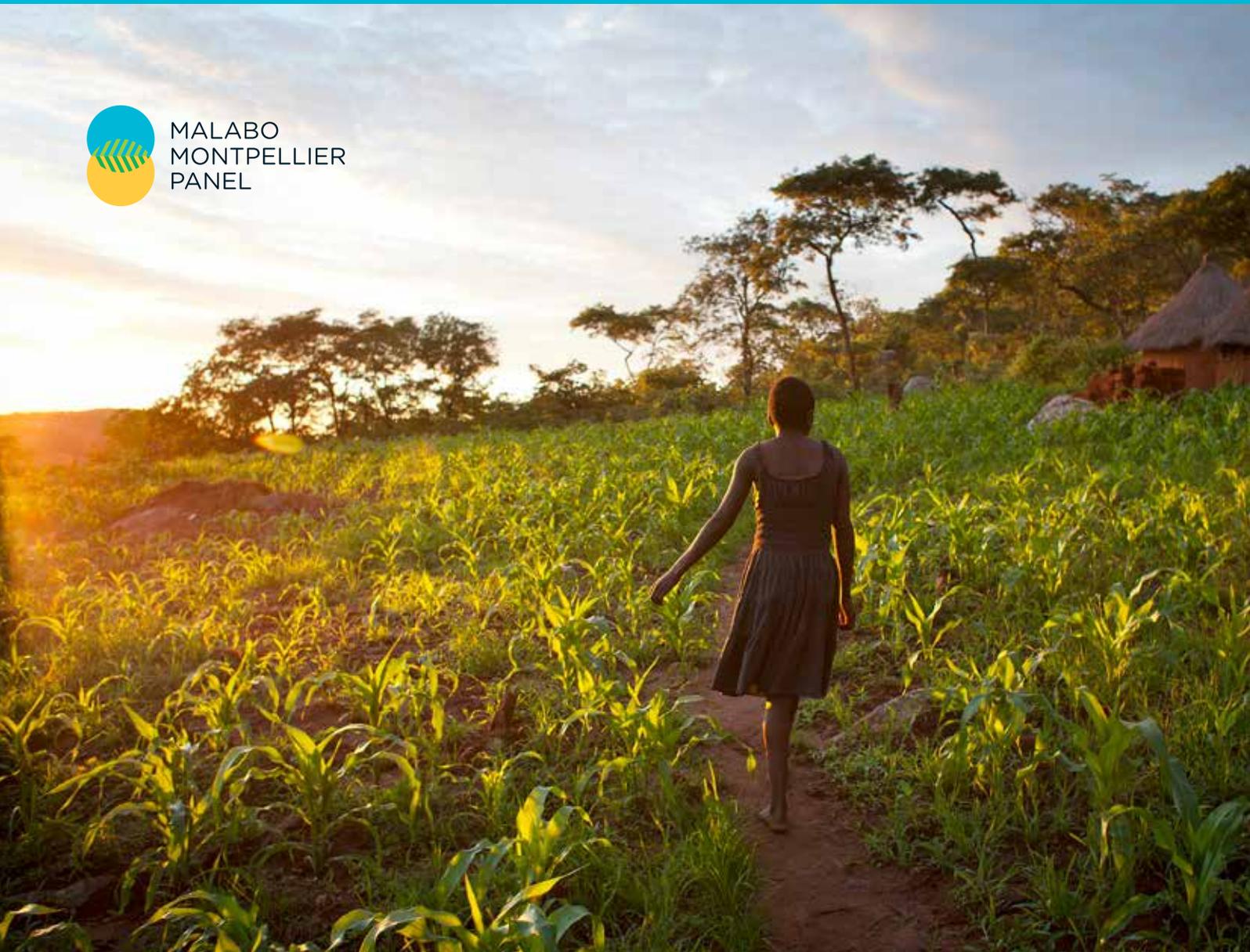


NOURISHED

How Africa Can Build a Future Free from Hunger and Malnutrition





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Foreword

Thanks to the progress of the past couple of decades, African countries have started to reverse trends in poverty, hunger, and malnutrition. The ambitions contained in the Malabo Declaration, the African Union's Agenda 2063, and global development goals are recognition of the size and complexity of the challenge that still lies ahead. Sustaining the progress to realize the goals of ending extreme poverty and hunger by 2030, and the many other targets anchored within the Malabo Declaration and the Sustainable Development Goals, will require continued improvement in the quality of policy and program design and implementation. The Malabo Montpellier Panel, convening 17 leading African and international experts in agriculture, ecology, nutrition, public policy, and global development, seeks to enhance the use of relevant, high-quality evidence to support dialogue and guide policy choices by African governments and their partners. The Panel works with African governments and civil society organizations to provide access to data and analysis that facilitates the design and implementation of policies leading to better poverty,

hunger, and nutrition outcomes. The related Malabo Montpellier Forum provides a platform for evidence-based dialogue and exchange among high-level decision makers on African agriculture, nutrition, and food security.

The current report—*Nourished: How Africa Can Build a Future Free from Hunger and Malnutrition*—takes a systematic country study approach to identify where progress has been achieved. It analyzes which policy decisions were taken to substantially reduce malnutrition levels and to promote healthier and more diverse diets, and draws lessons for other countries to replicate such successes. A set of policies and practices are identified that, if scaled up, could have significant impact on nutrition, child survival, and development in Africa. The experience of the seven countries covered in the report shows what can and needs to be done to substantially improve a country's nutritional status. The report provides a roadmap for African governments to take concerted action to deliver on the nutrition targets set out by the Malabo Declaration and the Sustainable Development Goals.



Ousmane Badiane



Joachim von Braun

Co-Chairs, Malabo Montpellier Panel

THE MALABO MONTPELLIER PANEL

The core mission of the Malabo Montpellier Panel, a group of leading African and European experts from the fields of agriculture, ecology, food security, nutrition, public policy and global development, is to support evidence-based dialogue among policy makers at the highest level. The Panel's reports seek to inform and guide policy choices to accelerate progress toward the ambitious goals of the African Union Commission's Agenda 2063, the Malabo Declaration and the global development agenda. The Panel works with African governments and civil society organizations to provide support and evidence-based research that facilitate the identification and implementation of policies that enhance agriculture, food security and nutrition.



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Introduction

Remarkable progress has been made during the last two decades in reducing extreme hunger in Africa. However, around one in five people are still chronically undernourished, increasing the continent's vulnerability during food crises, and we are witnessing recurring famines related to persistent conflicts, extreme poverty in segments of the population, and droughts. Population growth, demographic changes, and urbanization are placing pressure on food systems to increase yields and make more food available, as well as to produce more diverse and nutritious foods to address all forms of malnutrition. Climate change, conflict, and protracted crises could contribute to an increase in hunger and child malnutrition that would reverse the gains achieved over the last two decades and jeopardize progress toward achieving the nutrition goals of the Malabo Declaration, the African Union Commission's Agenda 2063, and the United Nations Sustainable Development Goals (SDGs).

Fortunately, important lessons can be drawn from successful interventions, and can be adopted and scaled up by African countries in their fight against hunger and malnutrition. The main objective of this report is to identify interventions that work and recommend options for policies and programs to eliminate hunger and malnutrition in all its forms. The report begins with a review of the African and global policy agenda, setting out the challenges and complexity of addressing all forms of malnutrition in Africa. It then offers an overview of successful interventions and innovative approaches that have been implemented in some countries and discusses critical threats—climate change and conflicts—that jeopardize progress on reducing malnutrition. Lastly, the report reviews the experiences of seven African countries that have been particularly successful in reducing malnutrition levels and draws some important lessons for other countries.



African and international policy frameworks



At the continental level, the African Union Agenda 2063¹ reflects the common African position on the socio-economic transformation of Africa and functions as an important motivation for countries to deliver on nutrition. This is reflected in the African Regional Nutrition Strategy 2015-2025, which enshrined the Agenda 2063 aspiration of “a prosperous Africa based on inclusive growth and sustainable development” (Aspiration #1).² The 2014 Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods also has elevated nutrition to a key commitment under the Comprehensive Africa Agriculture Development Programme (CAADP). The African Union Declaration on Agriculture and Food Security,³ adopted more than 10 years ago in Maputo, already placed strong emphasis on ensuring food security and nutrition, and the Malabo Declaration reinforces this commitment.⁴ As a result, nutrition indicators have been incorporated in the CAADP Results Framework common to all countries.

There has also been a substantial improvement in how nutrition is prioritized and funded at the international level, and

nutrition has been elevated to a top priority on the development agenda through the SDGs.* SDG2 aims to “End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.” In addition, the Scaling Up Nutrition Movement (SUN) Strategy and Roadmap 2016-2020 emphasizes the importance of nutrition as a universal agenda integral to delivering on the SDGs and the United Nations (UN) Decade of Action on Nutrition. With 39 African countries now members, the SUN Movement has the potential to accelerate progress in reducing stunting and improving nutrition through its learning networks, a common results framework, and communities of best practice.⁵ More recently, the G20, at their Summit in Hamburg and G20 conferences with an Africa focus in Berlin,⁶ made important commitments that reinforce the determination of the global community to support the efforts of African countries to fight hunger and malnutrition. Delivering on the SDG and G20 agendas will only be possible if African governments successfully deliver on the ambitious goals of the Malabo Declaration and Agenda 2063.

* In October 2015, the UN Committee on World Food Security (CFS) requested that the High Level Panel of Experts for Food Security and Nutrition (HLPE) prepare a report on Nutrition and Food Systems. The report will be launched in October 2017 and will be the starting point of a global policy convergence process. This Malabo Montpellier Panel report—with its focus on Africa—looks forward to contributing to this process.

The Challenges

The choices that families and farmers have regarding the food that they consume and the crops they produce and sell at markets have a direct bearing on nutrition outcomes. Good nutrition contributes to cognitive development, better opportunities for children to realize their potential, and higher earnings later in life, which in turn support macro-economic and societal growth.⁷ Poor nutrition, on the other hand, impairs productivity, acting as an impediment to national growth.

Despite current efforts and progress, reducing malnutrition—undernourishment, micronutrient deficiencies, and overweight and obesity—remains a challenge in Africa. More needs to be done to achieve the Malabo Declaration targets of reducing the prevalence of stunting, wasting, and underweight, while ensuring a minimum dietary diversity for women and meeting minimum standards for infant diets by 2025.⁸ If African countries are to meet these goals, governments and other stakeholders will need to harness the potential of the agriculture sector and rural services, including health and sanitation, and reach beyond just increasing the levels of agricultural production to make actual improvements in the quality and diversity of diets.⁹ Unlocking Africa’s agriculture sector in a way that captures the synergies among nutrition, health, and food production and identifies and reduces trade-offs will contribute to food security, poverty eradication, inclusive economic growth, and resilient communities and food systems across the continent.

Agricultural and economic growth and transformation in Africa must be nutrition sensitive and lead to sustainable food system development, creating jobs, improving livelihoods, and providing more diverse and nutritious diets.¹⁰ Without the political will to prioritize nutrition across all areas of government, including agriculture, health, and rural development, and without increased investments in infrastructure and public goods and services, malnutrition will persist, contributing to continued poverty and a reduced quality of life for millions of people across Africa.

