity on experimental and research plots never reach nearby farms.

In many countries, regional markets are underdeveloped, with barriers across borders inhibiting the flow of goods and services that can help increase agricultural productivity and access to food. It is not uncommon to see food surpluses on one side of a border and deficits not far away on the other, with infrastructure or policy barriers—or corruption—preventing markets from connecting. National governments on both sides of borders must help improve road, power, and water networks. Governments can work to reduce tariffs and nontariff barriers and eliminate unnecessary border restrictions that sometimes lead to food rotting on trucks before they can cross borders. They can work with other governments to establish appropriate food safety, sanitary, and phytosanitary standards.⁹⁸ These kinds of steps will help improve the well-being of producers and consumers on both sides of borders by integrating markets and increasing opportunities for production, marketing, and processing.

The best opportunities for significant advances in food security are where national government policies move towards opening markets, removing distortions, and providing greater opportunities for farmers. One mechanism underpinning these efforts is the Comprehensive Africa Agriculture Development Programme (CAADP), which provides

Box 7 – African commitment and accountability: Evolving African leadership in the public sector

CAADP: A strategy for agricultural transformation

Over the past two decades, the African Union (AU) has championed agricultural development as a tool for economic growth. Alongside the New Partnership for Africa's Development (NEPAD, or the AU's economic development implementing agency), the AU established the CAADP in 2003. A framework for country-led agricultural development, it established two targets to eliminate hunger and reduce poverty—to achieve 6 percent annual growth in agricultural productivity in 2015 and to increase national budget allocations directed to agriculture to at least 10 percent. Within these targets CAADP also organized around four pillars: to extend the area under sustainable land and water management, to improve rural infrastructure and trade capacity for enhanced market access, to increase food supply and reduce hunger, and to expand the dissemination and adoption of new agricultural techniques and technologies.

Assessments of CAADP have described mixed results in terms of target achievement. As of 2012, 40 African countries had engaged in the CAADP process, while only eight had surpassed the budget allocation target and 10 had surpassed the agricultural production target. However, CAADP has positively impacted agricultural value-added and land and labor productivity across the continent. The effort has also encouraged donors to follow and collaborate with CAADP priorities and initiatives, encouraging African countries to “approach agricultural development more strategically.”

The Malabo Declaration: Maximizing impact

In 2014 African leaders doubled down on commitments to agricultural productivity and trade with the adoption of the Malabo Declaration. The com-

mitments set forth by the Malabo Declaration include a reaffirmation of the values of the CAADP process and six others: to enhance investment finance in agriculture, end hunger in Africa by 2025, halve poverty by 2025 through agricultural growth and transformation, boost intra-African trade in agricultural commodities and services, enhance resilience of livelihoods and production systems, and ensure mutual accountability to action.

NEPAD released an implementation strategy for the Malabo Declaration in January 2015 to assist private sector, farmer organizations, civil society, development partners, and multilateral institutions in achieving the targets. It also established a set of milestones with which participating entities can measure progress and operationalize impact. According to the CEO of NEPAD, Malabo has “changed the way of doing business in agriculture,” allowing African countries to better assert their needs and priorities on a global stage.

Country scorecards: Accountability for better results

These initiatives have been bolstered by recent pushes for greater accountability and monitoring within African agriculture and food security efforts. The African Leaders for Nutrition—comprised of representatives from the AfDB, UN, and several African governments and philanthropies—put forward a Nutrition Accountability Scorecard at their first meeting in October 2016. This effort will monitor progress on country and regional nutrition outcomes.

Similarly, the 2016 Africa Green Revolution Forum (AGRF) yielded a commitment from AGRF partners to develop an agricultural transformation scorecard ahead of the CAADP biennial review in January 2018. This scorecard would measure and track all financial commitments to ensure accountability and action in the CAADP process.



In Ecuador, Cruz Alvarado spreads his cocoa beans out to dry before they are sold to a collection facility. Credit: Heifer International.

support to African countries to develop policy frameworks for agricultural transformation, income growth, food security, and nutrition. Launched in 2003 as an initiative of the AU and NEPAD, CAADP champions reform in the agricultural sector, helping national governments establish programs and policies aimed at achieving 6 percent annual growth in agricultural GDP and allocating at least 10 percent of public expenditures to the agricultural sector. Country agricultural strategies are vetted and reviewed by African peer groups, leading to country “compacts” detailing their commitments and strategies for strengthening agriculture (see box 7).

As of 2013, 13 countries in Sub-Saharan Africa, of 41 AU member states who made the pledge, had achieved their CAADP target of allocating 10 percent of their budgets to agriculture in one or more years.⁹⁹ On average, public agricultural expenditures rose

On average, public agricultural expenditures rose by more than 7 percent per year across Africa between 2003 and 2015, nearly doubling public agricultural expenditures in just over a decade.

by more than 7 percent per year across Africa between 2003 and 2015, nearly doubling public agricultural expenditures in just over a decade.¹⁰⁰ These investments have helped build research facilities aimed at developing new seeds and plant varieties that thrive in local ecosystems, begun to strengthen agricultural extension systems to help farmers learn of new ideas and best practices, and improved infrastructure like rural roads, power supplies, and water systems. Given the low starting points of investment in agriculture in many countries across Sub-Saharan Africa, particularly in comparison to counterparts in Asia, much progress is still needed. But, the evidence is strong for several countries that smart, scaled-up investment can result in gains in productivity, reductions in poverty, and overall GDP growth.

Ultimately, the key to sustained growth in agricultural productivity, food security, and nutrition is to strengthen a country’s capacities, skills, and institutions. To succeed, a country needs well-trained and skilled policymakers, engineers to design and build infrastructure, research institutions that can develop and adapt technologies for local conditions, health and nutrition experts working at the national and community level, land and titling systems to clarify ownership, effective extension systems to help disseminate ideas and best practices, and health systems to undergird effective nutrition.

Getting there requires investing in education and skills training, building effective agriculture and health organizations and systems, and developing local capacities. It will also mean building effective systems for transparency, accountability, monitoring, and evaluation to ensure that resources are allocated effectively and that decision makers can learn what works and what does not work. The United States and other governments should use mechanisms that encourage greater investments in countries’ own institutions and systems as well as new mechanisms for accountability. Doing so requires a long-term perspective. Building strong systems, skills, and capacities will require multiyear efforts by both local governments and international organizations, using longer-term metrics for success.

PART III



Fatima Bingesiti and Raphael Mwande weed their One Acre Fund maize in Malawi. Credit: Hailey Tucker/One Acre Fund.

SUPPORTIVE POLICIES PAVE THE WAY FOR ECONOMIC OPPORTUNITY AND PRIVATE-SECTOR INVESTMENT



Agriculture and food production are driven in large part by the private sector. It all starts with smallholder farmers and herders, who are the epitome of entrepreneurship, risk taking, and private investment. Up and down the value chain, from seed and tool companies to large and small farm producers to traders to food processors, the business of feeding the planet is stewarded by private investors. Achieving increases in agricultural productivity, improvements in nutrition, and enhanced global food security is only possible through the considerable capital, technological and product development capabilities, knowledge, experience, and distribution capacities of private businesses, large and small.

Although private-sector investment in areas related to food security has increased rapidly in recent years, businesses still face many obstacles and impediments, keeping investment from reaching its full potential. Unlocking that potential is a key challenge. What steps can be taken by the US government and other donors, along with the governments of low-income countries, to promote, encourage, and expand private investment in agriculture? Where does the private sector have a comparative advantage?

Partnership with the private sector must be a cornerstone of US assistance programs

In recent years new kinds of public-private partnerships have developed in which donors and local governments work to reduce risks and leverage additional private-sector investment. For example, the New Alliance for Food Security and Nutrition, launched in 2012 with the G8, was a large-scale effort to secure private-sector commitments to socially impactful investment in the food and nutrition sector. The New Alliance brought together local governments, private businesses, and the international community with joint commitments to improve the investment climate and opportunities for new investments related to agriculture. In its first three years, more than 200 African and global companies made

Through June 2015, a total of 30 private-sector investment projects in 21 countries had been approved with \$186 million of GAFSP funding.

commitments through the New Alliance worth \$10 billion in 12 different countries. These investments cover a wide range of areas related to agricultural production, marketing, processing, and nutrition such as biofortification. By mid-2015 more than \$1.8 billion of these investments had been implemented, reaching 8.6 million smallholder farmers and creating 58,000 jobs.¹⁰¹

The Global Development Alliance (GDA) is the US Agency for International Development's (USAID) flagship model for building partnerships with the private sector. The GDA, which was initiated in 2001 in the early days of the George W. Bush administration, is a partnership involving USAID and the private sector in which partners jointly develop and implement activities that leverage their respective assets and expertise. These partnerships follow market-based approaches to addressing development challenges; are cocreated, with partners sharing risks, responsibilities, and rewards; and leverage contributions from the private sector for greater development impact. Since 2001 USAID has built more than 1,600 partnerships with a wide range of private-sector actors, including US and global corporations, local businesses based in low-income countries, financial institutions, and impact investors and entrepreneurs.¹⁰² Many of these partnerships are related to agriculture, nutrition, and other food security-related activities.

Similarly, the Overseas Private Investment Corporation (OPIC) is a US government agency designed to mobilize private capital to help solve critical development challenges. OPIC specifically works with the US private sector, helping US businesses expand into emerging markets, which helps create jobs and economic growth both overseas and in the United States. OPIC is a self-sustaining agency that provides investors with financing, political risk insurance, and support for private equity funds. Since 2003 OPIC's portfolio

Box 8 – Foundation for Food and Agricultural Research: Building unique public-private partnerships

Created by the 2014 Farm Bill, the Foundation for Food and Agricultural Research (FFAR) serves to leverage public and private resources to advance agricultural research for some of the most pressing national and international challenges. FFAR operates as a nonprofit under the leadership of a 15-member board of directors. When FFAR was created, Congress authorized \$200 million for the foundation, which must in turn be matched by nonfederal funds. As a result, FFAR, by design, builds unique public-private partnerships and joint funding opportunities.

Sources: FFAR; USDA, 2014.

FFAR research priorities fall into two overarching categories: 1) more productive, sustainable agriculture (including optimizing agricultural water use; transforming soil health; enhancing sustainable farm animal resilience, productivity, and health; and improving plant efficiency) and 2) better health through food (including achieving a deeper understanding of nutrition and healthy food choices; managing food production systems to enhance human nutritional outcomes; and spurring food system innovation).

of agriculture-related projects has expanded from less than \$10 million to almost \$300 million. The companies it works with in the agriculture sector reported employing a total of 9,300 people in host countries. For example, OPIC provided a \$10 million loan to the One Acre Fund to work with smallholder farmers in Burundi, Kenya, Rwanda, and Tanzania. These funds help the One Acre Fund provide a market bundle on credit to individual farmers, including seed and fertilizer along with technical education and information on market and trade practices.¹⁰³

Multilateral initiatives have also made efforts to encourage business and private-sector investment in agriculture and food. As mentioned, GAFSP includes a private-sector window managed by the International Finance Corporation that is designed to provide long- and short-term loans, credit guarantees, and equity to support private-sector activities for agricultural development and food security. Through June 2015 a total of 30 private-sector investment projects in 21 countries had been approved with \$186 million of GAFSP funding. Complementary private-sector advisory service engagements have been deployed through 29 advisory projects in 24 countries totaling \$6.1 million of GAFSP funding.¹⁰⁴

Some of the most important alliances aiming to advance global food security are led by private businesses. For example, the World Business Council for Sustainable Development (WBCSD) is a global, CEO-led organization of over 200 leading businesses and partners. WBCSD aims to help its member companies become more successful and sustainable by working along and across value chains to deliver solutions to challenging development and sustainability issues, including in agriculture and food security. The WBCSD is made up of almost 70 national business councils so members can more easily connect with other members working in related activities in other countries.

Incentives can spur greater private-sector action

The private sector solves problems with their business activities every day. However, sometimes incentives are needed to focus their attention on challenges that may not yet present an attractive business opportunity.

Grand challenges

Programs like the Grand Challenges Initiative—designed to engage a wide variety of actors to solve some of the world’s toughest societal challenges—can engage the private sector productively. This competition for great ideas is open to private businesses, researchers, scientists, foundations, and NGOs to come together to solve pressing development problems. The initiative focuses attention and resources on specific, well-defined problems to promote innovative approaches and solutions to solving them. USAID, Grand Challenges Canada, and the Bill & Melinda Gates Foundation have launched eight Grand Challenges on a range of issues, including scaling up off-grid energy, combating the Zika virus and other global threats, fighting the Ebola virus, and more effectively managing water (see box 9).

Going forward, the challenge is to build on these initiatives and create additional mechanisms for the public sector to work with private businesses to encourage them to bring their capital, experiences, innovations, and know-how to enhance global food security.

Programs like the Grand Challenges Initiative—designed to engage a wide variety of actors to solve some of the world’s toughest societal challenges—can engage the private sector productively.

There are a wide range of possible approaches towards this end. At the core is building the basic infrastructure—roads, ports, power systems, and water supplies—and creating a strong policy and regulatory environment that provides the foundation for private businesses to thrive. In addition, well-designed donor programs can help reduce risks, lower transactions costs, increase access to credit, and otherwise help support business. Donor programs can work with farmers and herders to improve the quality of their produce and livestock and the timeliness of their deliveries to reduce risks and encourage investment downstream in processing. They can help create linkages among private investors along value chains between producers and consumers. They can encourage additional private-sector collaboration on crop and food research and innovation with both American and international education institutions.