Eliminating malnutrition in Africa is also an economic policy decision: the cost of undernutrition to African economies averages 11 percent of gross domestic product (GDP) annually.¹¹ At the same time, the economic returns from investing in nutrition are high: for every US\$1 invested, US\$16 is generated.¹² Such appropriate investments in the first 1,000 days (from pregnancy through the first two years), including prevention of low birthweight and early initiation of and exclusive breastfeeding, are crucial and will yield benefits not only for a child’s lifetime, but across generations. The cost of implementing nutrition-specific



interventions that avert maternal and child undernutrition and micronutrient deficiencies amounts to US\$370 per life-year saved. If linked to nutrition-sensitive approaches—including women’s empowerment, dietary diversity and food fortification, education, and social protection and safety nets—nutrition-specific interventions can greatly accelerate progress in countries with high rates of maternal and child undernutrition and mortality. The benefits to global health and national economies would be even greater.¹³

Factors that undermine the efforts to improve the nutritional outcomes must be addressed simultaneously, including WASH (water, sanitation and hygiene), diseases and infections, including water-related and foodborne diseases, and health hazards linked to specific agricultural systems and practices, such as infectious animal diseases (avian flu, brucellosis), pesticide poisoning, and aflatoxicosis. More than 91 million people in Africa are estimated to fall ill and close to 150,000 die each year due to foodborne hazards.¹⁴ This urgently needs to be addressed to improve nutritional outcomes.

The Action Agenda

A set of policies and practices have been identified that, if scaled up, could have significant impact on nutrition, child survival, and development in Africa.¹⁵ Our studies from seven countries across Africa show what *can and needs* to be done to substantially improve a country's nutritional status. The Malabo Montpellier Panel therefore urges African governments to take concerted action to deliver on the nutrition targets set out by the Malabo Declaration and the SDG agenda. Specifically:

1

Elevating nutrition to a top policy priority

Governments need to elevate nutrition to a policy and investment priority and work across ministries and departments to ensure a holistic and inclusive approach to tackling all forms of malnutrition and hunger as part of broader country development efforts, accompanied by a mutual accountability system embedded across sectors and at all levels of governance.

2

Working in partnerships

Policy makers need to work in partnership with other stakeholders—particularly national research centers, the private sector, and development partners—to deliver on improved nutrition outcomes.

3

Mainstreaming nutrition

Governments need to mainstream nutrition into agricultural policy making, rural development plans, social protection, and education to ensure a nutrition-sensitive lens is applied to new policies and the implementation of specific interventions and programs.

4

Addressing the threat of conflict to malnutrition reduction

Civil conflict and protracted crises drive hunger in some regions across Africa and pose a critical threat to progress in strengthening food systems and successfully addressing malnutrition. African governments and non-state actors need to recognize that civil conflict adds a new set of challenges to reducing malnutrition and that interventions including diplomacy, security actions, and emergency aid will be required. Development partners need to scale up emergency aid in these cases.

5

Increasing the resilience of food systems

Changing weather patterns and extreme weather events, notably severe recurring droughts, pose critical threats to making progress on nutrition and to realizing gains from the adoption or scaling up of successful interventions. In addition to policy and technology actions to make production systems more resilient, measures need to be taken to enhance the capacities of countries to protect the nutritional status of vulnerable populations during extreme weather events.

6

Strengthening food-system regulation and controls

Governments and corporations need to promote healthier diets and consumption patterns through appropriate food system regulation and controls. The latter would seek to stimulate the production of larger quantities of safe and nutritious foods, while investing in marketing and distribution of affordable, healthy foods for the poor to stimulate demand and consumption.

7

Strengthening national agricultural and nutrition research

Governments need to invest in strengthening the capacities of national agricultural and nutrition research to mainstream the breeding and release at scale of varieties of micronutrient-rich crops for farming communities to grow, eat, and sell in local markets. Investments are needed to increase the productivity of nutrient-rich foods and to take actions on fortification, biofortification, and enrichment to accelerate nutritional gains as part of a food-based approach.

8

Mainstreaming nutrition education

Nutrition education needs to be embedded into social science and science curricula in schools to ensure a long-term impact on changing consumption patterns and to better understand the linkages between nutrition, agriculture, and health. This needs to be backed by continuous promotion of healthier consumption patterns and awareness and education campaigns targeting people of all ages.

9

Empowering women's groups

National and local governments and civil society organizations need to support and empower women's groups. This allows women to take control over nutrition-relevant resources and decision making, particularly with regards to food, nutrition, and healthcare.

10

Providing better data for more effective interventions

Governments, the private sector, and research institutions need to work together to collect, track, and process the many different indicators of malnutrition. More and better data is urgently needed to provide critical insights that could drive more effective solutions to address malnutrition and famines and to monitor progress.

11

Capturing synergies among agriculture, water, health, and sanitation

Governments and other stakeholders need to increase access to services among vulnerable populations in urban and rural areas, including WASH, and reach beyond just increasing the levels of production to making actual improvements in the quality and diversity of diets.

12

Elevating obesity to a priority within countries' nutrition policies

There is urgent need to raise awareness and to address the emerging burden of obesity among some segments of the African population. Rapid changes in the food system in middle-income African countries together with a shift in dietary patterns and physical activity levels is leading to an increased prevalence of overweight and obesity. African nutrition science and policy needs to connect with global actions in this field and be supported accordingly.

The Complexity of Malnutrition

One of the targets of the Millennium Development Goals (MDGs) set in 2000 was to halve, between 1990 and 2015, the proportion of people who suffered from extreme hunger. This has nearly been achieved for developing countries as a whole, due to the considerable reduction in hunger in China and Southeast Asia. In Africa, the proportion of people who suffer from hunger dropped from 28 percent to 20 percent between 1990 and 2015, although the total number of hungry people increased from 182 million to 233 million due to a rapidly increasing population.¹⁶

Overall, progress in reducing the level of malnutrition has been slower than expected as a result of population growth, volatile commodity prices, higher food and energy prices, rising unemployment and underemployment rates, and the global economic crises that have hampered development. Moreover, increasingly frequent extreme weather events and natural disasters coupled with political instability, large-scale migration, and civil strife have taken a huge toll in terms of human lives and economic damage that has added to food insecurity and malnutrition.¹⁷

Malnutrition is a term for a condition caused by improper diet or nutrition. It means “badly nourished,” but is more than a measure of how much people eat or fail to eat. Malnutrition results from inadequate intake of protein, calories, or micronutrients and is characterized by frequent infections and disease and reduced cognitive development.¹⁸ Currently, in Africa, 45 percent of child mortality is attributable to malnutrition including undernourishment, micronutrient deficiencies, and overweight and obesity.¹⁹

Malnutrition is not only a consequence of poverty, food insecurity, and disease but also one of the reasons for the lack of progress in economic development. It has been proven to slow economic growth and deepens poverty through productivity losses from poor physical performance and cognitive capacity.

Micronutrient deficiencies

As displayed in Figure 1, in most African countries the severity of the common micronutrient deficiencies is high, and the continent still shows the highest rates of “hidden hunger” compared to Latin American and Asian countries where rates have been improving. In fact, the 2011 Global Hidden Hunger Index (HHI-PD)—defined for preschool-age children as the average of three deficiency prevalence estimates (stunting, anemia due to iron deficiency, and vitamin A deficiency)—found that of the 20 countries with the highest HHI-PD scores, 18 were in sub-Saharan Africa.

While the proportion of children below the age of five who grew up stunted in Africa decreased from 38 to 32 percent between 2000 and 2015 across the continent, in some regions the proportion still remains high at 40 percent.²⁰ Moreover, the total number has continued to rise. In 2015, 58 million children below the age of five were stunted (too short for their age) and approximately 14 million children were severely or moderately wasted (weighing too little for their height), while another 10 million children grew up overweight or obese.

In addition, there are several million children and adults across Africa who suffer vitamin or mineral deficiencies, which can lead to anemia, blindness, cognitive impairment, and greater susceptibility to many diseases, and can result in higher mortality rates.²¹ The adverse effects of micronutrient deficiencies on child health and survival are particularly acute, especially within the first 1,000 days of a child’s life, and include serious physical and cognitive consequences. Even mild to moderate deficiencies can affect a person’s well-being and development.²² And hidden hunger can curtail socioeconomic development too, particularly in low- and middle-income countries.

Malnutrition terminology

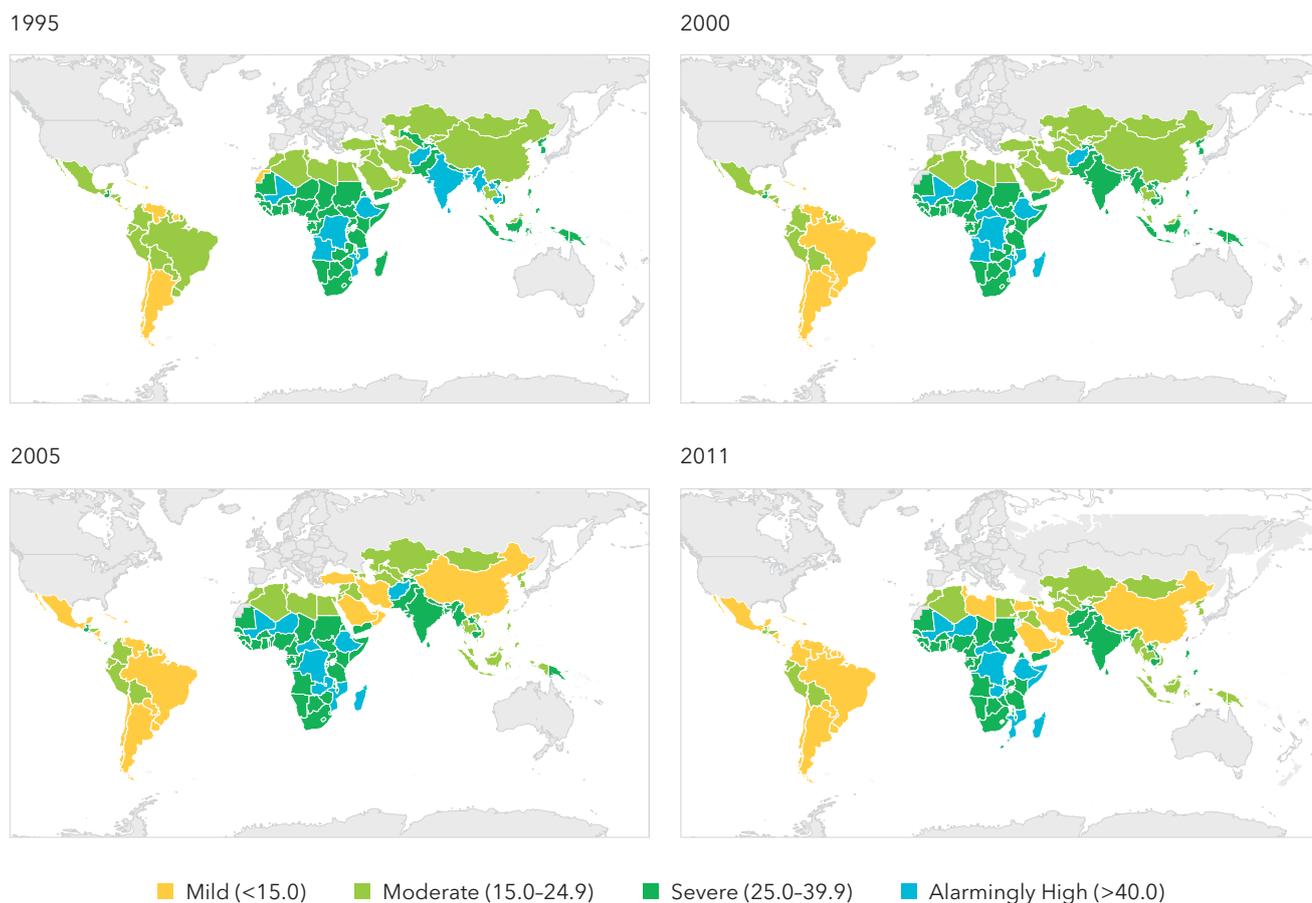
MALNUTRITION: Deficiencies, excesses, or imbalances in a person’s intake of energy and/or nutrients, including undernutrition, micronutrient deficiencies or insufficiencies, and overweight/obesity that may result in diet-related noncommunicable diseases (such as heart disease, stroke, diabetes, and cancer).

UNDERNOURISHMENT: Insufficient food intake to provide enough calories (energy) to meet minimum physiological needs for an active and healthy life; starvation is an extreme form of these conditions, characterized by a “state of exhaustion of the body caused by lack of food.”

MICRONUTRIENT DEFICIENCY (“HIDDEN HUNGER”): Intake or absorption of vitamins and minerals—iron, folic acid, vitamin A, zinc, and iodine—that is below healthy thresholds and too low to sustain good health and development in children and normal physical and mental function in adults.

OVERWEIGHT/OBESITY: Abnormal or excessive fat accumulation that may impair health.

FIGURE 1 Hidden hunger scores 1995–2011



Source: C. J. Ruel-Bergeron, et al., "Global Update and Trends of Hidden Hunger, 1995–2011: The Hidden Hunger Index," *PlosOne* 10, no. 12 (2015): e0143497.

Disclaimer: The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the members of the Malabo Montpellier Panel concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The long-term economic consequences for Africa can hardly be overstated. Fortunately, vitamin A, iron, and iodine deficiencies as well as other deficiencies, such as folate, zinc, and vitamins D and B12, constitute health threats that can be effectively targeted through food-based interventions. The progress that has been achieved against the MDG goal of halving the proportion of people who suffer from hunger between 1990 and 2015 shows that the battle against malnutrition can be won. Governments and other stakeholders need to learn from past successes and redouble their efforts to live up to the ambitious targets set out by the Malabo Declaration, Agenda 2063, and the SDGs.

The many faces of malnutrition

Rapid urbanization and population growth put pressure on Africa's food system to produce more food that is also diverse and nutritious. However, food systems across Africa also need to enable consumers to make healthy and affordable food choices consistent with optimal nutrition outcomes. Africa now has the fastest growing middle class in the world, having tripled over the past 30 years, and under

The growing middle class in East and Southern Africa²⁶

55 percent of the region's middle class is rural.

61–83 percent of the middle class's food is purchased.

Processed food accounts for 70–80 percent of middle-class food expenditure, with similar shares in urban and rural areas.

Perishable products account for 44–55 percent of the middle class's expenditure.

current trends is set to grow to 1.1 billion or 42 percent of the population by 2060.²³ Consumer spending, primarily by the middle class—people with more than US\$3,900 income per year—reached an estimated US\$680 billion in 2008.²⁴ And with growth of the middle-class and increased urbanization, the burden of malnutrition has accelerated in some countries due to poor diets.²⁵

It is not uncommon to find undernutrition and obesity coexisting within the same country (Figure 2), the same community, or even the same household.²⁷ In such situations, child stunting coexists alongside overweight in adults (particularly among women), as well as in stunted but overweight children. Overweight persons may also manifest multiple micronutrient deficiencies.²⁸

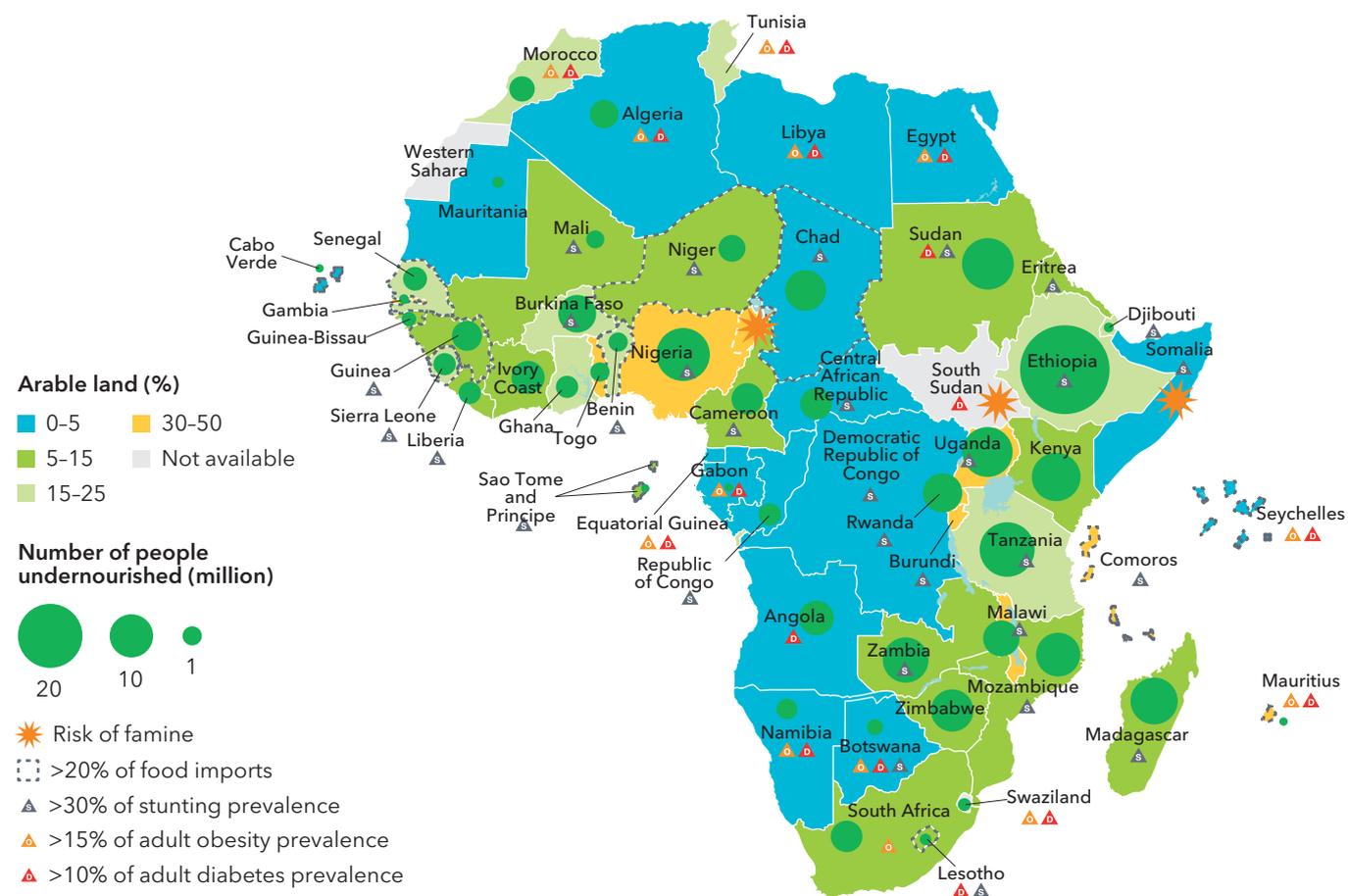
Several causes contribute to this. One explanation is a rapid food system transition in some middle-income African countries. A shift in dietary patterns and physical activity levels is leading to a nutrition transition, with an increased prevalence of overweight and obesity levels. Changes in eating habits, such as the consumption of cheap, nutrient-poor, highly processed foods, combined with a reduced physical workload from increasingly deskbound economic activities, have increased obesity levels at a much faster rate than undernutrition has been reduced.²⁹

Urban and, to some extent, rural children in Africa are increasingly exposed to high-fat, high-sugar, high-salt, energy-dense processed foods, which tend to be lower in cost

but also lower in nutrient quality. These dietary patterns, in conjunction with lower levels of physical activity, result in sharp increases in childhood obesity and disease, such as type 2 diabetes. In Africa, the estimated prevalence of childhood (7-11 years of age) overweight increased from 4 percent in 1990 to 7 percent in 2011, and is expected to reach 11 percent in 2025, while the percentage of children under five who are overweight varies between 4 percent in West Africa and 15 percent in Southern Africa.³⁰ Of particular concern is the rise in the number of children who are both stunted and overweight, as healthcare systems remain ill-equipped to manage malnutrition in all its forms.³¹

Malnutrition, associated with unhealthy diets and unhealthy lifestyles, now represents the number one risk factor in the global burden of disease. The risk that poor diets pose to mortality and morbidity is now greater than the combined risks of unsafe sex, alcohol, and drug and tobacco use (Figure 3).³² To successfully address the multiple forms of malnutrition, governments and the private sector need to work together to reshape the food system in a way that will ensure healthier diets for all.

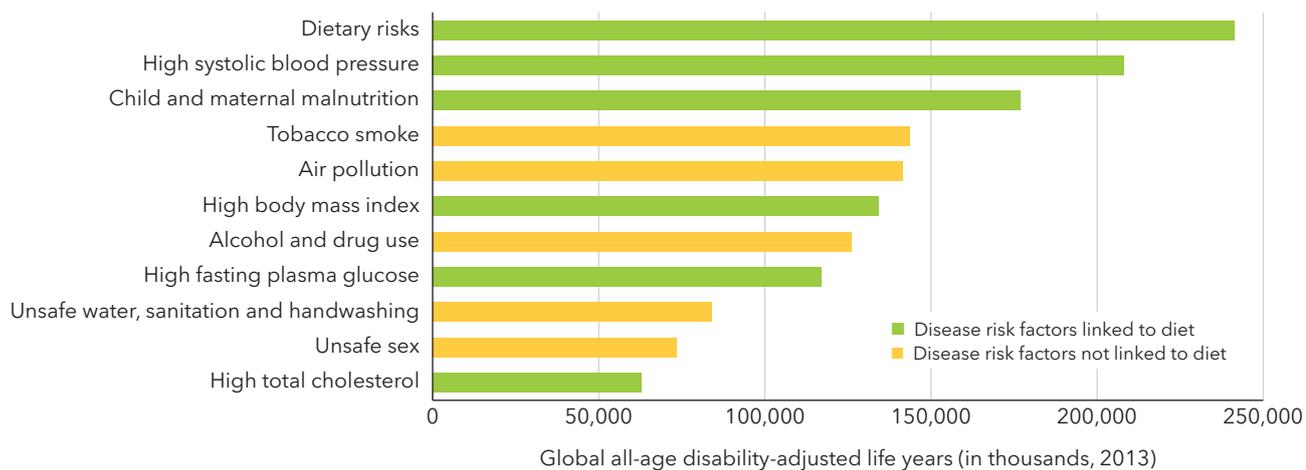
FIGURE 2 Overview of nutrition in Africa



Source: NEPAD, Overview of Nutrition in Africa as a Response to the Malabo/CAADP Commitments to End Hunger and Malnutrition by 2025, (2017), <http://www.nepad.org/resource/nepad-overview-nutrition-africa-2017>.