Increased access to finance for farmers and entrepreneurs

In partnership with the private sector, donors can also help encourage the expansion of finance and related instruments from local banks, international financial institutions, or diaspora communities. It is especially important to help build programs that address the key constraints faced by women, youth entrepreneurs, and others that face extra obstacles in starting and expanding businesses. In particular, donors can work with local governments to help women and youth entrepreneurs gain access to credit, strengthen their ability to

Box 9 – The Powering Agriculture Grand Challenge

Of the 1.2 billion people worldwide who lack access to electricity, 80 percent live in rural areas, predominantly in Africa and Asia. The Powering Agriculture Grand Challenge, launched in 2012, aims to overcome barriers to providing electricity to farmers and others working in agricultural production, processing, and storage. The initiative is a joint effort by USAID, OPIC, the governments of Sweden and Germany, and Duke Energy. This effort is providing resources to entrepreneurs and innovators around the world.

Award winners in 2013 included Motivo Engineering (a US company), which received an award for developing hybrid energy solutions—drawing from varied sources such as solar panels, wind turbines, and the power grid—for cold storage, irrigation, and processing of aquaculture, dairy, horticulture, and staple crops in India. Motivo’s “Swiss Army Knife” system, the Hybrid Agriculture/Road Vehicles with Electricity Storage and

Transformation (HARVEST), creates a multipurpose approach to power-related problems, providing power for plowing, well drilling, cold storage, and transporting crops to market.

In 2015 award winners included SimGas Tanzania, Ltd., a Dutch design and production company that received a Powering Agriculture award for the research and development (stage 2) of biogas solutions for cold storage in the production of dairy in Kenya, Rwanda, and Tanzania. The emerging dairy sector in East Africa faces the immediate challenge of having no energy grid and therefore no ability to chill raw milk. The SimGas Biogas Milk Chiller aims to meet this challenge by using cow manure to generate the biogas needed to fuel on-farm milk chillers.

These examples demonstrate the power and potential of building effective public-private partnerships to solve critical development problems.

Source: International Energy Agency; Powering Agriculture.



Solar panel on used for lighting village homes in Sri Lanka. Credit: Dominic Sansoni/World Bank.

Box 10 – Guidelines for “Responsible Lending for Smallholders” (Council on Smallholder Agricultural Finance)

The Council on Smallholder Agricultural Finance is an alliance of social lending institutions that targets agricultural businesses in low- and middle-income countries. As socially responsible lenders, members of the Council on Smallholder Finance seek to build a thriving and sustainable financial sector and commit to a series of principles in their lending:

- 1. Promotion of inclusive finance.** We will actively promote and contribute to the further development of the market for smallholder agricultural finance. We embrace the concept of additionality in our lending, meaning that we will seek to expand the addressable market to serve an ever-greater number of underserved agricultural businesses and a wider range of their financing needs.
- 2. Responsible credit decisions.** We will act in the best long-term interests of a sustainable financial sector that serves our agricultural business clients, their affiliated smallholder farmers, and our investors. As a group we will work together to integrate environmental, social, and corporate governance into policies and reporting.
- 3. Transparency.** We will maintain a high degree of transparency regarding loan terms, conditions, and processes by communicating clear, sufficient, and timely information in a manner and language our clients can understand.
- 4. Harmonization of standards.** We will collaborate to set more harmonized lending and performance standards to reduce the burden for borrowers and contribute to further comparability in the industry.
- 5. Prevention of overindebtedness.** We will take adequate care in all phases of the credit process to determine that clients have the capacity to repay our loans without becoming overindebted.
- 6. Trusted information sharing.** To promote the development of a healthy agricultural lending sector, we will share information pertaining to due diligence and risk management while respecting the confidentiality of our borrowers’ business and financial information.
- 7. Fair treatment.** We commit to ethical behavior in all credit decisions, including loan approvals, servicing and collections, and due processes for resolving disputes.

Source: Council on Smallholder Agricultural Finance.

own land, and improve their abilities to learn about and use technologies that can help make them become more successful.

Towards this end, donors can work with local banks to help reduce their risks and expand lending. For example, USAID's Development Credit Authority (DCA) helps reduce the risks faced by local banks in providing additional credit to small businesses and other underserved markets and sectors. The DCA encourages banks to expand their lending by providing partial credit guarantees that help demonstrate the long-term commercial viability of lending in developing markets. These guarantees have been an important instrument to de-risk and mobilize private capital into agriculture, food security, and nutrition. Experience has shown that local companies that receive these loans from local banks

It is especially important to help build programs that address the key constraints faced by women, youth entrepreneurs, and others that face extra obstacles in starting and expanding businesses.

rarely default, so the expansion in new private-sector loans far outpaces the call on USAID to cover losses. To date, each \$1 spent by DCA leverages more than \$25 in new private-sector lending to local businesses. DCA's programs have helped support the development of agricultural value chains by providing financing to farmers and herders as well as to small- and medium-sized businesses selling seeds and tools, processing food and other agricultural products, and operating in transportation and retail and wholesale trade.

The private sector can help develop new approaches and opportunities

In many aspects, the private sector is uniquely positioned to advance agricultural development and global food and nutrition security through key mechanisms. The American agribusiness and wider agricultural community—from farmer cooperatives and commodity groups to multinational food companies—are leveraging their expertise and knowledge through supply chain innovation to ensure inclusive growth in low-income countries. And particularly with the proliferation of new technology, the private sector stands poised to harness and bring to scale innovative new opportunities.

Unlocking capital

Innovative financing mechanisms for smallholder farmers

There is an estimated \$200 billion in unmet finance demand for smallholder farmers.¹⁰⁵ New tools that can successfully meet this demand could revolutionize smallholder agriculture. One promising new tool in the financial industry is peer-to-peer (P2P) lending, which has emerged as an important instrument for leveraging personal wealth and offering more competitive interest rates for borrowers. P2P lending platforms are among the fastest-growing segments in the financial services space. By some estimates the P2P market could reach nearly \$900 billion in 2024, up from \$26 billion in 2015.¹⁰⁶ There is a growing opportunity to harness this new innovation for development as well as the food and agribusiness sectors, especially if paired with complementary new innovations to determine credit worthiness and reduce the costs of due diligence on potential businesses.

Box 11 – Innovative finance mechanisms

A dynamic range of new financing tools presents a tremendous opportunity to secure expanded funding for the agricultural sector—especially for agricultural actors and efforts that would not be eligible to participate in traditional finance schemes. Such promising finance mechanisms include development impact bonds and diaspora-focused investment vehicles.

Development impact bonds (DIBs) are results-based financing contracts that fund social service delivery. An investor, typically from the private sector, will provide up-front capital for an intervention, carried out by a service provider. If the intervention achieves measured results, an outcome payer—a foundation or donor agency—will repay the investor in accordance with the program’s success. DIBs are an adapted form of social impact bonds. They operate under the same basic principles, but social impact bonds will engage governments as outcome payers as opposed to donors.

While there have been few operational DIBs to date, the Educate Girls bond, funded by the UBS Optimus Foundation, points to the potential for success in such a financing model. The project aims to improve educational attainment for 18,000 children in Rajasthan, India, with the

Children’s Investment Fund Foundation serving as the outcome payer. After just one year of operation, Educate Girls has enrolled 44 percent of all school-aged girls in the region, and progress is expected to accelerate in coming years. UBS will recoup 40 percent of its investment based on these results alone.

Diaspora-focused investment vehicles are an attempt to leverage increasing global remittance flows to address development challenges. With global remittance flows hitting \$586 billion in 2015, governments, NGOs, and the private sector have all begun to devise diaspora financing models that ease the transfer of funds or direct remittances to finance specific projects. Movement Capital is one such operation. A web-based crowdfunding service that connects diasporans with investment opportunities in emerging markets, Movement Capital has raised \$25 million for projects across 35 African countries.

While DIBs and diaspora finance mechanisms have not yet been specifically employed to achieve goals around agriculture or nutrition, models like these show promise in connecting development efforts with new and more flexible sources of capital. It stands to reason that they could achieve the same for the agricultural sector.

Sources: CGDEV, 2013; CSIS, 2015; Devex, 2016; Instiglio; Movement Capital.

Access to insurance for reducing risk

In addition, there is tremendous potential to expand private-sector involvement in a wide range of agricultural insurance mechanisms in low-income countries or related instruments for political or currency risk. Because agriculture is inherently an uncertain, high-risk business, strengthening financial instruments for risk mitigation, risk transfer, and risk coping has the potential to bring about large benefits to vulnerable rural households. Well-designed agricultural insurance mechanisms can reduce farmer and herder risk, expand access to credit, increase agricultural productivity, encourage investment, and increase incomes. A wide range of insurance instruments targeting small and medium farms are in different stages of development, including insurance for crops, livestock, forestry, aquaculture, natural disasters, and weather. There are many challenges inherent in designing and expanding these instruments in low-income countries, including significant up-front devel-

There is an estimated \$200 billion in unmet finance demand for smallholder farmers. New tools that can successfully meet this demand could revolutionize smallholder agriculture.

opment costs, mismatches between losses and payouts, building the technical expertise in low-income countries to manage the products, and developing the tools and indicators needed to adequately monitor and evaluate agricultural insurance programs. Solving these challenges will require close cooperation between governments, donor agencies, and private businesses, but will help pave the way for increased agricultural productivity and food security in low-income countries around the world.

Innovations in transport, logistics, and supply chains

New retail food system models

The rise of grocery platforms like Instacart and Amazon Fresh, farm-to-consumer efforts like Community Supported Agriculture (CSA) deliveries, and meal preparation kits in the United States and Europe have created a new modality for consumers to purchase food without setting foot in a supermarket. In many markets in low-income countries, delivery of goods on demand is common in urban centers but remains informal. Similarly, there is increasing desirability among higher income consumers to source food products from nearby farms where they trust the food quality and safety. There is room for a great deal of innovation in the nature of food retail systems that will emerge in low-income countries, taking into account the confluence of traditional practices, modern technology, and increased demand for traceability to the farm. With new technology, emerging regions have potential to create an innovative hybrid of supermarket retailers, informal market systems, and technology-driven home delivery services.

A “sharing economy” in farm machinery and expert services

The rise of the sharing economy—in which owners of underutilized assets connect with those willing to pay for them, like the models employed by Lyft or AirBnB—has resulted in huge reductions in transaction costs and better use of scarce resources in several sectors around the globe. The agriculture and food sector could utilize applications and business

models to establish sharing economies for resources such as farm machinery. Hello Tractor in Nigeria is an “Uber-for-tractors” start-up that connects tractor owners with nearby farmers through a mobile app.¹⁰⁷ Such platforms give a greater number of farmers access to otherwise expensive machinery and create a source of income for those farmers who have made such investments. In addition to looking across the transport and machinery sectors, there may be applications that enable farmers to find on-demand services like expert pesticide-spraying services or artificial insemination services for livestock.

Business model innovation

Traceability along the supply chain using blockchain

Blockchain is an emerging software system that creates a secure, digital transaction ledger that is shared among a network. There is great anticipation that blockchain has the potential to transform many sectors—most obviously financial systems and contracts. But there is also early evidence that blockchain can be used to trace food as it moves along the supply chain, improving transparency and therefore food safety.¹⁰⁸ For example, in 2016 Walmart announced a collaboration with IBM and Tsinghua University in Beijing to use blockchain to track information that authenticates food sources, including data on the originating

Driven by ingenuity and entrepreneurship, the private sector is particularly well positioned to develop and advance technological breakthroughs at every point along the food supply chain.

farms, processing plants, expiration dates, and food storage temperatures.¹⁰⁹ As food supply chains become more transparent as the result of new digital technology, stakeholders throughout the supply chain could have the ability to identify the weakest segments of the supply chain to make targeted investments for improvement.

Technological breakthroughs

New tools and technologies for agricultural production and food supply chains

Driven by ingenuity and entrepreneurship, the private sector is particularly well positioned to develop and advance technological breakthroughs at every point along the food supply chain that can help improve agricultural development, food security, and nutrition. From using microorganisms to increase agricultural productivity, to innovative methods for packaging food, private companies are integral to developing new technology for agriculture. Examples of such innovation are numerous. Indigo is a start-up company that seeks to boost agricultural yields and plant health by reintroducing microbes to plants.¹¹⁰ Apeel Sciences, based in southern California, is using leaves, stems, and other plant materials to create edible barriers, thin coatings on fresh fruits and vegetables that protects them from moisture and spoilage, extending the shelf life of produce by a factor of five.¹¹¹ PAVE Irrigation Systems, another start-up, is working to provide water storage and supplemental irrigation in the face of erratic weather throughout Ghana.¹¹² With the help of the private sector, it will be possible to attain the kind of innovation needed to expand and protect sustainable agricultural production and supply chains.



Zambian farmer Esther Musonda, age 34, feeds her cows. Credit: Heifer International.

PART IV



**THE UNITED STATES
MUST STRENGTHEN ITS
COMMITMENT TO ENDING
HUNGER AND MALNUTRITION**



Farmers from Gitega, Rwanda, make a nursery for Grevillea trees. Credit: Evariste Bagambiki/One Acre Fund.

Since World War II, when America’s leaders strove to meet the challenges of “hunger, poverty, desperation, and chaos” in the aftermath of such great conflict and suffering, the United States has been strongly committed to ending hunger and malnutrition around the world, not just as a moral imperative but as a matter of national security.¹¹³ Since that time, US efforts to advance global food and nutrition security have been among the greatest triumphs of American ingenuity and generosity, whether through Norman Borlaug’s lifesaving innovations that spurred the Green Revolution, the USDA McGovern-Dole International Food for Education and Child Nutrition Program, or initiatives like the John Ogonowski and Doug Bereuter Farmer-to-Farmer Program in which American farmers and agricultural experts travel abroad as volunteers to share their expertise.