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FIGURE 3 Diet-related risk factors driving the global burden of disease



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



Successful Interventions and Innovative Approaches

There is no one-size-fits-all solution to successfully reducing malnutrition levels across Africa. Interventions and solutions, including the ones discussed here and in the case studies, have to be adapted to local contexts.

Breastfeeding

Optimal breastfeeding practices are crucial to a child's development. Breastfeeding fosters healthy growth, improves cognitive development, and has both short-term and long-term nutritional benefits for children. Good nutrition in the first 1,000 days of a child's life is critical for child growth, well-being, and survival and for future productivity. Immediate and exclusive breastfeeding is the best source of nutrition for newborns. Breast milk is safe and contains antibodies and vitamin A, which help protect infants from common childhood illnesses such as diarrhea and pneumonia; protects against major causes of death such as sepsis, acute respiratory-tract infections, and meningitis; and improves overall child growth and development.

In Africa, a majority of babies are breastfed, but suboptimal breastfeeding practices continue to put them at risk. Of total deaths of children under age five, 12 percent are attributable to suboptimal breastfeeding practices. The proportion of newborns that were breastfed within one hour of birth in 2015 was 59 percent in Eastern and Southern

Africa, and 40 percent in West and Central Africa, while only 57 percent of infants 0–5 months of age were exclusively breastfed in East and Southern Africa and 29 percent in West and Central Africa.³³ Various factors can undermine women's confidence in exclusive breastfeeding, which is often regarded as time-consuming. Societal pressures, family responsibilities, and paid and unpaid work present significant challenges for women. Governments and the private sector need to provide mothers with information on the benefits of breastfeeding, best breastfeeding practices, and advice on how to prepare nutritious complementary foods.

Biofortification

Biofortification uses conventional plant-breeding methods to enrich the micronutrient content of the staple crops that comprise a majority of rural populations' diets. The three crucial micronutrients that are most limiting in the diets of the poor—vitamin A, zinc, and iron—are bred into key staple food crops, ensuring that, when consumed regularly, these new crops have sufficient amounts of the nutrient required for healthy diets. Biofortified crops are bred not only to have higher micronutrient content, but also for high yields and pest resistance, climate adaptability, and consumption traits, like taste and cooking time, to match—if not outperform—non-biofortified varieties. Over 130 varieties of several

Alive & Thrive, Ethiopia

A program of the International Food Policy Research Institute (IFPRI), Alive & Thrive (A&T), has achieved positive results promoting infant and young child feeding (IYCF) during the first 1,000 days of an infant's life in rural communities in three countries: Bangladesh, Ethiopia, and Viet Nam.³⁴ Between 2010 and 2014, the program reached more than 16 million children under two years old, and developed large-scale program models that can be replicated almost anywhere in the world. A&T worked with government and nongovernmental partners and through existing health systems to deliver a comprehensive package of interventions—including counseling and communication, community mobilization, and media outreach targeted at policy makers. In Ethiopia, where breastfeeding rates are higher than in Bangladesh or in Viet Nam, overall IYCF practices remain poor. A&T

provided information and counseling to mothers and caregivers primarily through the Federal Ministry of Health's Health Extension Program throughout Ethiopia's four most populous regions—Amhara, Oromia, SNNPR (Southern Nations, Nationalities, and Peoples' Region), and Tigray—using its large network of female health extension workers and teams of community health volunteers. Village gatherings were held to discuss breastfeeding and demonstrate how to prepare nutritious complementary foods. A&T also partnered with various nongovernmental organizations, faith-based organizations, and women's associations to launch a radio campaign. Early initiation of breastfeeding increased from 67 to 82 percent, while exclusive breastfeeding rates rose significantly from 72 to 83 percent.

Orange-fleshed sweet potato

One example of biofortified crops are orange-fleshed sweet potatoes (OSP). OSPs are rich in beta-carotene, a provitamin A that the body converts into vitamin A. An effectiveness study was implemented in Mozambique and Uganda, from 2006 to 2009, to evaluate the impact of delivery of OSP vines on OSP adoption, vitamin A intake, and vitamin A status outcomes of beneficiary households. The study found that 61 to 68 percent of beneficiary households adopted OSP in Uganda and Mozambique, respectively. Further, evidence from Uganda showed that delivery of OSP resulted in significantly increased vitamin A intake among children and women, and measurably improved vitamin A status among some children.³⁸ In Mozambique, delivery of vitamin A-rich OSP resulted in doubling of vitamin A intakes, with vitamin A-rich OSP providing almost all of the total vitamin A intakes for children.³⁹ Consumption of vitamin A-rich OSP was also found to reduce the prevalence and duration of diarrhea among children, revealing that child health could be improved through biofortification.⁴⁰

biofortified crops (including vitamin A enriched banana/plantain, cassava, maize, and sweet potato, iron rich beans and pearl millet, zinc rich rice and wheat, and iron and zinc cowpea, lentil, and sorghum) have been released in over 30 countries, and several more varieties are under testing in over 50 countries. National governments officially release the best performing varieties of micronutrient-rich crops for farming communities to grow, eat, and sell in local markets. When consumed regularly, these micronutrient-rich foods can contribute to body stores of micronutrients and to the overall reduction of hidden hunger.³⁵

Given the positive evidence supporting biofortification, biofortified crops could provide a steady and safe source of certain micronutrients for people not reached by other interventions or who are simply unable to access nutritious crops.³⁶ Even though biofortified staple foods are not the best response to clinical deficiencies, they can help close the micronutrient intake gap and increase the daily intake of vitamins and minerals throughout a person's life.³⁷

Homestead gardens

Home gardens are an integral part of local food systems and the agricultural landscape of developing countries.⁴¹ Studies have shown positive impacts of home gardens for addressing food insecurity and malnutrition as well as providing additional benefits such as income and livelihood opportunities for resource-poor families and delivering

several ecosystem services.⁴² Most of the value of the home garden to the rural household lies not in the net income but in the range of production and its contribution to the overall livelihood and well-being of the household. According to the Food and Agriculture Organization of the United Nations (FAO), a well-developed home garden has the potential to supply a family with essential micronutrients: roots and tubers are rich in energy and legumes are important sources of protein, fat, iron, and vitamins; green leafy vegetables and yellow- or orange-colored fruits provide essential vitamins and minerals, particularly folate and vitamins A, E, and C. Moreover, when combined with other interventions, such as the promotion of better nutrition and social transfers, homestead gardens are proven to be even more effective in reducing malnutrition.

Better data for more effective interventions

As African governments continue to lack the data necessary to effectively combat malnutrition, responses to food crises remain reactive, rather than proactive. Signs of malnutrition may not be apparent until a food crisis erupts, and without the data to combat crises, response coordination remains slow and often ineffective. There are various forces influencing nutrition and it can be difficult to identify how they converge to cause widespread problems. In addition, most governments and aid organizations use multiple metrics and separate tracking systems to measure malnutrition. This renders it almost impossible to form proactive food policies and escape the trap of reacting to disruptions rather than getting ahead of hunger and tackling malnutrition in a systematic way.

Community gardens in Burkina Faso

In Burkina Faso, the Enhanced Homestead Food Production program established community gardens and provided seeds, tools, and knowledge about good agricultural, health, hygiene, and nutrition practices to mothers with young children (3-12 months old) between 2013 and 2016. In just two years, the program increased women's intake of meat and poultry by 8 percent and of fruits by 16 percent while their overall dietary diversity, compared to women who were not enrolled in the program, also improved. Prevalence of underweight among beneficiary women also decreased by almost 9 percent,⁴³ and their children benefited too: the prevalence of anemia in infants aged 3-6 months decreased by 15 percent, and among children aged 3-12 months, the prevalence of wasting decreased by 9 percent while diarrhea was reduced by up to 16 percent.⁴⁴

Currently, there is no single system collecting, tracking, and processing the many different indicators of malnutrition, which deprives decision makers of critical insights that could drive more effective solutions. More and better data are urgently needed to substantially improve the quantity and quality of dietary data. Few national governments collect the data required to inform decision makers about what people eat, and there is no functioning global dietary database. Recent efforts to gather data such as the Global Dietary Database (GDD)⁴⁵ and Global Individual Food Consumption

Data Tool,⁴⁶ developed by the FAO and the World Health Organization (WHO), should be built up. Many other indicators for the food system also need to be collected, for example on food quality and safety, to help policy makers better understand the links between food systems and actual nutritional outcomes and to be able to monitor progress. In addition, data on the continued cost of malnutrition—economically and socially—needs to be collected and made available to decision makers to ensure nutrition remains a top policy priority on governments’ agendas.

Nutrition Early Warning System (NEWS)

The International Center for Tropical Agriculture (CIAT) is applying machine-learning technology to search for early signs of potential crop failures, drought, rising food prices, and other factors that can trigger food shortages. Over time, this bespoke system—known as the Nutrition Early Warning System (NEWS)—will become “smarter” and more accurate so that data can be used to predict the likelihood of malnutrition threats before they occur as well as to suggest mitigating measures. NEWS will enable governments, development partners, farmers, healthcare providers, NGOs, and food companies to contribute toward and implement more rapid, tailored interventions.

CIAT will coordinate the development of NEWS, which will be deployed in collaboration with partners to alert

decision makers to nutrition threats well ahead of a crisis. Initially, CIAT will use NEWS to focus on boosting nutrition in sub-Saharan Africa. By picking up food shortage triggers, the system will give relief agencies, development partners, and governments information they need to make informed decisions about agricultural policies and programs.

Ongoing surveillance is also expected to provide multiple recommendations for future nutrition interventions. The recommendations can be tailored to the needs of individual countries through national “nutrition dashboards.” These will further refine insights available through NEWS. The dashboards will be accessible via a secure website that will regularly monitor and post updates on key nutrition and food security indicators.⁴⁷



An innovative new approach to collating and analyzing large sets of data could enable this shift to early action. Through machine learning, computer programs track complex and constantly changing data from multiple sources to “learn” from them and make predictions.

Innovative tools for expanded coverage and improved coordination

By 2025, Africa is expected to have 535 million unique mobile-phone subscribers,⁴⁸ nearly half of its population, and its subscriber base is expected to grow faster than in any other region. The mobile industry therefore plays an increasingly important role in social and economic development in Africa, with opportunities to harness the potential of information and communications technologies (ICT) and

StartSmart (GAIN), South Africa

Launched in October 2013, StartSmart is an initiative of the Global Alliance for Improved Nutrition (GAIN) in South Africa to support national efforts to drive awareness of malnutrition and to help mothers feed their babies correctly from the start. It is a digital campaign active across three main platforms: a mobile, or “mobi,” website; the popular South African messaging platform Mxit; and an interactive USSD-based platform. Accessible from all GSM phones, USSD is an interactive, text-based service that enables access to information and quizzes on nutrition to deepen understanding about healthy diets. StartSmart is part of a wider program called NutriMark, run by the Ministry of Health, which focuses on the 1,000-day window of opportunity for child and infant nutrition.⁴⁹



mobile technologies in healthcare, education, finance, agriculture, retail, and government services. Mobile technologies can also be used to develop efficient early-warning systems and rapid response kits. If a community can detect and respond rapidly and appropriately to increasing rates of malnutrition or infectious diseases, major outbreaks could be prevented and lives saved. Mobile technology offers unique opportunities for community-based, inexpensive early-warning and response systems to tackle malnutrition and disease in the community.

ChildCount

ChildCount is an mHealth platform developed by the Earth Institute to improve child survival and health by providing support to community-based nutrition screening programs. Community health workers (CHWs) monitor mid-upper-arm circumference measurements and perform edema checks and diarrhea screenings to diagnose children with severe acute malnutrition. ChildCount uses text messages to coordinate the activities of the CHWs and to refer children rapidly for treatment. Using any standard mobile phone, CHWs use text messages to register patients and report their health status to a central web dashboard that provides a real-time view of a community's health. Powerful messaging features help facilitate communication among the members of the health system, and an automated alert system helps reduce gaps in treatment.⁵¹

mHealth and mNutrition

The GSMA Mobile for Development mHealth program connects the mobile and health industries, with the aim of developing commercially sustainable mHealth services that meet public health needs. In September 2013, the GSMA mHealth program partnered with the UK Department for International Development (DFID) and the Norwegian Agency for Development Cooperation (Norad) to support the scale up of mobile nutrition (mNutrition) services—services intended to have a positive impact on nutrition outcomes—and is supported through the use of mobile technologies targeting maternal and child health in 10 African countries. There are a number of ways in which mobile technology can be used to facilitate such nutrition interventions: education and behavioral change communication, data collection and reporting, supply chain management services, electronic decision support, and financial transactions and services. In Mozambique for example, information is shared by text, audio, or video message to participating women's phones on improved nutrition practices such as balanced diets and the improved use of locally available foods to ensure increased intake of important nutrients; and promoting the intake of micronutrients and fortified foods, as well as exclusive breastfeeding of infants and safe and appropriate complementary feeding of infants and young children.⁵⁰



Critical Threats to Making Progress on Nutrition

Climate change, civil conflict, and protracted crises continue to pose critical threats to sustainably addressing malnutrition across Africa.

Addressing the impact of climate change on nutrition

Without effective adaptation and mitigation, food insecurity is likely to worsen due to climate change in regions across Africa that already have a high prevalence of hunger and undernutrition. Higher temperatures will reduce agricultural yields while changes in rainfall and extreme weather events will affect quantity and quality of crop and livestock production, reduce the availability of water for irrigation, and decrease soil fertility.⁵²

Following current trends, rice, wheat, and maize yields in Africa are set to decline by up to 14, 22, and 5 percent, respectively, by 2050, while prices in 2050 are projected to rise by 7, 15, and 4 percent, respectively.⁵³ Prices of other important crops in the region, such as sweet potato, cassava, and millet, are also expected to increase.⁵⁴ These higher food prices would reduce the affordability of many agricultural products, including nutritious horticultural and livestock products.

As access to healthy food is largely a matter of household income, capabilities, and rights, malnutrition is likely to worsen under climate change and recurring extreme weather events. For example, in Ethiopia and Kenya, two of the world's most drought-prone countries, children aged five years or younger and who were born during a drought are 36 to 50 percent more likely to be malnourished than children not born during a drought. In Niger, children aged two years or younger who were born in a drought year were 72 percent more likely to be stunted.⁵⁵ Furthermore, there is growing evidence that elevated CO₂ concentrations in the atmosphere will have significant impacts on the micronutrient availability of crops, including a reduction of zinc levels in important food crops. Lack of zinc increases the risk of premature births and, later in childhood, increases the risk of diarrhea and acute lower respiratory infections.⁵⁶

Food utilization to attain nutritional well-being depends upon water and sanitation and will be affected by any impact of climate change on the health environment. Hygiene may also be affected by extreme weather events causing flooding or drought in environments where sound sanitation is absent.⁵⁷ In addition, uptake of micronutrients is adversely affected by the prevalence of diarrheal diseases. Rainfall and temperature determine the spatial and

seasonal distributions of these diseases, influence year-to-year variability, including epidemics, and affect long-term trends.⁵⁸ Furthermore, higher temperatures and extreme weather events create a more favorable environment for foodborne pathogens, such as campylobacter and salmonella, which when consumed, reduce the body's ability absorb nutrients.⁵⁹

The threat of climate change to food security and nutrition, arising from the severe vulnerability of agriculture and rural households, needs to be at the top of the agenda of governments and the private sector. The African research system needs to be more strongly connected to global climate science and build capacity to engage in evidence-based climate adaptation policy. The West African Service Center on Climate Change and Adaptive Land Use (WASCAL), in which 10 countries participate, is a promising example.

Addressing the impact of conflicts on nutrition

Civil conflict continues to be a main driver of food insecurity, famine, and hunger in Africa, having triggered recent famine conditions in South Sudan, northern Nigeria, and Somalia. Currently, about 3.2 million people are estimated to be in need of food and agricultural emergency assistance in Somalia, while in northern Nigeria, disruption caused by conflict has left 7.1 million people facing acute food insecurity, with even more deemed to be in less dire but still "stressed" conditions.⁶⁰ In South Sudan, maize and sorghum prices were four times higher in June 2017 than in April 2016, largely due to conflict disrupting production and markets. While food crises, famine-like conditions, and famines recur with regularity and the current famines in Africa can be largely attributed to conflicts, they also can have negative spillover effects on neighboring countries.⁶¹

Governments need to recognize that conflicts and civil wars bring a set of challenges and problems that require a comprehensive set of political, security action, and emergency aid interventions to prevent widespread hunger and the spread of diseases. In particular, governments need to invest in strengthening local early-warning capacities for crisis prevention and emergency interventions during times of peace and stability as measures of national preparedness. Food security policies, including targeted social safety nets and health- and nutrition-specific programs would help increase resilience of communities and households in times of crises.⁶²



A critical role rests with the African Union and regional economic communities when national initiatives are not able to overcome internal conflicts in a country. Humanitarian agencies urgently need more funds to scale up aid; improve cholera management, vaccination campaigns, and treatment of malnutrition; and implement safe water and sanitation interventions.

It is a promising case in point that several of the countries studied in this report were able to rapidly improve nutrition after they overcame domestic violent conflicts. Many of the interventions that are presented in this report and in the country case studies will help countries build resilience at the individual and household levels.

Country Case Studies

Several countries across Africa have been able to dramatically reduce malnutrition over the past 15 years. Their experiences are reviewed in detail to draw lessons for other countries. In particular, this report analyzes which policy decisions were taken and which institutional changes made to substantially reduce malnutrition, to promote healthier and more diverse diets, and to improve well-being.

Seven African countries—Senegal, Ghana, Rwanda, Togo, Cameroon, Angola, and Ethiopia—were selected as case studies, based on the relative decrease of the Global Hunger Index (GHI)⁶³ between 2000 and 2016. The GHI combines undernourishment, child wasting, child stunting, and child mortality indicators into one index, and is a tool designed to comprehensively measure and track hunger at the global, regional, and country levels. Based on the GHI indicators, these seven countries are ranked tops in terms of having successfully reduced malnutrition levels compared to the rest of the continent.

Global Hunger Index scores

Country	GHI in 2000	GHI in 2016	Change (%)
Senegal	38	17	-56
Ghana	30	14	-54
Rwanda	59	27	-53
Angola	58	33	-43
Cameroon	40	23	-43
Ethiopia	59	33	-43
Togo	39	22	-42

SUMMARY: Senegal, Ghana, Rwanda, Togo, Cameroon, Angola, and Ethiopia

Based on the Global Hunger Index, seven countries—Senegal, Ghana, Rwanda, Togo, Cameroon, Angola, and Ethiopia—were able to substantially reduce the level of malnutrition between 2000 and 2016, when compared to other African countries. With the exception of Angola, all countries are members of the Scaling Up Nutrition (SUN) Movement. Some of the countries had initial high rates of malnutrition due to conflicts and socioeconomic instability. In addition to recovered political and economic stability, government commitment to programmatic and institutional reforms played a key role in improving countries' nutrition status. Although the health sector has traditionally taken the lead in tackling malnutrition, many countries have now created units specifically tasked with reducing malnutrition levels. In Senegal, the Cellule de Lutte contre la Malnutrition (CLM), situated within the prime minister's office, provides technical assistance in the definition and implementation of the national nutrition policy; in Rwanda, the implementation of the national nutrition policy is led by an inter-ministerial coordination committee based within the prime minister's office. Other ministries are also starting to assume greater responsibility, particularly ministries of agriculture, often in cooperation with the private sector.