America's commitment to ending hunger and malnutrition was most recently reaffirmed by Congress in July 2016 when it overwhelmingly passed the Global Food Security Act. Shepherded by lead cosponsors Senators Johnny Isakson (R-GA) and Bob Casey (D-PA) in the Senate and Congressman Chris Smith (R-NJ) and Congresswoman Betty McCollum (D-MN) in the House of Representatives, the act passed with strong bipartisan support. There were no objections in the Senate and 87 percent approval in the House. The act also enjoyed strong support from a broad coalition of civil society groups, including 30 faith-based organizations that issued a joint faith community statement of support.¹¹⁴

The act authorizes expenditures of more than \$1 billion in FY2017 for the administration to continue to meet the country's global food and nutrition security goals. The act also required the creation of a comprehensive global US government food security strategy, submitted to Congress in September 2016 and developed through a broad consultative process with stakeholders across business, civil society, and the US government (see box 12). This comprehensive strategy lays the groundwork for moving global food and nutrition security efforts forward.¹¹⁵

The passage of the Global Food Security Act was an historic step forward, upholding the strong bipartisan support for food and nutrition security goals over the past decade. In the wake of the 2007-08 food price crisis, President George W. Bush called on Congress to commit nearly \$1 billion in new funds to bolster global food security.¹¹⁶ At the 2009 G8 Summit, as outlined in Part II, the United States joined other world leaders to commit a combined \$22 billion over three years to strengthen global agriculture and nutrition. In

In recent years, the US government's renewed global food security efforts have achieved noteworthy initial success, reaching more than 18 million children with nutrition interventions and helping 9 million farmers improve production in 2015 alone. The efforts also leveraged more than \$150 million in private-sector resources just last year.

2010 the Barack Obama administration launched Feed the Future, a "whole-of-government" effort that includes 11 departments and agencies (including multilateral commitments through the World Bank), with USAID responsible for coordinating its implementation. Feed the Future's twin objectives are to 1) accelerate inclusive agricultural growth and 2) improve nutrition, with a cross-cutting approach that includes gender and the environment. Feed the Future investments target agricultural research and extension, agricultural productivity, and related value chains. Nutrition interventions focus on mothers and children, especially during the critical 1,000-day developmental period from pregnancy to a child's second birthday.

In recent years, the US government's renewed global food security efforts have achieved noteworthy initial success, reaching more than 18 million children with nutrition interventions and helping 9 million farmers improve production in 2015 alone. The efforts also leveraged more than \$150 million in private-sector resources just last year in order to maximize results.¹¹⁷ US investments in research have delivered several hundred new innovations that benefit US farmers as well as farmers around the world, including tech-

Box 12 – Global Food Security Act of 2016 and the US Global Food Security Strategy

When the Global Food Security Act passed with overwhelming bipartisan support in 2016, authorizing funding for FY2017 and FY2018, it codified into law the US “whole-of-government” approach to global food and nutrition security programs. By drawing on the agricultural, investment, and policy expertise of 11 agencies, this approach effectively leverages the best and brightest of the US government.

The 11 administrative agencies include:

- USAID (lead agency)
- USDA
- Millennium Challenge Corporation (MCC)
- OPIC
- US Department of State
- US Department of Treasury
- US Department of Commerce

- US Trade Representative (USTR)
- Peace Corps
- US African Development Foundation
- The US Geological Survey

The Global Food Security Act required the completion of a whole-of-government strategy for the next five years. Each agency was required to prepare and submit agency-specific implementation plans. Together these plans form the Global Food Security Strategy, submitted to Congress in September 2016. This strategy lays the groundwork for how the US can draw on the greatest strengths and know-how across the government—in close partnership with the private sector, universities, and civil society—and establishes a framework for transparency and accountability.

Sources: InterAction, 2015; USAID, 2016.



Awa Sylla, 6, eats curdled milk mixed with millet flour and sugar in Senegal. Credit: Heifer International.



In the Philippines' Agusan del Norte province, Liza Constancia Senarillos collects manure from her pigsty for fertilizer. Credit: Heifer International.

nologies that insulate crops and livestock from the threats of weather volatility, flooding, drought, salinity, pests, and diseases as well as technologies that improve value-added food processing and postharvest handling procedures.¹¹⁸ Millions of families and individuals around the world have become healthier, more food secure, and more stable because of the efforts of the United States.

The path forward: Building on a legacy and innovating for the future

The United States faces a crucial juncture. It can forcefully respond to food and nutrition security challenges with strong leadership, smart investments, effective global cooperation, and sound policy choices that will help fight hunger and malnutrition and strengthen US national security. This would give hundreds of millions more people the opportunity to lift themselves out of poverty and hunger in the next two decades, with benefits to high- and low-income countries alike, including greater stability, security, and prosperity around the world. The United States has the opportunity to demonstrate generosity and leadership at this critical moment by reinforcing the US commitment to global food and nutrition security.

Alternatively, the United States can choose to play only a modest role, treating food and nutrition security as a minor issue, ignoring signs of growing stress to the global food

The United States faces a crucial juncture. It can forcefully respond to food and nutrition security challenges, fighting hunger and malnutrition and strengthening US national security. Or it can ignore signs of growing stress to the global food system, leading to heightened global economic and political instability, increased migration pressures, and significant security threats.

system, leaving leadership to other world powers, and reacting to crises around the world only after they erupt. This failure to act forcefully will likely lead to an uptick in poverty, increases in hunger and disease, growing conflict, and increasing numbers of refugees and cross-border migration. When there has been a decline in support for agricultural development by national governments and donors in the past, even as overall areas of development assistance remained constant or increased, a slowing of agricultural progress and backsliding has followed. Indeed, this path would reverse the progress that has been made thanks to US leadership, which would result in heightened global economic and political instability, increased migration pressures, and significant security threats. It would also extend the timeline and inflate the ultimate costs of solving the scourge of food and nutrition insecurity in the 21st century.

America's agricultural development and nutrition assistance matters because US leadership creates a cascade of positive effects. Globally, the United States inspires others to persist in their efforts, and it incentivizes governments in low-income countries to invest in their own national systems. It instills confidence in the US private sector to have the US government stand beside it as it invests in frontier markets with the aim of building their businesses and building a world without hunger. And US leadership on global food and

Box 13 – Key considerations for US global food security policies and programs

Achieving US global food security goals will require close attention to four overarching and interlinked policy considerations.

Reducing vulnerability among the rural poor in countries of strategic importance. Farmers in the United States and around the world are increasingly facing shocks and stresses stemming from intense variability in weather, water availability, prices, pests, and other factors that significantly undermine food security. Programs should aim to enhance the resilience of individuals, families, and communities (especially the most vulnerable and marginalized) to reduce, mitigate, or adapt to these disruptions.

Advancing the inclusion and protection of rights for women and girls. Women are at the center of food systems because of their multiple roles as farmers, mothers, income earners, meal providers, family teachers, and health caregivers. Focusing more resources on reaching them and ensuring their legal and cultural access to key inputs for agriculture such as land tenure rights will lead to stronger results and larger impact, espe-

cially over time as their children grow and reach adulthood.

Addressing and engaging growing youth populations. Broader national security goals cannot be achieved without creating opportunities for growing populations of youth. Investments should help generate employment and income opportunities for youth in agriculture and in businesses throughout the value chain—in the United States and globally. Such opportunities can be found from the farm to urban markets, in processing, storage, transport, finance, cold chains, input supplies, technology and digital tools, information systems, and wholesale and retail trade of agricultural products.

Developing new approaches in failing and fragile states. Some of the most intense food security and stability challenges arise in fragile and failing states where traditional approaches have not been effective. New approaches are required to begin to strengthen food and nutrition security in these difficult environments.



Tea pickers transport harvested leaves in Kenya's Mount Kenya region. Credit: Neil Palmer/CIAT.

nutrition security shows civil society, including leading humanitarian NGOs and faith-based organizations, that their leaders share their values and vision for a safe and just world.

To address the challenges facing the United States and threatening global security, the US administration, together with Congress, should support investments that take an integrated approach to agricultural-led economic growth, nutrition, and food system resilience through innovation and new technologies. To succeed, the administration and Congress must work closely with private businesses, the agricultural community, entrepreneurs, investors, universities, research institutions, and civil society. These investments should

To address the challenges facing the United States and threatening global security, the US administration, together with Congress, should support investments that take an integrated approach to agricultural-led economic growth, nutrition, and food system resilience through innovation and new technologies.

aim to at least double the impact of existing agricultural development programs to help farmers, producers, and rural families increase their incomes and reach millions of children and adults with nutrition programs addressing hunger, micronutrient deficiency, and diet-related chronic diseases. Indeed, these goals are interlinked. Even with rapid urbanization, the majority of the world's food insecure and malnourished people still live in rural areas, and most depend on agriculture for their livelihoods. Holistic approaches to agricultural development and nutrition programs can help farmers boost their incomes through the production of nutritious foods, for example, while also helping to ensure the nutrition of their families and communities.

To accomplish these goals, the administration must work closely with Congress to secure adequate US budget outlays for food and nutrition security and related long-term agriculture and nutrition programs. Moreover, when the Global Food Security Act is due for reauthorization in 2018, **Congress should continue to lead legislatively by committing to a long-term or permanent authorization of global food and nutrition security efforts to ensure stability of programming and to set long-term food security and nutrition goals.**

The administration can also draw from the expertise and know-how of a broad American coalition of private-sector partners, the agricultural community, philanthropists, universities, and civil society organizations who are interested in and working on food security and nutrition issues. Strategic investments by the US government have the power to unlock a tremendous amount of private-sector investment in food and agriculture, both at home and abroad.

RECOMMENDATION 1



A Nigerian man sells fresh vegetables at a market in the capital of Abuja. Credit: Milo Mitchell/IFPRI.

Make global food and nutrition security a pillar of US diplomatic and national security engagement and strengthen the integration and coordination of activities both within the United States and around the world.

Food and nutrition security are too often treated as secondary issues within the US national security agenda, considered relevant only to development or poverty reduction. But hunger and malnutrition have a much broader impact and, as noted in Part I, are directly related to many of the most pressing security issues facing the world today.

For years, improving global health has been a strong component of the US government's national security strategy—and for good reason. Cultivating global food and nutrition security should play an equally prominent role in national security strategy. To accomplish this, the US government should take several actions.

Action 1A: Amplify the importance of global food security for US national security and diplomatic activities.

The administration should place much greater emphasis on global food security in the US National Security Strategy. The most recent US National Security Strategy released in 2015 makes only cursory mention of global food security—and even fewer references to nutrition—while national security threats from related issues such as climate and global health

The implications of food and nutrition insecurity for national security and stability are clear, and consideration of these challenges must therefore must be a larger component of our national security and foreign policy.

understandably receive significant attention.¹¹⁹ But the implications of food and nutrition insecurity for national security and stability are clear, and consideration of these challenges must therefore must be a larger component of our national security and foreign policy. For the same reason, food and nutrition security should play a greater role in National Security Council deliberations and decisions.

The administration should also include analyses in its security and intelligence modeling of the impact of food insecurity on stability and national security.¹²⁰ Similarly, it should develop and prioritize strategies to improve food security in weak and fragile states. The Department of Defense plays a particularly important role in these efforts. Food security challenges can be particularly complex—and unique—in an unstable context, so specialized strategies are critical to moving the needle. In particular, for its own benefit and for the benefit of others, the United States should invest in research, expanded classified and unclassified reporting on national security threats due to food insecurity, and strategy development on issues that exacerbate fragility, including conflicts between farmers and livestock keepers, control of water resources, and food price volatility.

Food and nutrition security are global in scope and must play a prominent role in US relations and engagement with other countries. The United States should give greater

prominence to food security issues in bilateral and multilateral diplomatic engagements around the world, recognizing the relationship between food security and key threats such as civil unrest and violence.

Action 1B: Maximize resources through smart integration and coordination among agencies and between the US government and civil society.

The continued successful implementation of US global food security efforts depends on efficient and effective coordination across administrative agencies. A whole-of-government approach is a cornerstone of US global food security programs, particularly in recent years. Most recently, as required by the passage of the Global Food Security Act in 2016, 11 agencies together submitted to Congress a whole-of-government strategy for global food security, including agency-specific implementation plans.¹²¹ Yet even with these positive steps, interagency integration and coordination continues to be an area for improvement. The administration should significantly bolster efforts to improve interagency

Given the important leadership from civil society on food security and nutrition, the United States should continue to partner with and learn from a broad coalition of civil society groups interested in and working on food and nutrition security issues.

planning, integrate investments, and more effectively draw on the comparative strengths of various agencies so that US government food security programs and efforts are more closely aligned and mutually reinforcing, both in Washington, DC and in the field in low-income countries.

Interagency coordination is critical not only within global food security activities but across program areas. The United States should also strengthen coordination between global food and nutrition security and other related US government activities focused on energy, water, health, and education such as the USDA McGovern-Dole International Food for Education and Child Nutrition Program and related programs.¹²² Likewise, the United States should bolster mechanisms to enhance coordination and collaboration among humanitarian and development actors within the government and knock down artificial and administrative barriers that impede better coordination. US ambassadors and diplomats serving in priority countries should receive training on the importance of global food security for US foreign policy, including national security. This training should also include the need for collaboration between agencies and their respective field staffs. Also, given the important leadership from civil society on food and nutrition security, the United States should continue to partner with and learn from a broad coalition of civil society groups interested in and working on food and nutrition security issues.

Action 1C: Work closely with bilateral and multilateral partners to achieve collective goals.

The United States does not and should not act alone in its efforts to advance global food and nutrition security. As outlined in Part II, other global donors are taking action and making investments to end hunger and malnutrition. In addition to internal coordination efforts

within the US government, external coordination and collaboration with these donors is essential. As in the past, the United States should be a leader in multilateral bodies on food and nutrition security and should encourage partners to do the same.

Such partnerships have been a key component of US global food and nutrition security initiatives, particularly in recent years. As noted in Part II, the 2009 G8 summit that led to a combined \$22 billion in commitments by national governments, the creation of GAFSP at the 2009 G20 summit to assist in implementing the pledges, and the launch of the New Alliance for Food Security and Nutrition in 2012 with other G8 countries, African heads of states, and corporate leaders to promote private-sector investment in African agriculture have been integral to the success that has been achieved in recent decades. To continue this progress, the United States should work closely with leadership in G7 and G20 countries to double down on global commitments to ending hunger and malnutrition.