Institutional and programmatic actions taken in seven African countries

Country	Institutional commitment	Programmatic commitment	Implementation modalities
Senegal	<ul style="list-style-type: none"> ■ Creation of the Cellule de Lutte contre la Malnutrition⁶⁴ (CLM) in 2001 within the prime minister's office. ■ Setting up of the Bureau Exécutif National (BEN) in charge of programs and project management by the CLM. 	<ul style="list-style-type: none"> ■ Launch of the Programme de Renforcement de la Nutrition (PRN) in 2002. ■ Putting implementation into the hand of organizations already embedded in local communities. ■ Member of SUN since 2011. 	<ul style="list-style-type: none"> ■ Mainly led by the health sector but with an increasing recognition of the importance of a multisectoral approach involving the agriculture sector.
Ghana	<ul style="list-style-type: none"> ■ Involvement of the National Development Planning Commission created in 1994 in the malnutrition fight. ■ Enforcement of several health policies and regulations related to nutrition. 	<ul style="list-style-type: none"> ■ Integration of nutrition in many government programs. ■ Strong government support for implementation. ■ Scaling-up evidence-based interventions. ■ Member of SUN since 2011. 	<ul style="list-style-type: none"> ■ Multi-sectoral approach with the participation of the private sector.
Rwanda	<ul style="list-style-type: none"> ■ Creation of an intersectoral nutrition committee in 2007. ■ Creation of an Inter-Ministerial Coordination Committee (IMCC) focused on nutrition in the prime minister's office in 2013. 	<ul style="list-style-type: none"> ■ Improved coherence in nutrition strategies. ■ Implementation of the national multisectoral strategy to eliminate malnutrition (NSEM). ■ Many activities led by the Ministry of Agriculture. ■ Member of SUN since 2011. 	<ul style="list-style-type: none"> ■ Multisectoral approach involving the Social Cluster Ministries, particularly Ministry of Agriculture.
Angola	<ul style="list-style-type: none"> ■ A nutrition unit based within the Ministry of Health's National Directorate of Public Health. ■ Creation of a National Council on Food and Nutrition in 2009, with a consultative, coordination, and consensus-building role for all stakeholders, directly linked to the office of the president. 	<ul style="list-style-type: none"> ■ A transition from focusing on emergency operations and humanitarian interventions to a more development-oriented approach to improving nutrition. ■ Many programs delivering nutrition services. 	<ul style="list-style-type: none"> ■ Main leadership by the health sector but with an increasing recognition of the importance of a multisectoral approach involving the agriculture sector. ■ Greater responsibility in malnutrition reduction assumed by social cluster ministries.
Cameroon	<ul style="list-style-type: none"> ■ Creation of the Interdepartmental Committee for Food Security in 2009, comprising 19 ministries and chaired by the secretary general of the prime minister's office. ■ A network of "parliamentarians for the fight against malnutrition." ■ Extensive nutrition regulation. 	<ul style="list-style-type: none"> ■ Development of a food and nutrition policy in 2006, setting out concrete actions to improve nutrition levels. ■ Integration of nutrition within the National Food Security Program and the National Agriculture Investment Plan. ■ Member of SUN since 2013. 	<ul style="list-style-type: none"> ■ Leadership by the health sector but with an increasing recognition of the importance of a multisectoral approach involving the agriculture sector.
Ethiopia	<ul style="list-style-type: none"> ■ Creation of the National Nutrition Coordination Body in 2008 led by the Federal Ministry of Health. ■ Expanding Productive Safety Net Program for food security with food support and employment components. 	<ul style="list-style-type: none"> ■ Implementation of the Enhanced Outreach Strategy/Targeted Supplementary Feeding in 2004. ■ Establishment of the Productive Safety Net Programme in 2005. ■ Development of a national nutrition program in 2008, revised in 2013. ■ Member of SUN since 2010. 	<ul style="list-style-type: none"> ■ Multisectoral approach with increased responsibility of the Ministry of Agriculture.
Togo	<ul style="list-style-type: none"> ■ Creation of the Service National de Nutrition (SNN) within the Ministry of Health in October 1990. ■ Creation of a Nutritional Emergency Response unit within the SNN in 2007. ■ Extensive national legislation on nutrition. 	<ul style="list-style-type: none"> ■ Integration of nutrition in the Programme National de Sécurité Alimentaire. ■ Member of SUN since 2014. 	<ul style="list-style-type: none"> ■ Government's key programs led by the Ministry of Health. ■ Multisectoral approach with increased responsibility of the Ministry of Agriculture. ■ Shared responsibility for malnutrition reduction by involving the private sector through food fortification programs.



Between 2000 and 2016, Senegal made remarkable progress on undernutrition reduction. The GHI score fell from 38 in 2000 to 17 in 2016. The prevalence of stunting decreased from 30 percent to 19 percent over the same period. These improvements in nutrition have been driven in large part by significant institutional and programmatic commitment by the Senegalese government.

Institutional

Drawing on the experience of the Programme de Nutrition Communautaire (1994–2000), then executed through a private contractor, the Cellule de Lutte contre la Malnutrition (CLM) was created in 2001 within the prime minister’s office.⁶⁵ It provides technical assistance in the definition and implementation of the national nutrition policy. The CLM coordinates its activities with seven ministries—Health, Education, Economy and Finance, Decentralization, Trade, Industry, and Agriculture—and the National Association of Rural Advisors and civil society organizations. The main function of the CLM is to:

- Assist the prime minister in defining national nutrition policy and strategies;
- Review and agree on proposals for collaboration from the technical ministries in the implementation of the program;
- Facilitate a framework for consultation between technical ministries, nutrition policy entities, NGOs, and grassroots community organizations;
- Develop good synergy with other programs to fight poverty in general;
- Foster a policy to promote communication for behavioral change and good practices in the fight against malnutrition; and
- Contribute to the strengthening of national capacities for the effective conduct of nutrition programs.

To ensure the implementation of community nutrition interventions in the 14 regions it covers, the CLM has also set up a Bureau Exécutif National (BEN) in charge of programs and project management. Furthermore, Senegal joined the SUN Movement in 2011.

Programmatic

In 2002, the Programme de Renforcement de la Nutrition (PRN) was launched by the CLM. The program seeks to improve nutrition status and healthy development of children under the age of five living in poor urban or rural areas of Senegal, and to strengthen the institutional and organizational capacity to implement and evaluate nutrition interventions. PRN interventions are organized around six types of activities:

- A monthly weighing of the child from birth to age three, followed by advice given to the mother;
- Treatment of moderate cases of malnutrition through the distribution of fortified food and awareness activities for mothers, with severe cases referred to health services for treatment;

- Community-based distribution of products and medicines (mosquito nets, iron, vitamin A supplements);
- Information, Education and Communication (IEC) and Communication for Behavior Change for the promotion of key family practices;
- Support for community initiatives (such as mills and market gardening); and
- Provision of potable water.

To implement the PRN, the CLM relies on the Agences d’Exécution Communautaire (AEC) and ministries. The AEC is a network of community agencies, NGOs, and branches of local government, thus putting implementation into the hand of organizations already embedded in local communities. In 2006, an evaluation⁶⁶ of the impact of PRN was carried out by analyzing wasting rates between 2004 and 2006 in villages in the Fatick, Kaolack, and Kolda regions and within the PRN program. It was found that between 2004 and 2006 wasting rates decreased significantly more in the intervention villages (–34 percent) than in the control villages (–21 percent). The reduction in wasting was most pronounced for children of 6–11 months in the intervention villages (–52 percent), against a worsening trend in control villages (+3 percent).

While the health sector remains the lead sector tackling malnutrition in Senegal, there is evidence that making agriculture more nutrition-sensitive can improve nutrition outcomes. A study among pastoralists in northern Senegal has shown that using a dairy value chain approach to promote access to more nutritious food, in this case a micronutrient-fortified yogurt, can improve the nutritional status of preschool children.⁶⁷ With the introduction of the micronutrient-fortified yogurt, anemia prevalence dropped from a very high 80 percent to close to 60 percent. Furthermore, after one year, hemoglobin concentration increased by 0.55 g/dL more among children consuming micronutrient-fortified yogurt. However, this latter impact was greater for boys than for girls.

Another program, Yaajeende (Abundance),⁶⁸ has been developing biofortified varieties of millet, beans, and sweet potato since 2011, addressing micronutrient deficiencies including iron, zinc, and vitamin A. Yaajeende has been operating in Matam, Bakel, and Kédougou regions since 2011, and was introduced in Kolda in 2014. It is also promoting the adoption of conservation agriculture and sustainable land management techniques. The Yaajeende mid-term evaluation concluded that households and individuals living in villages in project intervention areas saw greater improvement in nutritional status indicators than those residing in non-project areas: stunting prevalence among children aged 6–59 months in project areas decreased from 23 percent before project implementation to 16 percent at the mid-term evaluation, while in the non-project areas, the stunting level decreased from 32 to 29 percent during the same period. The stunting rate reduction due the intervention was evaluated at more than 4 percent.



In 2008, Ghana was ranked among the 36 countries in the world with the highest burden of chronic childhood undernutrition.⁶⁹ However, the reduction of undernutrition levels since then has been substantial compared to other countries in West Africa. In 2006, Ghana was the first African country to achieve the target of cutting the proportion of the population living in extreme poverty by half, and by 2015 had halved the number of hungry people. This is backed up by the GHI score, which decreased from 30 to 14 between 2000 and 2016. Ghana also made significant progress in reducing the proportion of stunted, wasted, and underweight children during the same time.⁷⁰

Institutional

In Ghana, nutrition is well-integrated in the government's policy agenda, led through the Ministry of Health. However, instead of a national-level coordinating body specific to nutrition providing leadership on tackling malnutrition, it was the National Development Planning Commission (NDPC)—a body with oversight of all facets of development in Ghana—that ensured successful implementation and monitoring and evaluation of the National Nutrition Policy. From 2000, under President Kufuor, several health policies and regulations related to nutrition, including the Breastfeeding Promotion Regulation (L.11667), Food and Drugs Law (Public Health Act 851 of 2012), Vitamin A Policy, Anemia Strategy, and Infant and Young Child Feeding Strategy have been enforced.⁷¹

Programmatic

Nutrition is well-integrated in government programs⁷² and clearly highlighted in human development objectives under government policy frameworks such as the Ghana Poverty Reduction Strategy (GPRS I) issued in 2003, the Growth and Poverty Reduction Strategy (GPRS II) for the period 2006–2009, and the Ghana Shared Growth and Development Agenda (GSGDA) for 2010–2013. Although the policies have been largely donor-driven, the government has provided policy backing, personnel, facilities, and logistical support for their implementation. Based on strategic recommendations from the pilot programs, the government, in collaboration with development partners, scaled up interventions to other parts of the country. In 2011, Ghana joined the SUN Movement.

A multisectoral approach bringing together the Ministries of Health, Education, and Agriculture has been shown to be successful in malnutrition reduction.⁷³ In 2008, a five-year Integrated

Malnutrition, HIV/AIDS and Tuberculosis (TB) Prevention and Control project to reduce childhood illness and death was implemented in central and northern Ghana. The project's goals were to improve household food security and diet quality for children and families, access to quality health services, and a healthy environment and to support communities and institutions implementing programs to address malnutrition. Between 2009 and 2012, stunting rates decreased from 43 to 25 percent, exclusive breastfeeding increased from 63 to 75 percent, consumption of animal-source foods among young children increased from 43 to almost 60 percent, iodized-salt intake increased from 48 to 53 percent, and among pregnant women there was an increase in iron supplement consumption from 77 to 99 percent.

Another project, Nutrition Links,⁷⁴ aims at improving the health and economic well-being of vulnerable rural populations in the Upper Manya Krobo district (Eastern Region) of Ghana. The project develops small poultry businesses for egg production, home gardens, and weekly group meetings promoting nutrition and health education among women and their children. Technical assistance is available each week to address concerns about poultry health, productivity, and egg marketing as well as the community gardens. Before the program started, only 16 percent of all children had consumed eggs in the previous 24 hours; after the intervention, 27 percent of children had consumed eggs in the previous 24 hours. A positive change in egg consumption over time was more common among children of project beneficiaries (24 percent) compared to those of non-beneficiaries (12 percent). The project highlights that integrated financial, agriculture, and education interventions can improve young children's diets by increasing maternal income from small businesses, which can be used to purchase nutrient-rich foods, and expanding access to home-raised animal-source food products, such as eggs and milk.

In 2009, under a program called KOKO Plus,⁷⁵ a food supplement containing amino acids was added to *koko*—a porridge made from fermented corn—during cooking, providing additional nutrients for children. *Koko* is a traditional complementary food in Ghana. However, the levels of protein and micronutrients in traditional *koko* do not meet WHO's nutrient requirements and dietary recommendations. Results of a pilot study have shown that KOKO Plus was effective in preventing stunting. Moreover, a comparison of hemoglobin levels between children who received the product and ones who did not revealed that KOKO Plus is also effective in preventing anemia.