At the next appropriate G7 Summit, the administration should consider participating in a renewal initiative in support of food and nutrition security to restart a multilateral food security funding program like those agreed upon at the 2009 L'Aquila Summit. The administration should also continue to play a strong role in G7 and G20 deliberations on global food security issues.



One Acre Fund field officer Edelquinne Munoko trains farmers how to space and measure their maize and bean intercropped fields for maximum yields. Credit: Hailey Tucker/One Acre Fund.

RECOMMENDATION 2



Lillian Gichuru works on improved maize varieties at the Kenya Agricultural Research Institute. Credit: AGRA.

Prioritize public research investments to unlock innovation and harness new technologies for the agriculture, food, and nutrition sectors.

Achieving global food and nutrition security in the decades to come will not be possible without the development and adoption of new agricultural and nutrition technologies, especially in the face of growing populations and water scarcity. Better IT platforms, data collection, and modeling can help improve the generation and sharing of information much more widely. And improvements in the mechanisms for traceability within an increasingly global food system will help to protect consumers globally, including in the United States, from threats to food safety. To accomplish this, the US government should take several actions.

Action 2A: Harness the unparalleled expertise of American universities and their research partners to solve the most pressing problems in agriculture, food, and nutrition at home and abroad.

America's universities—particularly its land grant university system—are among the most valuable resources available to the United States to advance global food and nutrition security. Yet they must be leveraged and supported effectively to fully capitalize on their expertise and potential contributions. To do so, the United States should create incentives and performance targets for its academic institutions to help build the extension, financial,

America's universities—particularly its land grant university system—are among the most valuable resources available to the United States to advance global food and nutrition security.

human, and institutional capacities of partner institutions in low-income countries. At the same time, the United States should strengthen and prioritize partnerships and relationships that connect the unmatched expertise of American universities with universities and agricultural research institutions in low-income countries. In particular, demand-driven partnerships with US universities should be established through the creation of a “one-stop shop” for global researchers, policymakers, and other stakeholders to identify and solicit specific expertise from within the American university system.

American universities are also a tremendous resource for preparing the next generation of leaders in agriculture, food, and nutrition. The USDA's Norman E. Borlaug International Agricultural Science and Technology Fellowship Program, for example, has trained approximately 700 fellows in agriculture and related fields from 64 countries since 2004. Yet over the past 25 years, overall US support for international students seeking to study at American universities has gradually decreased. Meanwhile, other global powers are training growing numbers of students within their borders. The United States should significantly increase scholarship funding and expand opportunities for foreign students studying in US universities using US government funding alongside funding from the private sector, philanthropy, and other sources.

Yet no matter how great the support available, training at US institutions will never reach the demand for education and training in low-income countries. US universities

Box 14 – Engaging American students in the food and agriculture sectors

With the average age of a US farmer currently at 58 years old and rising and over one-quarter of the US workforce projected to be 55 years old by the year 2020, engaging young people in food and agriculture is key to responding to the challenges of the next several decades. The US government, agricultural community, private sector, and universities alike are actively seeking to draw American students and young people into the agricultural sector as innovators and leaders in every aspect of the food supply chain.

Universities are taking an increasingly interdisciplinary approach to food and agriculture. They are bringing evolving technology to the forefront of the field, along with hands-on, real-world experience for students in the agricultural sciences and in related fields. For example, the University of Wisconsin-Madison established a certificate program available to all undergraduates in global health—including human, animal, or environmental health—administered jointly by the College of Agricultural and Life Sciences and the Global Health Institute. The University of California (UC) launched its UC Global Food Initiative in 2014, facilitating student engagement across the UC system and academic departments. The UC President’s Global Food Initiative Student Fellowship Program funds student-generated research, re-

lated projects, or internships that focus on food issues. The UC Global Food Initiative invites participation in student challenges such as the CITRIS Mobile App Challenge, for which UC students designed mobile apps that aimed to make purchasing healthy food easier.

Food and agribusiness companies are actively engaging students. Land O’Lakes Inc., for example, selects 10 undergraduate students annually to participate in their Global Food Challenge. Students are selected from partner universities and are named “Emerging Leaders for Food Security,” participating in a year-long program that Land O’Lakes conducts. Created in 2014, the Global Food Challenge engages students in a variety of academic fields, from agronomy and environmental science to business administration.

New resources are helping young farmers get their start. For example, in 2010 a group of young farmers joined together to establish the National Young Farmers Coalition, a nonprofit organization that today reaches more than 100,000 farmers and consumers in all 50 states. In 2014 USDA announced the launch of a new digital platform for new farmers as a centralized resource for USDA initiatives that can help new farmers succeed. The platform includes a section specifically for young farmers (newfarmers.usda.gov/youngfarmers).

Sources: Land O’Lakes, Inc; National Young Farmers Coalition; University of California; University of Wisconsin; USDA, 2014; US News and World Report, 2016.

should bolster existing partnerships and build new relationships with universities within low-income countries for joint training programs and the sharing of mutually beneficial research and intellectual resources. Today's digital technology tools offer tremendous opportunities for American institutions to educate international students within their own countries. The United States should collaborate with universities and the American private sector to scale up the availability of online coursework designed to train future leaders—including in the United States—in the area of food and nutrition security.

Action 2B: Expand support for the development of scientific and technological innovations that improve agricultural productivity, pest and disease resistance, supply chains, and nutrition.

In the last century, scientific breakthroughs enabled the world to dramatically increase its agricultural productivity and the global food supply. As food demand evolves and the food system faces new and growing pressures, research investments are more important than ever. Yet US investment in agricultural R&D has fallen, even as other countries' investments rise. By 2009 the US share of total global public spending on agricultural R&D had fallen from 21 percent to 13 percent since 1960, while China's grew from 13 to 19 percent of total

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global spending.¹²³ Yet, the rate of return on investment in public agricultural research in the United States is estimated at an average of 45 percent.¹²⁴ State government support is also an important source of research investment, but this has also declined over time. In 1970, 87 percent of total USDA support to states was matched by the states. By 2009 this share had fallen to 35 percent.¹²⁵

The United States should increase its support for basic agricultural research—that is, research that does not have a specific application but feeds into future innovations and is necessary to develop the building blocks for broader solutions to food system challenges.¹²⁶ These research findings help not only the American agricultural community tackle key challenges, but also farmers around the world. The United States should invest in research on drought- and heat-resistant seeds and plants, new fertilizers, pest and disease resilience, soil fertility, off-grid power, postharvest loss prevention, biofortified food, and other related advances. Such advances would benefit American farmers and farmers in low- and middle-income countries alike. The United States should also expand research, innovative programs, and metrics aimed at improving water management, irrigation, and use of scarce or impaired water supplies that would benefit farmers at home and around the world.

Public research investments are essential, but private-sector research can and should make significant contributions, particularly in partnership with American institutions and their partners globally. The United States should encourage additional private-sector collaboration on crop and food research and innovation with both American and international educational institutions.

Without the adoption of existing research and knowledge as well as new research findings, food and nutrition security cannot advance. Innovative tools can incentivize and encourage consumers and businesses to adopt technology, best practices, and healthy behaviors such as the consumption of nutritious food. Social innovation, for example, leverages business ideas to find effective and sustainable solutions to social problems. The United States should invest in social innovation and research to accelerate adoption of improved technologies, practices, nutritious foods, and healthy behaviors.

Action 2C: Develop new technology platforms to collect more and better data and improve communication of information among key stakeholders.

New tools and technology are gathering data at an unprecedented rate, creating extraordinary capacity for measurement and modeling. Effectively collecting, measuring, and utilizing these data can unlock a host of new information to inform policymaking and investments. US global food and nutrition security programs should support the development and use of next-generation data systems, modeling, remote sensing, cell phone applications, and knowledge products to more accurately gather real-time information, anticipate upcoming challenges, and measure results and impact. The United States should support entrepreneurs to consolidate, integrate, and scale IT systems that link suppliers, producers, buyers, extension workers, water experts, health providers, and related actors.

The United States should establish shared digital global extension platforms that support farmers both in the United States and globally, linking actors across the global food

The United States should continue leading—and expand—policies that support global open data for agriculture and nutrition.

system and developing data standards that can provide traceability and open market development opportunities.

The United States should continue leading—and expand—policies that support global open data for agriculture and nutrition. For example, the United States was a founding partner for the Global Open Data on Agriculture and Nutrition (GODAN) initiative launched in 2013 that is now comprised of more than 430 global partners, including governments, the private sector, and NGOs, and for which USDA serves as the US government lead. GODAN is a global partnership that “supports the proactive sharing of open data to make information about agriculture and nutrition available, accessible, and usable to deal with the urgent challenge of ensuring world food security.”¹²⁷ The United States should also lead the development of open-access global digital platforms for agricultural data standards and structures, technology approaches, and knowledge management developed in partnership with American universities and with global reach and influence.



Job Saliso Chiyangaya feeds his animals in Zambia. Credit: Heifer International.

RECOMMENDATION 3



Pauline Kamau stands in the new processing facility of her Kenyan milling business, Sopa Supplies. Credit: TechnoServe.

Productively partner with committed companies to amplify the power of the private sector to transform food and nutrition security, from individual entrepreneurs to multinational businesses.

As explored in Part III, marshaling the knowledge, ideas, market reach, energy, and financial resources of the private sector is essential to enhancing global food and nutrition security in the face of today's challenges. Private businesses are at the core of creating jobs and increasing income opportunities all along the value chain, from family farms to city supermarkets. Existing programs have initiated efforts to partner with private investors, but there is significant potential to accelerate and expand these efforts to better harness private-sector involvement in tackling these challenges. The US administration should take several actions.

Action 3A: Form strong public-private partnerships to harness the private sector's strengths and spur inclusive and sustainable growth in smallholder agriculture and food systems in low-income countries.

Advancing global food and nutrition security will depend on the innovation and expertise from the private sector and the scale of its involvement. Yet for numerous businesses, a lack of incentives or enabling policy environment impedes their ability to engage. To leverage and enable private-sector engagement, the United States should identify and

Marshaling the knowledge, ideas, market reach, energy, and financial resources of the private sector is essential to enhancing global food and nutrition security in the face of today's challenges. Private businesses are at the core of creating jobs and increasing income opportunities all along the value chain, from family farms to city supermarkets.

promote areas where the strengths and involvement of the private sector can make a difference. Such areas include building and strengthening agricultural value chains that bring more food—especially nutritious foods—to market; diversifying income opportunities; and creating jobs for youth and women in processing, storage, transport, cold chains, input supplies, value addition, finance, and wholesale and retail trade of agriculture-related products. For example, the United States should use tax incentives, reductions in regulations, trade incentives, or agreements to promote engagement by the private sector in priority low-income countries. The United States could incentivize multinational investment by US investors through tax and regulation harmonization and tax credits. OPIC mobilizes private capital in emerging markets and could play a leading role in enacting new policy mechanisms to incentivize private investment and engagement.

The United States should also create or expand challenge programs that incentivize the private sector to develop creative, effective, and sustainable solutions to the world's most pressing food and nutrition security challenges. Programs that could be expanded or replicated include the Grand Challenges as well as AgResults, a \$118 million multidonor, multilateral initiative created at the 2010 G20 Summit that offers competitive, results-based

economic incentives to private actors to spur the development, pilot testing, and adoption of new agricultural technologies that promote global food security, health, and nutrition. Such innovative programs should be further leveraged or scaled.¹²⁸

Action 3B: Strengthen and open the environment for investment, action, and collaboration.

Without an enabling environment within low-income countries, private-sector action and investment is difficult. The United States should work with local governments to build capacity to improve policies for private investment in agriculture and value chain activities. Such policies include moving towards open markets, removing distortions, reducing and eliminating corruption, and providing greater opportunities for farmers. Given that private-sector partners play a key role in the US global food security strategy, the United States should develop metrics that track cost sharing in US agricultural development activities by the American private sector.

Rising incomes and changing food demand in low-income countries mean that trade is an integral component to ensuring adequate food supply for consumers and market access for smallholder farmers. Trade also presents an opportunity for US farmers and businesses to expand into new markets.¹²⁹ Smart trade policy can remove obstacles across nearly every facet of the food system, from improving farmers' access to necessary inputs to easing the movement of food across regional borders.¹³⁰

To promote trade as an economic development tool, the United States should develop programs that help increase the efficiency of regional trade through consistent processes and improved food safety and phytosanitary standards. These efforts not only promote regional trade, they also protect US consumers: the US Food and Drug Administration (FDA) is increasingly working with its global counterparts as well as international organiza-



Lettuce harvesting in Intibuca, Honduras. Credit: Fintrac Inc.

tions and global industry more broadly to promote the safety and quality of food. Similarly, USDA's Animal and Plant Health Inspection Service develops and advances science-based standards with US trading partners.

The United States should also work with countries to help them reduce or remove tariff and nontariff barriers and unnecessary border restrictions and improve cross-border infrastructure and capacity. Such measures would encourage national and regional investment from the private sector while also improving the cross-border flow of food regionally.

Investments in sectors related to agriculture such as infrastructure, logistics, and energy also play a key role in advancing agricultural development. The United States should enhance and better coordinate US government, multilateral, and other bank investments

Investment in agriculture is often constrained, as many institutions and investors still lack a specialization to deal with agricultural risk, and they find easier investment opportunities in other sectors.

in infrastructure, including roads, ports, irrigation, water management, cold storage, markets, electricity, and information and communications technology.

Action 3C: Increase access to finance and mitigate the risks that undermine opportunities for investors.

US policy measures as well as those of low-income countries can help reduce risks that impede investors' ability to invest in emerging market food systems. The United States should support the development of national or multilateral mechanisms to mitigate political, currency, and weather-related risks for potential US investors in low-income countries' agriculture and food systems.

Investors are not the only stakeholders facing risks. Farmers and entrepreneurs, particularly smallholder farmers and entrepreneurs operating small rural enterprises in low-income countries, face numerous risks that impede their productivity and success. In partnership with other national governments, the United States should aim to mitigate risk both for local farmers and rural entrepreneurs. For example, the United States should further expand financial tools such as crop and weather insurance programs, mobile money, and digital payments. The United States should also support programs that address the key constraints faced by women and youth entrepreneurs, especially access to credit, land, and technologies, and that empower women to make credit and other financial decisions.

Agriculture is a sector fraught with risks, but these risks are also managed with specialized financial mechanisms. Despite this, investment in agriculture is often constrained, as many institutions and investors still lack a specialization to deal with agricultural risk, and they find easier investment opportunities in other sectors. To alleviate this, the United States should increase the scope and reach of instruments that help local financial institutions better assess agricultural risk and mitigate that risk. At the same time, the US should support the continued development of creative mechanisms aimed at reducing risk and encouraging private investment in food security activities using local government agencies and appropriate financial institutions.

RECOMMENDATION 4



A researcher from the International Institute of Tropical Agriculture harvests a cassava root from a farm in Abuja, Nigeria. Credit: Milo Mitchell/IFPRI.

In strategic alignment with foreign policy goals, ensure that US agriculture and nutrition assistance programs are efficient and support low-income countries' capacity to implement responsible and effective policies.

Leaders in low-income countries understand that growth of the agriculture sector is a primary path to improved health, prosperity, and well-being. However, in some countries governments often underinvest in their own agricultural systems and policies, significantly hampering the potential of development assistance to trigger long-term change and often making private-sector investment difficult or impractical.

Moreover, any US-led program to advance food and nutrition security is transitional by its very nature. Ultimately, national governments must be able and willing to carry the mantle of maintaining a strong agricultural sector and nourishing their population. But their ability to do so will depend on support and partnership with the United States today, with the United States holding countries accountable for their own commitments and programs' outcomes.

Thus, going forward the US government should encourage and use mechanisms to stimulate greater government investments in these countries' own systems as well as new mechanisms for accountability. To do this, the administration, together with Congress, should take several actions.

Action 4A: Strengthen the effectiveness of development assistance through strong commitment to monitoring, learning, and evaluation for accountability.

Effective development assistance requires rigorous monitoring and evaluation, which includes a focus on desired outcomes beginning from a program's onset. Significant improvements have been made in tracking progress under US-funded development programs. As technology and methodology improve, so should our ability to measure and attain desired outcomes. Many programs have demonstrated their effectiveness for agricultural development and the improvement of nutrition outcomes. This progress should continue, and other areas can undergo targeted efforts for improvement to ensure that US assistance programs are both effective and efficient.

Agricultural development depends on farmers' ability to benefit from agricultural R&D such as new practices or technologies. Yet farmers in low-income countries, particularly smallholder farmers, often never learn of or get access to these developments and are unable to reap the benefits, limiting their productivity and income. The United States should support local agricultural research and adaptation of globally relevant breakthroughs, including through challenge funds, and strongly encourage national investment in agricultural research. Scaling up extension and education services by better training and equipping extension workers and by using novel cell phone and video capabilities alongside radio would significantly enhance content sharing, interoperability, and reach farmers more effectively. Women farmers and young farmers in particular should benefit from agricultural research and training. Extension and education services should be customized for specific demographic groups to ensure that the information reaches those who need it.

To alleviate malnutrition in all its forms, countries' nutrition programs must not only be strong, but also well targeted for greatest effectiveness. The United States, alongside its partners within national governments, should strengthen nutrition programs focused on the 1,000 days from a woman's pregnancy through her child's second birthday—a crucial period that sets the nutritional foundation for the child's cognitive and physical development through all the days that follow. This period should be a priority for low-income and high-income countries alike, including the United States. As noted in Part I, investments in nutrition have a tremendous return. Research shows that \$1 spent in nutrition yields \$16 in productivity returns.¹³¹

Women's and children's nutrition also depends on numerous health, economic, and social factors. The United States and its partners should therefore prioritize programming that expands economic, health, and education opportunities for women, including adolescent girls. In parallel, they should strengthen programs aimed at childhood nutrition, with a greater focus on obesity and diet-related chronic diseases.

As youth populations become an increasingly prominent demographic in low-income countries, the United States should more directly define and measure youth engagement in agricultural development activities and use the findings to inform program design and

Nutrition programs focused on the 1,000 days from a woman's pregnancy through her child's second birthday—a crucial period that sets the nutritional foundation for the child's cognitive and physical development—should be a priority for low-income and high-income countries alike, including the United States.

evaluate success. The Women's Empowerment in Agriculture Index (WEAI) was launched in 2012 by the International Food Policy Research Institute, Oxford Poverty and Human Development Initiative, and USAID and serves as a useful tool to inform global food security programs and advance women's empowerment within food and nutrition security programs.¹³² The United States should develop and adopt a similar index to measure and monitor youth engagement, establishing a "Youth Empowerment in Agriculture Index."

Action 4B: Build national governments' capacity to prioritize, implement, manage, and measure their agricultural and nutrition policies, strategies, and goals for long-term effectiveness.

For long-term sustainability and success, country ownership is the immutable goal of US global food and nutrition security efforts. Country-led programs are a cornerstone of Feed the Future, and the monitoring, evaluation, and reporting of outcomes is a priority. The administration should ensure that monitoring and evaluation of programs in Feed the Future focus countries continue through the completion of their respective compacts to inform national planning and continuous improvement of efforts to advance food and nutrition security.

Well-founded targets for countries' programs have been established through multilateral efforts. Yet countries may need assistance in their capacity to reach these targets. The United States should provide technical assistance to help build countries' capacity to meet key national nutrition targets. For example, in 2012 the World Health Assembly endorsed

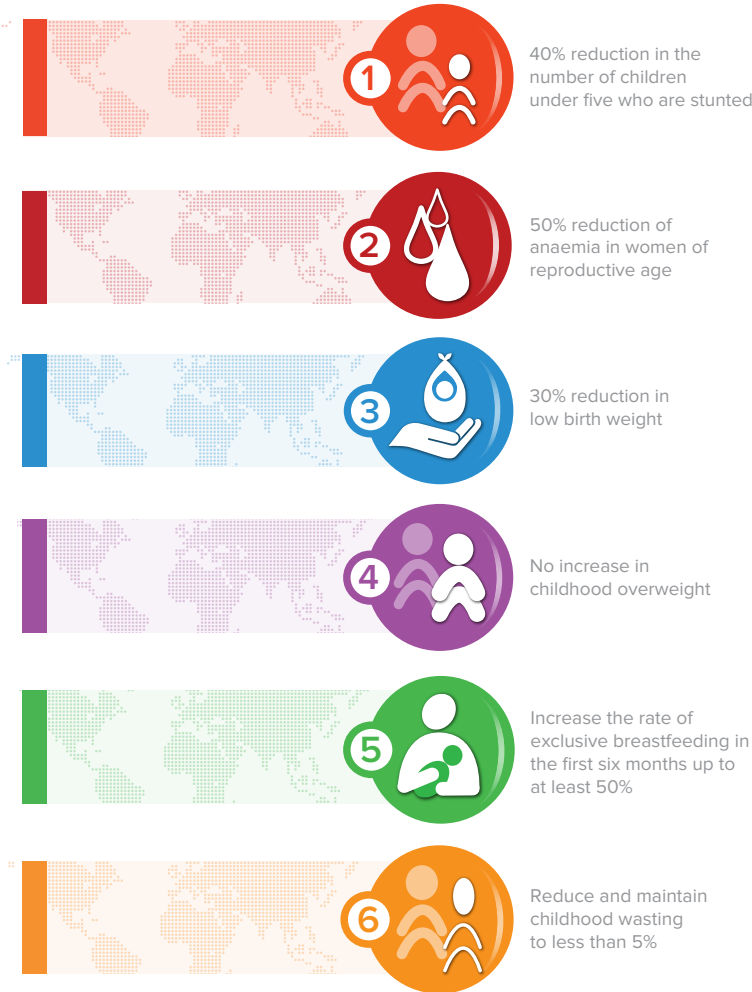
six global nutrition targets for countries to reach by 2025 to improve maternal and early childhood nutrition.¹³³ The Scaling Up Nutrition (SUN) Movement launched in 2010 puts forth a strategy, most recently in 2016, giving countries a road map to meet the World

Accomplishing national goals for agricultural development and nutrition are interlinked and depend on holistic policies.

Health Assembly targets (see figure 7) and the SDGs.¹³⁴ In order for countries to meet these targets, the United States should work closely with national governments to build their capacity to implement effective nutrition and health policies and programs.

Accomplishing national goals for agricultural development and nutrition are interlinked and depend on holistic policies. The United States should encourage governments to develop agriculture and nutrition policies not only with the ministries of agriculture and health, but also of commerce, industry, energy, environment, and water.

Figure 7 - World Health Assembly Global Nutrition Targets 2025



Source: WHO, 2014.

More broadly, the United States should help governments strengthen their capabilities to hold themselves and each other accountable. For example, “scorecard” mechanisms such as the one under development by the AU can measure nations’ progress on nutrition and agricultural development and provide a useful and effective mechanism for national governments to hold each other accountable to their commitments to agricultural development and food and nutrition security.¹³⁵

The United States should support the strengthening of key national government efforts, including extension services, research systems, land governance and titling, water and energy infrastructure investment, evidence-based policymaking, policy evaluation, and finance as well as cooperation among these efforts. The United States should work with governments to continue to mobilize additional domestic revenues and, where appropriate, to allocate more domestic funding to agriculture, nutrition, and other food security–related issues. The United States should condition some of its development assistance on strong commitment to and national investment in agriculture and nutrition to ensure effective, responsible, and sustainable programs.

Conclusion

The challenges of the 21st century are complex and represent a threat to US and global security and prosperity. Growing populations that become both increasingly urban and, in key regions, ever younger will test the ability to meet global food demand. A changing climate and related threats from weather volatility, water scarcity, and other natural resource

We stand poised to gain immensely from strong investment in food and nutrition security, helping to ensure US national security and expanded market opportunities for US farmers and businesses around the world.

pressures will test even the most resourceful farmers. A rising “triple burden of malnutrition” puts new strains on national and global health systems. And all the while, too many millions live in desperate poverty and lack sufficient amounts of safe and nutritious food.

Yet we also stand poised to gain immensely from strong investment in food and nutrition security, helping to ensure US national security and expanded market opportunities for US farmers and businesses around the world. Meeting the challenges will require strong leadership. The United States must mobilize the might of its farmers, entrepreneurs, universities and research institutions, and business community alongside our allies around the world to solve problems in harmony with market forces. And it must inspire and support our researchers and innovators. The aim is not only to address threats but also to meet and beat the challenges of today so that our grandchildren cannot conceive of a world where hunger and malnutrition ever existed. The world has never been more capable, equipped, and better poised to end global hunger and malnutrition than it is today. Now is the time to commit to the leadership necessary to achieve a food-secure world once and for all.

About the Chicago Council on Global Affairs

The Chicago Council on Global Affairs is an independent, nonpartisan organization that provides insight—and influences the public discourse—on critical global issues. We convene leading global voices and conduct independent research to bring clarity and offer solutions to challenges and opportunities across the globe. Ranked the #1 Think Tank to Watch worldwide, the Council on Global Affairs is committed to engaging the public and raising global awareness of issues that transcend borders and transform how people, business, and governments engage the world. Learn more at thechicagocouncil.org and follow @ChicagoCouncil.

The Global Food and Agriculture Program, launched in 2008 and expanded in 2010, aims to build support and provide policy innovation and accountability for a long-term global commitment to agricultural development and food and nutrition security as a means to alleviate global poverty. It aims to maintain the policy impetus towards a renewed US focus on agricultural development, provide technical assistance to agricultural development policies' formulation and implementation, and offer external evaluation and accountability for US progress on food security. Douglas Bereuter, president emeritus of The Asia Foundation, and Dan Glickman, former secretary of US Department of Agriculture, provide strategic leadership as cochairs and are supported by an advisory group comprised of leaders from the government, business, civic, academic, and NGO sectors. For further information, please visit thechicagocouncil.org/globalagdevelopment.

Independent Task Force on Global Food Security Biographies

Cochairs

Douglas Bereuter

President Emeritus, The Asia Foundation

Former Member, US House of Representatives, Nebraska

Douglas Bereuter is president emeritus of the Asia Foundation, a nongovernmental development organization he led for more than six years following his 26-year service as a member of the US House of Representatives. During his congressional career, he was a leading member of the House International Relations Committee, where he served as vice chairman for six years, chaired the Asia-Pacific Subcommittee and later the Europe Subcommittee, had long tenures on its subcommittees on Economic Policy & Trade and Human Rights, and was president of the NATO Parliamentary Assembly. He also served on the House Financial Services Committee for 23 years and on the House Permanent Select Committee on Intelligence, retiring as its vice chairman. Mr. Bereuter graduated Phi Beta Kappa from the University of Nebraska and has master's degrees from Harvard University in both city planning and public administration. He served as an infantry and intelligence officer in the US Army, practiced and taught graduate courses in urban and regional planning, led various agencies and programs in the Nebraska state government, and served one four-year term as a Nebraska state senator. He is a member of the Council on Foreign Relations, the World Affairs Council of Northern California, and served six years on the State Department's International Security Advisory Board. He also serves on the boards of the Arbor Day Foundation and the Nebraska Community Foundation.