Following conflict in the 1990s, Rwanda's nutrition situation worsened dramatically. However, between 2000 and 2016, Rwanda made significant progress in terms of undernutrition reduction due to a recovered stability on the one hand, and the government's institutional and programmatic commitments on the other hand. The GHI score decreased from 59 in 2000 to 28 in 2016, while stunting rates fell from 48 to 38 percent over the same period.

Institutional

Since 1963, nutrition has been positioned as a unit within the Ministry of Health's Unit of Policies and Capacity Building. Nutrition services are offered at health centers across the country. From the mid-1990s, despite government efforts to improve nutritional status, malnutrition remained a major challenge and obstacle to Rwanda's development. In 2007, recognizing the multi-sectoral nature of nutrition, the government of Rwanda developed a National Nutrition Policy.⁷⁶ At the national level, the coordination bodies and implementation structures are composed of an intersectoral nutrition committee, which includes line ministries, NGOs, the Rwanda Bureau of Standards, the Rwandan Consumers Association, the Private Sector Federation, and the national nutrition technical working group. In 2013, Rwanda revised the National Nutrition Policy of 2007 and adopted the National Food and Nutrition Policy (NFNP). Coordination of overall NFNP implementation is situated in the prime minister's office, coordinated by an Inter-Ministerial Coordination Committee (IMCC) drawn from the Social Cluster Ministries (Ministry of Local Government, Ministry of Health, Ministry of Agriculture and Animal Resources, Ministry of Education, and Ministry of Gender and Family Promotion) that meets quarterly to review progress on tackling malnutrition.

Programmatic

In 2011, Rwanda joined the SUN Movement. Over the years, there has been coherence in the way nutrition strategies are developed and implemented. Many of the strategic areas and activities originally defined by the National Nutrition Policy (2007) have been retained in the National Food and Nutrition Policy (2013). The government also developed and implemented a three-year (2010–2013) National Multisectoral Strategy to Eliminate Malnutrition (NSEM). The objectives were to reduce all forms of malnutrition in Rwanda by 2013 and to protect nutrition of young children and pregnant and lactating women. All districts in Rwanda have adopted and implemented their own District Plan to Eliminate Malnutrition (DPEM), with involvement of all stakeholders.

Between 2000 and 2016, some of the key programs that were implemented included:

- Development and adoption of protocols for managing malnutrition and promotion of optimal infant and young child feeding (IYCN);
- Scaling-up of community-based nutrition programs (CBNP) in every district;
- National supplies of therapeutic food products for treating acute malnutrition; and

- Expansion of micronutrient-fortified staples and special food products to use in emergencies and food programs supplementing the most vulnerable.

As Rwanda adopted a multisectoral approach to tackling malnutrition in 2007, agricultural investment increased. Activities led by the Ministry of Agriculture and Animal Resources included:

- Implementation of the national strategy "One Cow, One Family";
- Promotion of production and consumption of fruits, vegetables, and mushrooms at household level; and
- Reinforcement of a nutrition surveillance system in collaboration with the Ministry of Health, including mapping of food insecure zones.

In addition, in 2009 the President's Initiative to Eliminate Malnutrition⁷⁷ was launched, led by the Ministry of Local Government with technical leadership of the Ministry of Health. More than 30,000 community health workers (CHWs) were trained over a two-month period in 2009 to carry out community-level actions outlined in the National Protocol for the Management of Malnutrition. Over five months, CHWs used circumference tapes to screen more than 1.3 million children across the country; more than 65,000 were referred and treated for moderate or severe acute malnutrition.

There is a strong recognition that making agriculture and the food system more nutrition sensitive is an effective strategy to reduce malnutrition. The Girinka program (One Cow, One Family) provides evidence that agriculture is a key sector in malnutrition reduction in Rwanda.⁷⁸ Within six months of the program's introduction in 2006, 248,566 cows had been distributed to poor households. Girinka has led to a significant improvement of the nutritional status of children under the age of five, with fewer children found to be wasted, stunted, and underweight than in 2012. Stunting, which remains the main nutritional challenge in Rwanda, decreased from 43 percent in 2012 to 37 percent in 2015.

In addition, as beans are the predominant staple crop in Rwanda, the Rwanda Agriculture Board, with the support of HarvestPlus, is scaling up the availability of biofortified beans.⁷⁹ The beans are iron-enriched and can be grown by rural communities. And their benefits are not limited to the nutritional outcomes: they achieve a higher yield, are virus resistant, and heat- and drought-tolerant. Farming households are trained in nutrition improvements, crop management, postharvest handling, and marketing. Public awareness campaigns are run across the country and leverage the influence of mass media and local icons, including popular musicians, to help raise awareness of micronutrient deficiencies and the benefits of eating and growing iron-biofortified beans. Regular consumption of iron beans provides up to half of daily iron needs. An evaluation revealed that consuming iron biofortified beans improves the iron status in Rwandan women after just 128 days with greater increases in hemoglobin (3.8 g/L), log serum ferritin (0.1 log mg/L), and BI (0.5 mg/kg).⁸⁰



Since the end of a 30-year civil war in 2002, Angola has seen considerable progress in terms of economic and social development, including its nutritional status. Compared to many southern African countries, Angola's progress has been remarkable in reducing malnutrition levels, with a decrease in its GHI score from 58 in 2000 to 33 in 2016. Beyond the recovered political stability, government institutional and programmatic commitments have played a key role in achieving these outcomes.

Institutional

In Angola, nutrition sits within its own unit, housed within the Ministry of Health's National Directorate of Public Health. Therefore, it is the health sector that is centrally involved in delivering on nutrition interventions. One of the major postwar institutional changes has been the adoption of a multisectoral approach for malnutrition reduction. Government agencies, specifically some of the key ministries, have assumed greater responsibility for coordinating nutrition and food-security activities. The Ministry of Agriculture has played a particularly important role, coordinating the development and implementation of the National Food Security and Nutrition Strategy (NFSNS) since 2009. In addition, the government has put in place the National Council on Food and Nutrition Security, linked to the office of the president, to coordinate all processes pertaining to the NFSNS.

Programmatic

In terms of programmatic changes, Angola has made a transition from focusing on emergency operations and humanitarian interventions to a more development-oriented approach to improving nutrition. The following programs have been led mainly by the Ministries of Health and Social Assistance and Reintegration:⁸¹

- Therapeutic Nutrition Centers and Community-based Management of Acute Malnutrition treating signs of acute malnutrition among children 6–59 months of age;
- Municipal Child Days, a biannual campaign that distributes vitamin A supplements and deworming tablets to children aged 6–59 months;
- A baby-friendly hospital initiative focusing on appropriate breastfeeding practices;
- Iron-folic acid (IFA) supplementation for pregnant women, providing IFA supplements as part of an antenatal care program;
- Supplementary Feeding Program for HIV-affected orphans, providing supplementary food to children orphaned by HIV/AIDS;
- Community Infant Centers for milk and porridge provision to malnourished infants; and
- Nutrition Surveillance System for collecting regular and representative primary nutritional data.

There is evidence that nutrition programs have effectively contributed to malnutrition reduction in Angola. In 2003, a 10-year program of food fortification was initiated to produce fortified maize meal.⁸² The program's objective was to combat the persistent occurrence of pellagra, a micronutrient-deficiency disease found among people whose diets are dominated by maize and which was widespread in Angola after the war. The vitamin premix consisted of niacin, thiamine, riboflavin, folic acid, pyridoxine, and iron. Within one year, the production of the fortified maize meal reached 4 tons per hour and, by 2006, almost 10,000 tons of fortified maize meal had been produced. Approximately 115,000 people received the meal every month.

In addition, a multisectoral program was launched in 2009 to reduce hunger and malnutrition among poor and vulnerable groups. The Joint Programme,⁸³ implemented in Bie, Moxico, and Cunene provinces, brought together different stakeholders to strengthen capacities at the community level to mitigate hunger and malnutrition, to increase advocacy for the protection of children from the adverse effects of rising food prices, and to improve the research on and monitoring and evaluation of food and nutrition of children in beneficiary areas. The program revitalized health services by extending nutrition services in the three provinces. As a result, there was a 20 percent increase in the detection rate of severely malnourished children between 2010 and 2011, and a 60 percent increase between 2011 and 2012, facilitating the treatment of severe and acute malnutrition. The program also provided vitamin A supplementation and deworming for children under five years of age. Coverage of vitamin A supplementation increased from 75 percent in 2010 to 85 percent in 2011, and deworming rates from 82 to 88 percent.

Another program, the Community-based Management of Acute Malnutrition Program,⁸⁴ was launched in 2012 to address acute malnutrition at the community level, targeting families living in rural areas more than 3 kilometers away from the nearest health center. In the four most drought-affected provinces, volunteer community health activists were trained by the Ministry of Public Health to identify and initiate treatment for children with early signs of acute malnutrition. More than 2,000 community health activists were trained under the program to screen children, provide treatment and referrals, and deliver nutrition education. Severely malnourished children who showed medical complications were referred to in-patient facilities, known as Stabilization Centres, for more intensive treatment. Children with moderate acute malnutrition received take-home rations and basic health services. At the end of 2013, the program had been successfully implemented, with coverage estimated at 82 percent in areas reached by the program and the cure rate for severe acute malnutrition estimated at 94 percent.



From 2000 to 2016, Cameroon made substantial progress in reducing malnutrition levels. Cameroon decreased its GHI score from 40 to 23 during that period, which was characterized by institutional and programmatic changes.

Institutional

In the 1990s, nutrition levels deteriorated in Cameroon due to economic crises and the HIV/AIDS pandemic. There was no clear government policy to address rising malnutrition levels. However, in 2001 the government took concrete measures, notably including food security and nutrition in its health-sector strategy.

Recognizing the importance of a multisectoral approach to malnutrition reduction, in 2009 the Interdepartmental Committee for Food Security, comprising 19 ministries and chaired by the secretary general of the prime minister's office, was created.⁸⁵ Its mission was to develop a coherent policy strategy for food security actions and the implementation of the National Food Security Program (PNSA). A network of "parliamentarians for the fight against malnutrition," as well as regulation on the marketing of breast-milk substitutes, food fortification, and maternity leave, have been put in place.

Programmatic

In 2006, reflecting the government's commitment, the food and nutrition policy was implemented in the form of a program aimed at improving Cameroon's food and nutrition profile through:⁸⁶

- Promotion of breastfeeding and food hygiene;
- The fight against malnutrition and micronutrient deficiencies and prevention of noncommunicable diseases related to nutrition;
- Nutritional support for vulnerable groups and individuals living with HIV/AIDS; and

- Food security and training and employment of qualified professionals in the field of nutrition.

Nutrition is also well integrated in the PNSA 2010–2015, which includes a support component for production and nutrition education to raise awareness of the consumption of food with a high nutritional value, and in the National Agriculture Investment Plan (PNIA) 2014–2020. In 2013, Cameroon joined the SUN Movement.

Direct interventions in Cameroon have proven to have great impact on malnutrition reduction. In 2011, Cameroon instituted a mandatory food-fortification program.⁸⁷ The program includes the addition of vitamin A to refined vegetable oil and the addition of iron, zinc, folic acid, and vitamin B12 to wheat flour. In 2012, an evaluation of the impact of the fortification program was conducted in Yaoundé and Douala. Greater iron, zinc, folate, and vitamin B12 status and a lower prevalence of deficiencies of these micronutrients among women of reproductive age and children aged 12–59 months were observed, as well as a slightly lower prevalence of anemia among women, one year after the introduction of mandatory wheat-flour fortification.