Dan Glickman

Former US Secretary of Agriculture

Former Member, US House of Representatives, Kansas

Senior Fellow, The Bipartisan Policy Center

Vice President, The Aspen Institute

Dan Glickman is a cochair of the Council's Global Food and Agriculture Program. He is vice president of the Aspen Institute and executive director of the Aspen Institute Congressional Program, which was established in 1983. Mr. Glickman also serves as a senior fellow at the Bipartisan Policy Center, where he is cochair of its Democracy Project. He chairs the Foundation for Food and Agriculture Research, created in the 2014 Farm Bill to fund new and innovative research projects in the areas of food and agriculture. Prior to joining the Aspen Institute, Glickman served as US secretary of agriculture in the Clinton administration. He also represented the 4th congressional district of Kansas for 18 years in the US House of Representatives, where he was very involved in federal farm policy on the House Agriculture Committee. He also served on the House Judiciary Committee as chairman of the House Permanent Select Committee on Intelligence. In addition, he is the former chairman of the Motion Picture Association of America, Inc. and former director of the Institute of Politics at Harvard University's John F. Kennedy School of Government. Mr. Glickman

has served as president of the Wichita, Kansas, school board; was a partner in the law firm of Sargent, Klenda, and Glickman; and worked as a trial attorney at the US Securities and Exchange Commission. He received his BA in history from the University of Michigan and his JD from the George Washington University. He is a member of the Kansas and District of Columbia bars.

Members

Catherine Bertini

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Catherine Bertini is a distinguished fellow at the Chicago Council on Global Affairs. For five years she cochaired the Council's Global Agricultural Development Initiative. She also chaired the Council's Girls in Rural Economies project and cochaired the Council's work on domestic agriculture. Ms. Bertini is also a professor of public administration and international affairs at the Maxwell School of Citizenship and Public Affairs at Syracuse University. She previously served as UN under secretary-general for management (2003 to 2005) and as executive director of the UN World Food Program, the world's largest international humanitarian agency (1992 to 2002). Ms. Bertini also chaired the UN System Standing Committee on Nutrition. For two years she was senior fellow, agricultural development, at the Bill & Melinda Gates Foundation. Before serving in the UN, Ms. Bertini was USDA assistant secretary for food and consumer services, where she ran the nation's then \$33 billion domestic food assistance programs. Ms. Bertini is the 2003 World Food Prize Laureate. She was a presidential appointee to the Board for International Food and Agricultural Development and is a Stuart Family Foundation board member. She is a board member of the Tupperware Brands Corporation and the Global FoodBanking Network, a member of the senior management board of the CGIAR, and on the Leadership Council for IFPRI's Compact 2025.

James C. Borel

Former Executive Vice President, DuPont

Jim Borel has over 38 years of experience in the global agriculture and food industry. He served as executive vice president and member of DuPont's Office of the Chief Executive until early 2016, where he had responsibility for the DuPont Pioneer, Crop Protection and Nutrition & Health businesses. He joined DuPont in 1978 as a sales representative and during his career held a variety of progressively responsible roles in the agriculture businesses in the United States, United Kingdom, Canada, and Japan.

Mr. Borel is currently advising selected venture capital and private equity firms regarding their agriculture and food industry investments, including as a member of the board of directors of Farmers Edge, the board of directors for Neogen, and the board of advisors for Arsenal Capital Partners. He is a past chair of the board of trustees for National 4-H Council. He is also a member of the board of trustees of the University of Delaware, the Farm Foundation, and the Alpha Gamma Rho Educational Foundation as well as the board of advisors for AGree. He is a credentialed Board Governance Fellow by the National Association of Corporate Directors. Mr. Borel graduated from Iowa State University with a degree in agricultural business.

Euler Bropleh

Founder and Managing Director, VestedWorld

A Liberian native educated in the United States and abroad who has traveled extensively throughout Africa, Asia and Europe, Mr. Bropleh understands firsthand how access to capital has the potential to transform the developing world and improve the lives of all people. In his career as an attorney, he specialized in corporate transactions with leading law firms Latham & Watkins and Vedder Price, representing Fortune 100 companies, venture capital and private equity firms and emerging businesses worldwide. As an angel investor, he's helped fund several early stage businesses in Sub-Saharan Africa, developing an acute understanding of the challenges and opportunities associated with early stage investing in emerging markets.

Now the Managing Director of VestedWorld, Euler is diligent about helping early stage companies reach their full potential. One of his key duties is to ensure that VestedWorld is a trusted steward of its investors' capital and a true partner to its portfolio companies.

Euler holds a JD from University of Chicago Law School, where he was a Donald E. Egan Scholar and the recipient of the Ann Watson Barber Outstanding Service Award. He was also a Robert T. Jones Scholar at the University of St. Andrews (Scotland), where he earned a graduate diploma in international strategy and economics. He earned his BA in international studies from Emory University, where he was a Sonny Carter Scholar.

Thomas A. Daschle

Founder and CEO, The Daschle Group

Senator Daschle is the founder and CEO of The Daschle Group, A Public Policy Advisory of Baker Donelson. The Daschle Group is a full-service strategic advisory firm that advises clients on a broad array of economic, policy, and political issues.

Senator Daschle has participated in the development and debate of almost every major public policy issue of the last three decades. In 1978 he was elected to the US House of Representatives, where he served for eight years. In 1986 he was elected to the US Senate and was chosen as Senate Democratic leader in 1994. Senator Daschle is one of the longest serving Senate Democratic leaders in history and one of only two to serve twice as both majority and minority leader.

During his tenure, Senator Daschle navigated the Senate through some of its most historic economic and national security challenges. In 2003 he chronicled some of these experiences in his book, *Like No Other Time: The 107th Congress and the Two Years That Changed America Forever*. In the 2013 release of *The US Senate: Fundamentals of American Government*, Senator Daschle explores the inner workings of this important part of the legislative branch. In his latest book, *Crisis Point*, Senator Daschle and former Senate majority leader Trent Lott explore the political gridlock in Washington and offer their vision for moving the country forward.

Since leaving the Senate, Senator Daschle has remained an active and learned voice among policymakers. As a well-known expert on health policy reform, he has written two books: *Critical: What We Can Do About the Health-Care Crisis and Getting It Done* and *How Obama and Congress Finally Broke the Stalemate to Make Way for Health Care Reform*.

Senator Daschle has also emerged as a leading thinker on climate change, food security, and renewable energy policy. He serves on both advisory and governing boards of a number of corporate and nonprofit organizations and currently co-chairs The Cuba Consortium, an organization dedicated to an improved relationship with the people of Cuba.

In 2007 Senator Daschle joined with former majority leaders George Mitchell, Bob Dole, and Howard Baker to create the Bipartisan Policy Center, an organization dedicated to finding common ground on some of the pressing public policy challenges of our time. Senator Daschle is chair of the board of directors at the Center for American Progress and vice-chair for the National Democratic Institute. He serves on the board of Edward M. Kennedy Institute and the LBJ Foundation. He also is a member of the Health Policy and Management Executive Council at the Harvard School of Public Health and the Council of Foreign Relations.

Born in Aberdeen, South Dakota, Senator Daschle attended South Dakota State University, graduating in 1969. He then served for three years as an intelligence officer in the US Air Force Strategic Command. Following his military service, he spent five years as an aide to South Dakota Senator James Abourezk. After leaving the Senate in 2005, Senator Daschle joined Alston & Bird LLP as a special policy advisor and then went on to work in the same role at DLA Piper before establishing The Daschle Group in 2014. He is married to Linda Hall Daschle and has three children and six grandchildren.

Tony Fratto

Partner, Hamilton Place Strategies

Through his work at Hamilton Place Strategies (HPS), the US Treasury Department, and the White House, Mr. Fratto has accumulated decades of experience in domestic and international economic policy. He founded Hamilton Place Strategies in 2009. The communications consulting firm brings an analytical approach to solving complex public policy issues. At HPS he directs the firm's business strategy and leads client teams in highly regulated sectors, especially in finance and international economic policy.

Before founding HPS, Mr. Fratto worked at the White House as deputy assistant to the president and principal deputy press secretary. He worked directly with the president and the administration's senior economic policy, national security, and legal teams, communicating on international and domestic policy issues to national and foreign media.

Prior to his time at the White House, Mr. Fratto served at the US Treasury Department, including as assistant secretary of the Treasury. In this capacity, he led the administration's communications strategy for addressing major economic policy issues, including financial crises, tax policy, and international development programs.

Mr. Fratto served in senior roles with three US Treasury secretaries, leading on activities including G7 and G20 finance ministers meetings; IMF and World Bank meetings; and preparation for congressional testimony, media interviews, and speeches.

Combining his work at the Treasury and the White House, Mr. Fratto directed and participated in communications efforts in more than 60 countries around the world. He is especially proud of his work to advance major international initiatives, including multiple trade agreements, creation of the Millennium Challenge Corporation, debt cancellation for highly indebted poor countries, and global health initiatives to fight HIV/AIDS and malaria.

In addition to his role with Hamilton Place Strategies, Mr. Fratto serves on the boards of World Food Program USA, Center for Global Development, Care Action!, and Fundação Dom Cabral. He is an on-air contributor with the CNBC Business News Network, regularly commenting on current economic policy issues. He is also a member of the Bretton Woods Committee and The Economic Club of Washington, DC.

Born and raised in Pittsburgh, Pennsylvania, Tony received his bachelor's degree in economics from the University of Pittsburgh and attended the university's Graduate School of Public and International Affairs.

Rikin Gandhi

CEO, Digital Green

Rikin Gandhi is CEO of Digital Green. His interests include sustainable agriculture and technology for socioeconomic development. He received a master's in aeronautical and astronautical engineering from MIT and a bachelor's in computer science from Carnegie Mellon University. Mr. Gandhi is a licensed private pilot and received patents for linguistic search algorithms that he helped develop at Oracle. He ventured to rural India to start a social enterprise to develop biofuels. He then joined Microsoft Research as a researcher in the Technology for Emerging Markets team that incubated Digital Green. Digital Green is now an independent, not-for-profit organization with support from the Bill & Melinda Gates Foundation, USAID, DFID, Google, and others.

Aubrey Hruby

Senior Visiting Fellow, Africa Center, Atlantic Council; Coauthor, The Next Africa

Aubrey Hruby is a partner at Baylis Emerging Markets fund, cofounder of the Africa Expert Network (AXN) and an advisor to investors and Fortune 500 companies doing business in Africa. She designs market entry strategies, sources opportunities, and facilitates transactions. Ms. Hruby leads CEO-level delegations to Africa and has worked in more than 25 African markets. As a senior fellow at the Atlantic Council and advisor to the Wharton Social Impact Initiative, she speaks regularly on African business issues. She has interviewed with *The New York Times*, *The Wall Street Journal*, National Public Radio, Al Jazeera, Bloomberg Radio, CNBC, CCTV, Africa24, and VoiceAmerica Business. She writes regularly for the *Financial Times* and *Newsweek*. Ms. Hruby is a term member of the Council on Foreign Relations, a Young Leader at the Milken Institute and the coauthor of the award-winning book *The Next Africa* (July 2015, Macmillan). She earned an MBA from the Wharton School at the University of Pennsylvania and a MA from Georgetown University.

A.G. Kawamura

Cochair, Solutions from the Land

A.G. Kawamura is a third generation grower and shipper from Orange County, California. From 2003 to 2010 he was the secretary of the California Department of Food and Agriculture. He is cochair of Solutions From the Land, a nationally acclaimed nonprofit that is developing innovative and sustainable collaborations for 21st century agriculture. He serves on several boards and committees, including the Ag Advisory Committee for the AGrEE Initiative; the Board on Agriculture and Natural Resources, a policy arm of the National Academy of Sciences' Natural Resource Council; American Farmland Trust Board; Farm Foundation Round Table; and the Western Growers Association Board as former

chair. Mr. Kawamura serves on the boards of the Delta Vision Foundation and the Southern California Water Committee. For over 35 years he has pursued a lifelong goal to work towards an end to hunger and malnutrition. He has worked closely with Second Harvest and Orange County Food Banks to create exciting projects that address nutrition and hunger. As a progressive urban farmer, Mr. Kawamura has a lifetime of experience working within the shrinking rural and urban boundaries of southern California. Through their company, Orange County Produce, LLC, he and his brother Matt are engaged in building an interactive, 21st century 100-acre agricultural showcase at the Orange County Great Park in Irvine, California.

Janet Napolitano

President, University of California

Janet Napolitano was named the 20th president of the University of California on July 18, 2013, and took office on Sept. 30, 2013. She leads a university system with 10 campuses, five medical centers, three affiliated national laboratories, and a statewide agriculture and natural resources program. Ms. Napolitano is a distinguished public servant with a record of leading large, complex organizations at the federal and state levels.

She served as secretary of Homeland Security from 2009-13, as governor of Arizona from 2003-09, as attorney general of Arizona from 1998-2003, and as US attorney for the District of Arizona from 1993-97. Before that she practiced at the law firm of Lewis & Roca in Phoenix, where she became a partner in 1989. She began her career in 1983 as a clerk for Judge Mary M. Schroeder of the US Court of Appeals for the Ninth Circuit.

As governor of Arizona, Ms. Napolitano focused on education, from pre-kindergarten through public higher education. She was the first woman to chair the National Governors Association and was named one of the nation's top five governors by *Time* magazine.

She earned a B.S. degree (summa cum laude in political science) in 1979 from Santa Clara University, where she was Phi Beta Kappa, a Truman Scholar and the university's first female valedictorian. She received her law degree in 1983 from the University of Virginia School of Law. Ms. Napolitano holds honorary degrees from several universities and colleges, including Emory University, Pomona College, and Northeastern University. In 2010 she was awarded the prestigious Thomas Jefferson Foundation Medal (Law), the University of Virginia's highest external honor.