However, there is evidence that traditional dishes in Cameroon are contributing significantly to addressing malnutrition. A study was conducted to determine the nutrient content of some traditional dishes and their potential contribution to dietary reference intakes.⁸⁸ These dishes were *ekomba*, prepared from maize flour with roasted-peanut paste; *ekwang*, prepared from crushed cocoyam tubers and cocoyam leaves; *tenue militaire*, prepared from dried maize flour and cocoyam leaves; and *koki*, prepared from dried crushed cowpea seeds. It was found that 100 grams of each dish eaten by children aged one or two years can provide more than 100 percent of their daily recommended vitamin A intake.



Between 2000 and 2016, Ethiopia made significant progress in reducing malnutrition levels. Stunting rates declined from 57 percent in 2000 to 40 percent in 2014, and Ethiopia's GHI score decreased from 59 to 33 during the same period, largely due to increased stability and government commitment to reducing malnutrition, reflected both at the institutional and programmatic level.

Institutional

Institutional reform to address malnutrition in Ethiopia started in 1987 with the creation a nutrition unit situated within the Ministry of Finance and Economic Development, the country's intersectoral coordinating ministry, inspired by the success of the Joint WHO/UNICEF Nutrition Support Programme (JNSP) in Tanzania. However, with a change of government, the unit was disbanded in 1991. Between 1991 and 2008, various institutions took the lead on nutrition policy: emergency nutrition by the Disaster Prevention and Preparedness Agency (DPPA), micronutrients by the Ministry of Health (MoH), and other programs facilitated by development partners. In 2008, the government adopted a multisectoral approach to alleviate malnutrition. One of the major institutional changes was the creation the National Nutrition Coordination Body⁸⁹ (NNCB) led by the Federal Ministry of Health, now the main mechanism for leadership, policy decisions, and coordination of the National Nutrition Programme. The NNCB includes government sectors, development partners, civil society organizations, academia, and the private sector.

Programmatic

Prior to 2008, the health sector was the lead in tackling malnutrition in Ethiopia, which joined the SUN Movement in 2010. Recently, many well-funded agricultural programs have been developed to improve nutrition. Between the late 1990s and the early 2000s, the Ethiopian government introduced health programs, which were not nutrition-focused but did include promotive and preventive healthcare that took aspects of nutrition into account. In 2004, the first national program, Enhanced Outreach Strategy/Targeted Supplementary Feeding, was established in Ethiopia to link community-based preventive health services with a ration of supplementary food for women and children identified as malnourished. In 2005, the government of Ethiopia also established the Productive Safety Net Programme to enable the rural poor facing chronic food insecurity to resist shocks, create assets, and become food self-sufficient.⁹⁰ In addition, in 2008, the government developed a National Nutrition Program⁹¹ (NNP) with the aim of ensuring adequate nutritional status for all Ethiopians in a sustainable manner by targeting the most vulnerable—children under the age of five, pregnant and lactating women, and adolescents. The NNP gives priority to the rural population while recognizing that significant malnutrition exists in low-income urban areas.

Key nutrition activities of the NNP included:

- Health Extension Programme;
- Promotion of Essential Nutrition Actions;
- Community-based Nutrition;
- Therapeutic Feeding Programme; and
- Enhanced Outreach Strategy and Targeted Supplementary Feeding.

Launched in 2008, Community-based Nutrition (CBN) is one of the key nutrition activities of the NNP.⁹² CBN is focused on children under the age of two and uses monthly growth-monitoring and promotion to involve families and community members in assessing health- and nutrition-related issues, analyzing the underlying causes, taking action, and monitoring progress. Other important processes of CBN include referral of severely underweight children to therapeutic feeding units or outpatient therapeutic programs; control of micronutrient deficiencies through biannual vitamin A supplementation and deworming; and quarterly screening for acute malnutrition through Community Health Days. Initial analysis of routine program data from 1.5 million children under the age of two, weighed in four regions, showed a decline in underweight from 30 percent in January 2009 to 20 percent in March 2010.

In Ethiopia, the multisectoral approach appears to be effective in undernutrition reduction. The Empowering the New Generation to Improve Nutrition and Economic Opportunities project (ENGINE)⁹³ operated in the Amhara, Tigray, Oromia, Southern Nations, Nationalities, and People's Region (SNNPR), and the Somali regions of Ethiopia between 2011 and 2016. ENGINE developed a comprehensive package of support to help Ethiopia's most vulnerable households overcome the barriers that prevented access to quality food and to address the cultural, gender, and other social drivers of malnutrition. ENGINE trained health and agriculture workers who introduced beneficiaries—Ethiopia's most vulnerable households—to homestead gardening of nutrient-dense vegetables and fruits, animal husbandry, and meal preparation using the crops and animal products they farmed. The project provided beneficiaries with essential farming tools, seeds, and livestock and provided financial training and support through village savings groups. ENGINE interventions resulted in a stunting decline of 20 percent in Amhara, 14 percent in SNNPR, and 12 percent in Oromia. The prevalence of underweight children also declined. In addition, the initiation of breastfeeding within a child's first hour increased by 27 percent or more in all three regions; the prevalence of maternal malnourishment as measured by body mass index decreased by 9 percent in Amhara and 6 percent in SNNPR; the proportion of women with low dietary diversity decreased by 25 percent in Oromia; and the proportion of women who took iron-folate supplements during their last pregnancy increased by 126 percent in all three regions.

Between 2008 and 2012, the Ethiopia Productive Safety Net Programme, a large-scale social protection intervention aimed at improving food security and stabilizing asset levels through a mix of public-works employment and unconditional cash and food transfers, successfully improved household food security.⁹⁴ The program may provide a basis for further strengthening nutrition impact, if combined with action for intensified contact of mothers through health extension workers and information on good feeding practices and sanitation.



After a long period marked by socio-political instability prior to 2000, Togo has made significant progress in terms of reducing malnutrition levels. While the reduction in stunting levels was moderate, with a decrease of just 6 percentage points, from 33 to 28 percent, the level of wasting was nearly halved, from 11 to 7 percent, between 2000 and 2016. Togo's GHI score decreased from 39 in 2000 to 22 in 2016. The government's institutional and programmatic commitment have in part driven this impressive performance.

Institutional

The importance of institutional change for malnutrition reduction was recognized by the Togolese government with the creation of the Service National de Nutrition (SNN) within the Ministry of Health in October 1990. However, prior to 2006 the SNN had no clear mission, and operated without a strategic plan to guide and implement its interventions. Following the 2007 nutrition crisis, the government made SNN a priority, and to strengthen the fight against malnutrition further, it created a Nutritional Emergency Response unit within the SNN. National legislation on nutrition is extensive and includes, for example, laws on food fortification (salt, oil, and wheat flour). Furthermore, a multisectoral approach has been adopted to tackle malnutrition by involving the agricultural sector.

Programmatic

In 2014, Togo joined the SUN Movement. The Plan Stratégique National d'Alimentation et de Nutrition,⁹⁵ which ran from 2012 to 2015 and was led by the Ministry of Health, formed one of the government's key programs for tackling malnutrition. The main elements of the program included:

- Promotion of nutrition and nutritional education and strengthening the implementation of infant and young child feeding;
- Prevention and management of acute malnutrition in the Center for Nutrition Recovery and Education/Health facilities and through a community approach;

- Feeding adolescent women, pregnant women, and lactating women;
- School feeding and nutrition interventions; and
- Management of acute malnutrition.

Additionally, the Ministry of Agriculture ensures food diversification and safety through the Programme National d'Investissement Agricole et de Sécurité Alimentaire and the Programme d'Appui à la Diversification Agricole.⁹⁶

The government has also been implementing innovative interventions across the country to improve the health and nutritional status of children.⁹⁷ In 2011, to reduce morbidity and mortality rates among children under age five in the Savannah and Kara regions, community-based high-impact interventions were implemented. The Integrated Management of Newborn Diseases and the Child program trained more than 1,000 community health workers, from villages over 5 kilometers away from the nearest health center, to recognize early signs of childhood illnesses and to either refer patients to community health facilities or to treat some of the most common illnesses, such as malaria, diarrhea, colds, pneumonia, and acute malnutrition, on site.

Furthermore, the implementation of national legislation on food fortification in Togo has ensured that more fortified foods, such as oils, are made available to consumers. A Togolese company, Nioto, manufactures edible oils that meet international standards from local and imported raw materials.⁹⁸ To ensure the quality of its products throughout the production process—from receipt of raw materials to packaging—Nioto works through a well-equipped laboratory and in coordination with other local or international laboratories. Since 2009 the oils have been enriched with vitamin A. Their consumption makes it possible to largely cover 40 IU/g, or 30 percent, of the daily vitamin A requirements recommended by UNICEF and WHO.

Conclusion

African governments can successfully reduce malnutrition, as illustrated by the case studies presented in this report. What is required are policies and interventions that go beyond just increasing agricultural production to making actual improvements in the provision and quality of diets, leveraging the potential of the agriculture sector, and in other rural services such as health, water, sanitation, and hygiene. Only then will it be possible to deliver on the African Union's aspiration of "a prosperous Africa based on inclusive growth and sustainable development" and, in particular, its Malabo Declaration commitment on nutrition.

Much progress has been made across the continent, but climate change and protracted crises, coupled with urbanization and a growing double burden of obesity and undernutrition, are threatening to undermine these achievements. Concerted efforts for peace and security are a precondition for nutritional improvement in parts of Africa.

There is now a window of opportunity with renewed interest of governments and development partners in nutrition to help deliver on national, continental, and international obligations and targets. Nutrition needs to be prioritized and be at the heart of all efforts to deliver on the African Union's Agenda 2063 and the Malabo Declaration targets. This is required for African countries to deliver on the 2030 Sustainable Development Agenda and the UN Decade of Action on Nutrition.

Several common features distinguish some African countries that have made significant progress toward reducing malnutrition. These countries have all been able to carry out successful interventions at the political, institutional, and programmatic level to:

1 Adopt a comprehensive policy on nutrition as a top priority.

2 Create a broad partnership dedicated to nutrition among key groups of actors.

3 Set up mechanisms to coordinate a coherent agenda on nutrition across government.

4 Invest in crisis prevention and emergency intervention capacities to address the threat of conflict to malnutrition reduction.

5 Invest in programs to protect the nutritional status of vulnerable populations during extreme weather events.

6 Strengthen food-system regulation and controls to raise the supply of safe and nutritious food.

7 Strengthen national agricultural and nutrition research to expand biofortification and other nutrient enrichment programs.

8 Expand access to nutrition education to ensure long-term positive changes in dietary patterns.

9 Support collective action and other initiatives that enhance the leadership role of women in the area of nutrition.

10 Invest in the availability and use of better data for more effective interventions.

11 Design programs that capture the synergies among agriculture, water, health, and sanitation to maximize the impact on nutrition.

12 Pay urgent attention to obesity and interventions to curb it in nutrition policies.

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