Steven Radelet

Donald F. McHenry Chair in Global Human Development and Director of the Global Human Development Program, Edmund A. Walsh School of Foreign Service, Georgetown University

Steven Radelet is a development economist whose work focuses on economic growth, poverty reduction, foreign aid, and debt, primarily in Africa and Asia. Professor Radelet has extensive experience as a policymaker in the US government—as an adviser to developing country leaders and as a researcher, teacher, and writer. He previously served as chief economist for USAID, senior adviser for development to secretary of state Hillary Clinton, and deputy assistant secretary of the Treasury for Africa, the Middle East, and Asia. He currently serves as an economic adviser to President Ellen Johnson Sirleaf of Liberia. He spent four years as an adviser to the Ministry of Finance in Jakarta, Indonesia, and two years as adviser in the Ministry of Finance in The Gambia. He was a Peace Corps volun-

teer in Western Samoa. From 2002 to 2009 Dr. Radelet was senior fellow at the Center for Global Development. From 1990 to 2000 he was on the faculty of Harvard University, where he was a fellow at the Harvard Institute for International Development (HIID) and a lecturer on economics and public policy. He is author of *The Great Surge: The Ascent of the Developing World*, *Emerging Africa: How 17 Countries Are Leading the Way*, the textbook *Economics of Development*, and dozens of other publications.

Christina Sass

Cofounder and COO of Andela

Christina Sass is cofounder and COO of Andela, or as CNN has called it, “The startup that’s harder to get into than Harvard.” Founded on the idea that brilliance is evenly distributed but opportunity is not, Andela’s mission to find and empower the next generation of global technology leaders. Specifically, Andela aims to train 100,000 world-class software developers in Africa over the next 10 years. To do so, Andela created a new model of education that funds itself through the work it does: training brilliant young software developers and placing them with top international companies. With a .6% acceptance rate, Andela is the most selective tech training program in Africa and has been featured by Wired, CNN, *The Today Show*, *The New Yorker*, *The Wall Street Journal*, and others.

Prior to founding Andela, Ms. Sass built education and employment programs in China, Gaza and the West Bank, Kenya, and in her home state of Georgia. During her three years directing the Program Department at The Clinton Global Initiative, she worked closely with President Clinton and his office to design and execute CGI meetings featuring over 1,200 attendees and 250 speakers. Ms. Sass worked with Fortune 500 CEOs, nobel laureates, heads of states, and other global leaders to advance CGI’s Commitments to Action with a particular focus on empowerment of girls and women. Ms Sass also served as senior advisor to the president and CEO of The MasterCard Foundation, a private foundation based with over \$12 billion in assets working to advance education, employment, and financial inclusion in Africa. There she focused on cultivating partnerships from within the foundation’s portfolio to create better pipelines for youth across Africa from education into employment working with Ashesi University, African Leadership Academy, Equity Bank, the IFC, and more.

Ms Sass serves on the advisory council of the NYU Stern Center for Business and Human Rights and on the board of the nonprofit Global Give Back Circle. She has also served as education topic expert for the Clinton Global Initiative University annual meeting. She was named as a 2014 *New York Business Journal* “Women of Influence,” a 2015 Business Insider “23 most innovative and inspiring women in New York City Tech,” and a 2015 University of Georgia “40 Under 40” alumni. Ms Sass has a BA in ancient philosophy from the University of Georgia (Go Dawgs) and a MA in international law and diplomacy from the Fletcher School at Tufts University.

Rajiv Shah

President, The Rockefeller Foundation

Dr. Shah brings over 20 years of experience in business, government, and philanthropy to the Rockefeller Foundation. Appointed as USAID administrator by President Obama in 2009 and unanimously confirmed by the Senate, Dr. Shah was charged with reshaping the \$20 billion agency’s operations to provide greater assistance to pressing development

challenges around the globe. By elevating the importance of innovation, promoting public-private partnerships, rethinking internal practices, and shifting how dollars were spent to deliver stronger results, Dr. Shah secured bipartisan support that enabled USAID to dramatically accelerate its work to end extreme poverty. Despite partisan gridlock on many issues, two significant presidential priorities—Feed the Future and Power Africa—passed the House and Senate with bipartisan support and were signed into law by President Obama. The Global Food Security Act is the second largest global development legislation after PEPFAR. Dr. Shah’s work delivered results for countries facing democratic transitions, post-conflict situations, and humanitarian crises and is widely credited with providing life-saving access to food, health, and water for millions of children across the planet.

When Dr. Shah left USAID in 2015, he continued to follow his passion for creating opportunities for communities to thrive in the developing world by founding Latitude Capital, a private equity firm focused on power and infrastructure projects in Africa and Asia. He was also appointed a distinguished fellow in residence at Georgetown University.

Raised outside of Detroit, Michigan, Dr. Shah is a graduate of the University of Michigan at Ann Arbor, the University of Pennsylvania School of Medicine, and the Wharton School of Business. Prior to his appointment at USAID, he served as chief scientist and under-secretary for Research, Education, and Economics at the United States Department of Agriculture. He also served in a number of leadership roles at the Bill & Melinda Gates Foundation, where he helped launch the Alliance for a Green Revolution in Africa (a joint venture by the Gates and Rockefeller foundations) and the International Financing Facility for Immunization (credited with raising more than \$5 billion for childhood immunizations worldwide) and supported the creation of the Global Development Program. He and his wife, Shivam Mallick Shah, have three children.

Ann M. Veneman

Executive Director, UN Children’s Fund (2005-2010)
United States Secretary of Agriculture (2001-2005)

Ann M. Veneman has a distinguished career in public service, serving as the executive director of the United Nations Children’s Fund (UNICEF) from 2005 to 2010 and as the US secretary of agriculture from 2001 to 2005. Veneman’s leadership and vision has been recognized both nationally and internationally. In 2009 she was named to the Forbes 100 Most Powerful Women list, and she has been the recipient of numerous awards and honors.

At UNICEF Veneman directed a staff of over 11,000 in more than 150 countries around the world. She worked to support child health and nutrition, quality basic education for all, access to clean water and sanitation, and the protection of children and women from violence, exploitation and HIV/AIDS. She traveled to more than 70 countries to review the plight of children; to witness the devastation caused by natural disaster, conflict, disease, and exploitation; and to advance programs aimed at improving and saving lives.

As secretary of the US Department of Agriculture (USDA), she directed one of most diverse federal agencies, with a budget of \$113 billion and 110,000 employees. She also served as secretary of the California Department of Food and Agriculture from 1995 to 1999, overseeing the state agency responsible for nation’s largest agricultural producing region. From 1986 to 1993 she served in various positions in the USDA, including deputy secretary, deputy undersecretary for international affairs, and associate administrator

of the Foreign Agricultural Service. At USDA, Veneman advanced an expanded trade agenda, food protection, progressive farm policy, responsible forest policy, and stronger nutrition programs.

Veneman currently serves on the boards of directors for Alexion and Nestlé S.A. Alexion is a global biopharmaceutical company that combines groundbreaking science with a steadfast commitment to meeting the needs of patients living with severe, life-threatening, and often ultra-rare diseases. Nestlé is the world's leading nutrition, health, and wellness company, providing consumers a wide range of food and beverage products. Veneman is also a member of the Council on Foreign Relations and The Trilateral Commission. She is a frequent speaker on a range of topics, including poverty alleviation, empowering women and girls, food security and nutrition, and global health.

Throughout her career Veneman has served on a number of advisory councils, committees, and nonprofit boards, particularly those involving higher education. Currently, she is on the boards of the National 4-H Council, the Global Innovative Health Technology Fund, and Just Capital. She is also a cochair of the Bipartisan Policy Center initiative on Obesity and Physical Activity and on the Bipartisan Policy Center Commission on Political Reform. She serves on the advisory boards of BRAC, the FEED Project, Pencils of Promise, Roosevelt House, Terra Vesco, the Chicago Council's Global Food and Agriculture Program, the Omega Women's Leadership Center, Living Goods, Runa, Full Harvest, and Aloha. She also served as a fellow at the Harvard School of Public Health and the U.C. Berkeley Goldman School of Public Policy.

A lawyer by training, Veneman has practiced law in both California and in Washington, DC. Early in her career she was a deputy public defender. Veneman holds a bachelor's degree in political science from the University of California, Davis; a master's degree in public policy from the University of California, Berkeley; and a juris doctor degree from the University of California, Hastings College of the Law. She has been awarded honorary doctorate degrees from several universities and colleges.

Global Food and Agriculture Program Advisory Group Biographies

Members

Marshall M. Bouton

President Emeritus, Chicago Council on Global Affairs

Marshall M. Bouton is president emeritus of the Chicago Council on Global Affairs, having served as its president from 2001 to 2013. Under his leadership the Council became a national and international thought leader on the subject of global agricultural development and food security.

Dr. Bouton currently serves as a member of the advisory group for the Council's Food and Agriculture Program, a member of the advisory board for Omnivore, a venture capital firm investing in Indian agricultural and food companies, and an affiliated expert of the Lugar Center focusing on issues of global food security. Dr. Bouton is a senior fellow at the Asia Society Policy Institute and at the Center for the Advanced Study of

India at the University of Pennsylvania. Dr. Bouton speaks and writes on India, Asia, and US-Asia relations.

Dr. Bouton came to the Council from Asia Society, New York, where he was executive vice president from 1990 to 2001. His previous positions include director of policy analysis for Near East, Africa, and South Asia in the US Defense Department, special assistant to the US ambassador to India, and founding US executive secretary of the Indo-US Sub-commission on Education and Culture.

He holds an AB cum laude in history from Harvard College, an MA in South Asian studies from the University of Pennsylvania, and a PhD in political science from the University of Chicago. He is married and has two grown children and three grandchildren.

Howard W. Buffett

Lecturer in International and Public Affairs, Columbia University

Howard W. Buffett is a lecturer in international and public affairs at Columbia University, where he teaches graduate courses on management innovation, philanthropy, and social value investing. Mr. Buffett also teaches at the University of Nebraska-Lincoln, lecturing on topics related to food security and agricultural policy. Before that he was the executive director of the Howard G. Buffett Foundation, which distributes over \$150 million annually to strengthen food security for vulnerable populations throughout the world.

Mr. Buffett previously served in the US Department of Defense, overseeing agriculture-based economic stabilization and redevelopment programs in Iraq and Afghanistan. For his work he received the highest-ranking civilian honor presented by the Joint Chiefs of Staff, requiring the request and approval of a combatant commander. Prior to that Mr. Buffett was a policy advisor for the White House Domestic Policy Council, where he coauthored the president's cross-sector partnerships strategy and managed the White House Partnerships for Innovation Interagency Working Group.

Mr. Buffett earned his BA from Northwestern University and his MPA in advanced management and finance from Columbia University. He is a term member of the Council on Foreign Relations and serves on a number of corporate advisory boards, including Toyota Motor North America Inc. Mr. Buffett coauthored *The New York Times* bestselling book *40 Chances: Finding Hope in a Hungry World*, which examines global agriculture and food systems challenges, drawing on his and his father's experiences while traveling in more than 70 countries across six continents.

John Carlin

*Visiting Professor and Executive-in-Resident, Kansas State University
Former Governor, Kansas*

John Carlin is currently a visiting professor/executive in resident at Kansas State University in the School for Leadership Studies, where he has taught executive leadership and practical politics since 2005. During this period, he also served as member, then chair of the Kansas Bioscience Authority. This authority was created in 2004 for the purpose of advancing the biosciences in Kansas. Mr. Carlin also chaired the Pew Trust Commission on Industrial Farm Animal Production. The commission's final report was issued in 2008 and it continues to help inform policymakers in Washington DC on key issues facing agriculture and our food supply. Mr. Carlin served 10 years as archivist of the United States after being appointed by President Clinton in 1995. He served two four-year terms as governor

of Kansas, leaving office in January of 1987. He was chairman of the National Governors Association from 1984 to 1985. Prior to being governor, he served four terms in the Kansas House of Representatives, the last term as speaker of the House. Mr. Carlin has a degree in dairy husbandry from Kansas State University.

Jason Clay

Senior Vice President, Market & Food, World Wildlife Fund

Jason Clay, senior vice president for markets and food at World Wildlife Fund (WWF), works with some of the world's largest companies to reduce their impact on the environment. In addition to his work with WWF, he is the author of 20 books and is National Geographic's first-ever Food and Sustainability Fellow. Dr. Clay created one of the first US fair-trade ecolabels and has been involved in developing many other standards for commodities such as cotton, shrimp, and sugarcane.

Early in his career, Dr. Clay received a PhD in anthropology and international agriculture as a result of his interest in sustainability from working on and then running the family farm. Over the course of his career, he worked with the US Department of Agriculture, taught at Harvard and Yale, and was awarded the 2012 James Beard Award for his work on global food sustainability. He spent 15 years working on human rights with indigenous people, refugees, and famine victims.

Gordon Conway

Professor of International Development, Imperial College London

Gordon Conway is a professor of international development at Imperial College, London, and director of Agriculture for Impact, which focuses on agricultural development in Africa. From 2005 to 2009 he was chief scientific adviser to the Department for International Development. Previously, he was president of the Rockefeller Foundation and vice-chancellor of the University of Sussex. He was educated at the universities of Wales (Bangor), Cambridge, West Indies (Trinidad), and California (Davis). His discipline is agricultural ecology. In the early 1960s, working in Sabah, North Borneo, he became one of the pioneers of sustainable agriculture. He was elected a fellow of the Royal Society in 2004 and an honorary fellow of the Royal Academy of Engineering in 2007. He was made a Knight Commander of the Order of Saint Michael and Saint George in 2005. He was recently president of the Royal Geographical Society. He has authored *The Doubly Green Revolution: Food for all in the 21st century* (Penguin and University Press, Cornell) and coauthored *Science and Innovation for Development* (UK Collaborative on Development Sciences). His most recent book *One Billion Hungry: Can we Feed the World?* was published in October 2012.

Gebisa Ejeta

Distinguished Professor of Plant Breeding & Genetics and International Agriculture, Purdue University

Executive Director, Center for Global Food Security, Purdue University

Gebisa Ejeta is Distinguished Professor of Plant Breeding & Genetics and International Agriculture and serves as executive director of the Center for Global Food Security at Purdue University. Professor Ejeta has been a member of the faculty of Purdue University since 1984. His career has been devoted to education, research, and international development, with contributions in human and institutional capacity building, technology development

and transfer, and advocacy for science in support of the cause of the poor. Professor Ejeta has served in advisory roles to several international development agencies. He currently serves on the boards of the Chicago Council on Global Affairs Global Agricultural Development Initiative, the National Academy of Sciences Board on Agriculture and Natural Resources, and the Global Crop Diversity Trust. Professor Ejeta is the 2009 World Food Prize Laureate and a recipient of a national medal of honor from the president of Ethiopia. He is a fellow of the American Association for the Advancement of Sciences, the American Society of Agronomy, and the Crop Science Society of America. Professor Ejeta has served the US government in several capacities, including as special advisor to USAID administrator Dr. Rajiv Shah and as science envoy of the US State Department. He was appointed by President Obama as member of the Board for International Food and Agricultural Development in 2010. He was more recently appointed by Secretary General Ban Ki Moon to the first UN Scientific Advisory Board.

Cutberto Garza

University Professor, Boston College

Visiting Professor, Johns Hopkins Bloomberg School of Public Health

Visiting Professor, George Washington University School of Public Health

Cutberto Garza previously held appointments as professor of pediatrics at Baylor College of Medicine and of nutrition at Cornell University (where he served as director of the Division of Nutritional Sciences and vice provost). His major research interests are in pediatric and maternal nutrition. He has worked with the United Nations University (as director of the UNU Food and Nutrition Program), World Health Organizations (WHO) and other international and national organizations. He served as chair of the WHO Steering Committee that developed the current WHO Child Growth Standards and the National Research Council's Board on International Scientific Organizations. He currently serves as chair of the Food and Nutrition Board of the National Academies of Science, Engineering, and Medicine and is a member of the National Academy of Medicine. He received the Alan Shawn Feinstein World Hunger Prize for Education and Research, awarded by Brown University in 1996, delivered the first Founders' Lecture sponsored by the American Academy of Breastfeeding Medicine in 2006, received the Conrad Elvehjem Award for Public Service in Nutrition, awarded by the American Society for Nutrition in 2008, and the Samuel J. Fomon Nutrition Award in 2011 from the American Academy of Pediatrics.

Carl Hausmann

Former CEO, Bunge North America

Carl Hausmann has more than 35 years of experience in the agribusiness and food industries and has successfully led a publicly held company in Europe as well as businesses in North America, South America, and Africa. Mr. Hausmann previously served as managing director of global government and corporate affairs of Bunge Limited ("Bunge"), a leading global agribusiness and food company, from 2010 until his retirement in 2012. Prior to that he was CEO of Bunge Europe and Bunge North America. He began his career at Continental Grain, serving in increasingly senior positions, and served as CEO at Central Soya, Cerestar USA, and Cereol SA. Mr. Hausmann served as the vice chair of the Consortium of International Agricultural Research Centers (CGIAR), a global partnership that unites organizations engaged in research for a food secure future. He currently is the vice chair

of Bioversity International, one of the 15 member centers that form the CGIAR. He is also a past president of Fediol, the European association of oilseed crushers. Mr. Hausmann received a bachelor's degree from Boston College and an MBA from the Institut Européen d'Administration des Affaires in France.

Mark E. Keenum

President, Mississippi State University

Dr. Mark Everett Keenum became Mississippi State's 19th president on January 5, 2009, following a distinguished public service career. After completing his bachelor's and master's degrees in agricultural economics at Mississippi State University (MSU), Dr. Keenum joined the university faculty in 1984 as a marketing specialist with the Mississippi Cooperative Extension Service. Two years later he accepted a position as a research associate with the Mississippi Agricultural and Forestry Experiment Station at MSU. He continued his education at the university, in 1988 receiving a doctorate in agricultural economics, and he joined the faculty of that department as assistant professor/economist. In 1989 Dr. Keenum joined the Washington DC staff of US Senator Thad Cochran as legislative assistant for agriculture and natural resources. As Senator Cochran's adviser on agricultural affairs, he worked on numerous issues important to US agriculture, including the 1990, 1996, and 2002 farm bills. From 1996 to 2006 he served as chief of staff for Senator Cochran. In this role Dr. Keenum was the chief adviser to the senator on political, legislative, and appropriations issues. He also was responsible for managing all administrative and legislative functions of Senator Cochran's Washington DC office and three Mississippi offices, including direct oversight of the US Senate Committee on Agriculture, Nutrition, and Forestry and the US Senate Committee on Appropriations. Prior to being named president of Mississippi State in November 2008, Dr. Keenum served as undersecretary of the US Department of Agriculture for two years, where he provided leadership and oversight for the Farm Service Agency, the Risk Management Agency, and the Foreign Agricultural Service. In 2014 he was appointed vice chairman of the Foundation for Food and Agricultural Research by US Secretary of Agriculture Thomas J. Vilsack. That same year along with other university presidents, he signed the Presidents' Commitment to Food and Nutrition Security at the United Nations in New York City. This marks the first time universities around the world began to share a collective focus on ending food insecurity.

Thomas R. Pickering

Vice Chairman, Hills and Company

Thomas R. Pickering, currently vice chairman at Hills and Company, retired as senior vice president, international relations, and a member of the executive council of the Boeing Company in July 2006. He served in that position for five-and-half years. Ambassador Pickering joined Boeing in January 2001 upon his retirement as US undersecretary of state for political affairs, where he had served since May 1997. Pickering holds the personal rank of career ambassador, the highest in the US Foreign Service. In a diplomatic career spanning five decades, he was US ambassador to the Russian Federation, India, Israel, El Salvador, Nigeria, and Jordan. From 1989 to 1992 he was ambassador and representative to the United Nations in New York. Pickering entered on active duty in the US Navy from 1956 to 1959 and later served in the Naval Reserve to the grade of lieutenant commander. Between 1959 and 1961 he was assigned to the Bureau of Intelligence and Research of the

State Department and later to the Arms Control and Disarmament Agency. Ambassador Pickering received a bachelor's degree, cum laude, from Bowdoin College in Brunswick, Maine, in 1953. In 1954 he received a master's degree from the Fletcher School of Law and Diplomacy at Tufts University and in 1956 a second masters from the University of Melbourne in Australia. In 2012 he chaired the Benghazi Accountability Review Board at the request of secretary of state Hillary R. Clinton, which made recommendations on responsibility for and improving security stemming from the attack on the US Mission. In 1983 and in 1986 Ambassador Pickering won the Distinguished Presidential Award and in 1996 the Department of State's highest award—the Distinguished Service Award.

Cynthia E. Rosenzweig

Senior Research Scientist, Columbia University

Dr. Cynthia Rosenzweig is a senior research scientist at the NASA Goddard Institute for Space Studies, where she heads the Climate Impacts Group. She is a senior research scientist at Columbia University's Center for Climate Systems Research and a professor in the Department of Environmental Science at Barnard College. She is the cofounder of the Agricultural Model Intercomparison and Improvement Project, a major international collaboration to improve global agricultural modeling, understand climate impacts on the agricultural sector, and enhance adaptation capacity in developing and developed countries. She is cochair of the New York City Panel on Climate Change, a body of experts convened by the mayor to advise the city on adaptation for its critical infrastructure. She co-lead the Metropolitan East Coast Regional Assessment of the US National Assessment of the Potential Consequences of Climate Variability and Change, sponsored by the US Global Change Research Program. She was a coordinating lead author of the Intergovernmental Panel on Climate Change Working Group II's Fourth Assessment Report. She is codirector of the Urban Climate Change Research Network (UCCRN) and coeditor of the First UCCRN Assessment Report on Climate Change and Cities, the first-ever global, interdisciplinary, cross-regional, science-based assessment to address climate risks, adaptation, mitigation, and policy mechanisms relevant to cities. She was named as one of "Nature's 10: Ten People Who Mattered in 2012" by the science journal *Nature*. A recipient of a Guggenheim Fellowship, she joins impact models with climate models to project future outcomes of both land-based and urban systems under altered climate conditions.

Navyn Salem

Founder & CEO, Edesia Nutrition

In 2007 Navyn Salem set out to help end the crisis of malnutrition for over 250 million children around the world by setting up a factory in Tanzania, her father's home country, that would produce ready-to-use therapeutic foods to treat severe acute malnutrition. In 2009 she expanded the vision by founding Edesia, a US nonprofit food aid manufacturer, to treat and prevent malnutrition in developing countries worldwide. Its factory in Providence, RI, produces a range of fortified, peanut-based products like Plumpy'Nut® and Nutributter® for humanitarian agencies like UNICEF, World Food Programme, USAID, and other NGOs working in emergency and conflict zones. Since production began in March 2010, Edesia has reached nearly 5 million children in 48 countries, including Somalia, Ethiopia, Guatemala, Haiti, Pakistan, and Syria. In 2012 Ms. Salem was named New England Business Woman of the Year by Bryant University, received the Roger E. Joseph Prize from Hebrew

Union College for being an outstanding humanitarian, and was awarded an honorary doctorate in social sciences from Boston College, her alma mater. In 2013 Ms. Salem received an honorary degree in business administration from Bryant University and became a trustee of Boston College. She is a member of the Chicago Council's Global Food and Agriculture Program Advisory Group, a 2014 Henry Crown Fellow of the Aspen Institute, and a member of the Aspen Global Leadership Network.

Paul E. Schickler

Retired President, DuPont Pioneer

Paul E. Schickler was president of DuPont Pioneer, the advanced seed genetics business of DuPont, from 2007 to 2017. In this role he continued to expand Pioneer's global business by remaining focused on innovation that improves local productivity and profitability of farmers in more than 90 countries. Mr. Schickler joined Pioneer in 1974 and served in a variety of finance, commercial, and administrative leadership roles, including vice president of international operations from 1999 to 2007. Mr. Schickler is a graduate of Drake University, where he received bachelor of science and master of arts degrees in business administration. He has served on the board of directors of the Cultivation Corridor, the Greater Des Moines Partnership, and the Iowa Business Council. He also served on the Iowa Partnership for Economic Progress committee. He currently serves as board chair of Grand View University, is on the board of directors of the Chicago Council on Global Affairs and The World Food Prize Foundation, and is a member of the Chicago Council's Global Agricultural Development Initiative Advisory Group. A strong contributor to the community, Mr. Schickler is an active supporter of United Way, the World Food Prize Foundation, Global Youth Institute, and Meals from the Heartland.

Lindiwe Majele Sibanda

CEO and Head of Mission, Food, Agriculture, and Natural Resources Policy Analysis Network (FANRPAN)

Dr. Lindiwe Majele Sibanda is the CEO and head of mission of the Food, Agriculture, and Natural Resources Policy Analysis Network. She works with governments, farmers, the private sector, and researchers and is currently coordinating food security policy research and advocacy initiatives aimed at making Africa a food-secure continent. She is an animal scientist by training and a practicing commercial beef cattle farmer. She has been at the forefront of the global agriculture, food security, and climate change policy agenda. She received her BSc degree at the University of Alexandria in Egypt and her MSc and PhD at the University of Reading in the UK. She has served as trustee and adviser to numerous international food security-related initiatives and institutions. Currently, she is a serving member of the United Nations (UN) Committee for Policy Development (CDP), a subsidiary body of the Economic and Social Council Committee (ECOSOC). She is a member of the African Union Commission (AUC) Leadership Council representing African civil society organizations.

Derek Yach

Chief Health Officer, The Vitality Group

Derek Yach has focused his career on advancing global health. He is chief health officer of the Vitality Group, part of Discovery Holdings Ltd. Prior to that he was senior vice president of global health and agriculture policy at PepsiCo, where he supported portfolio transformation and led engagement with major international groups and new African initiatives at the nexus of agriculture and nutrition. He has headed global health at the Rockefeller Foundation, has been a professor of Global Health at Yale University, and is a former executive director for Noncommunicable Diseases and Mental Health of the World Health Organization (WHO). At WHO he served as cabinet director under director-general Gro Harlem Brundtland, where he led the development of WHO's Framework Convention on Tobacco Control and the Global Strategy on Diet and Physical Activity. Dr. Yach established the Centre for Epidemiological Research at the South African Medical Research Council. He has authored or coauthored over 250 articles covering the breadth of global health. Dr. Yach serves on several advisory boards, including those of the Clinton Global Initiative, the World Economic Forum, and the Wellcome Trust. His degrees include an MBChB from the University of Cape Town, BSc (Hons Epi) from the University of Stellenbosch, and an MPH from the Johns Hopkins Bloomberg School of Public Health.

Acronyms

AfDB – African Development Bank

AGRF - African Green Revolution Forum

APHIS – USDA’s Animal and Plant Health Inspection Service

AU – African Union

BRICS Countries – Brazil, Russia, India, China, South Africa

CAADP – Comprehensive Africa Agriculture Development Programme

CSA – Community Supported Agriculture

DCA – Development Credit Authority

DIB - Development Impact Bond

FDA – Food and Drug Administration

GAFSP – Global Agriculture and Food Security Program

GDA – Global Development Alliance

GDP – Gross Domestic Product

GODAN – Global Open Data on Agriculture and Nutrition

Embrapa – Brazilian Agricultural Research Corporation

MDGs – Millennium Development Goals

NEPAD – New Partnership for Africa’s Development

NDB – New Development Bank

OPIC – Overseas Private Investment Corporation

P2P – Peer-to-Peer

PEPFAR – President’s Emergency Plan for AIDS Relief

SDGs – Sustainable Development Goals

SMEs – Small- and Medium-sized Enterprises

SUN – Scaling Up Nutrition

UN - United Nations

USAID – United States Agency for International Development

USDA – United States Department of Agriculture

WBCSD – World Business Council for Sustainable Development

WEAI – Women’s Empowerment in Agriculture Index

WFP - World Food Programme

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